



INSTITUTE OF AGRICULTURAL ECONOMICS, BELGRADE, SERBIA

SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT IV

Book of Abstracts



Belgrade, December 2023

INSTITUTE OF AGRICULTURAL ECONOMICS BELGRADE

Volgina Street no. 15, 11060 Belgrade, Serbia

Phone/Fax: +381 (0) 11 69 72 858

Phone: +381 (0) 11 69 72 848



E-mail:

office@iep.bg.ac.rs

Internet address:

www.iep.bg.ac.rs



International Scientific Conference

SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT IV

BOOK OF ABSTRACTS

December, 2023

Belgrade, Serbia

Publisher:

Institute of Agricultural Economics, Belgrade, Serbia

Editors:

Jonel Subić, Ph.D.

Miroslav Nedeljković, Ph.D.

Marijana Jovanović Todorović, Ph.D.

Jean Vasile Andrei, Ph.D.

Technical arrangement and printing:

SZR NS MALA KNJIGA +

Zetska Street no. 15,

21000 Novi Sad, Republic of Serbia,

Phone: +381 21 64 00 578

Technical preparation and typesetting:

Vladimir Sokolović

Printing: 200

ISBN 978-86-6269-132-3

ISBN (e-book) 978-86-6269-133-0

The publisher is not responsible for the content of the abstracts of scientific papers and opinions published in the Book of Abstracts.

They represent the authors' point of view.

Publication of Book of Abstracts was financially supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia.

Organizers

INSTITUTE OF AGRICULTURAL ECONOMICS, BELGRADE - SERBIA

Co-organizers

NATIONAL TEAM FOR THE REVIVAL OF SERBIAN VILLAGES, BELGRADE - SERBIA

CHAMBER OF COMMERCE AND INDUSTRY OF SERBIA, BELGRADE - SERBIA

COUNCIL FOR SMART AGRICULTURE - CHAMBER OF COMMERCE AND INDUSTRY OF BELGRADE, BELGRADE - SERBIA

ACADEMY OF ENGINEERING SCIENCES OF SERBIA, DEPARTMENT OF BIOTECHNOLOGICAL SCIENCES, BELGRADE - SERBIA

FACULTY OF AGRICULTURE, BELGRADE - SERBIA

FACULTY OF AGRICULTURE, NOVI SAD - SERBIA

FACULTY OF AGRICULTURE, KRUŠEVAC - SERBIA

FACULTY OF ECONOMICS, BELGRADE - SERBIA

FACULTY OF ECONOMICS, SUBOTICA - SERBIA

FACULTY OF ECONOMICS, KRAGUJEVAC - SERBIA

FACULTY OF ECONOMICS, KOSOVSKA MITROVICA - SERBIA

FACULTY OF HOTEL MANAGEMENT AND TOURISM, UNIVERSITY OF KRAGUJEVAC, VRNJAČKA BANJA - SERBIA

FACULTY OF APPLIED MANAGEMENT, ECONOMICS AND FINANCE (MEF), BELGRADE - SERBIA

FACULTY OF ECONOMICS AND ENGINEERING MANAGEMENT, UNIVERSITY BUSINESS ACADEMY, NOVI SAD - SERBIA

FACULTY FOR BIOFARMING, MEGATREND UNIVERSITY, BAČKA TOPOLA - SERBIA

FACULTY OF AGRONOMY IN ČAČAK, UNIVERSITY OF KRAGUJEVAC, ČAČAK - SERBIA

EUROPEAN UNIVERSITY, BELGRADE - SERBIA

UNIVERSITY "ALFA BK", BELGRADE - SERBIA

UNIVERSITY "SINGIDUNUM", BELGRADE - SERBIA

UNIVERSITY "UNION - NIKOLA TESLA", BELGRADE - SERBIA

UNIVERSITY "EDUCONS", NOVI SAD - SERBIA

INSTITUTE "MIHAJLO PUPIN", BELGRADE - SERBIA

INSTITUTE OF ECONOMIC SCIENCES, BELGRADE - SERBIA

INSTITUTE FOR SCIENCE APPLICATION IN AGRICULTURE, BELGRADE - SERBIA

INSTITUTE OF FORESTRY, BELGRADE - SERBIA

INSTITUTE OF FIELD AND VEGETABLE CROPS, NOVI SAD - SERBIA

INSTITUTE FOR BIOLOGICAL RESEARCH "SINIŠA STANKOVIĆ", BELGRADE - SERBIA

INSTITUTE FOR PLANT AND ENVIRONMENT PROTECTION, BELGRADE - SERBIA

MAIZE RESEARCH INSTITUTE ZEMUN POLJE, BELGRADE - SERBIA

FRUIT RESEARCH INSTITUTE, ČAČAK - SERBIA

INSTITUTE FOR VEGETABLE CROPS, SMEDEREVSKA PALANKA - SERBIA
INSTITUTE OF INFORMATION TECHNOLOGIES, KRAGUJEVAC - SERBIA
INSTITUTE FOR SOIL SCIENCE, BELGRADE - SERBIA
INSTITUTE FOR FORAGE CROPS, KRUŠEVAC - SERBIA
NOVI SAD BUSINESS SCHOOL, NOVI SAD - SERBIA
ACADEMY OF VOCATIONAL STUDIES IN ŠUMADIJA, ARANĐELOVAC DEPARTMENT,
ARANĐELOVAC - SERBIA
ASSOCIATION OF THE ECONOMIST OF BELGRADE, BELGRADE - SERBIA
DEVELOPMENT ACADEMY OF SERBIAN AGRICULTURE (RAPS), BELGRADE - SERBIA
BALKAN SCIENTIFIC ASSOCIATION OF AGRICULTURAL ECONOMISTS, BELGRADE
- SERBIA
SERBIAN ASSOCIATION OF AGRICULTURAL ECONOMISTS (DAES), BELGRADE -
SERBIA
COOPERATIVE UNION OF SERBIA, BELGRADE - SERBIA
COOPERATIVE UNION OF VOJVODINA, NOVI SAD - SERBIA
AGRICULTURAL CHEMICAL HIGH SCHOOL IN OBRENOVAC, BELGRADE - SERBIA
FACULTY OF AGRO-FOOD AND ENVIRONMENTAL ECONOMICS, BUCHAERST
UNIVERSITY OF ECONOMIC STUDIES, BUCHAREST - ROMANIA
CENTER FOR STUDY AND RESEARCH FOR AGROFORESTRY BIODIVERSITY,
BUCHAREST - ROMANIA
NATIONAL INSTITUTE FOR ECONOMIC RESEARCH “COSTIN C. KIRITESCU”,
ROMANIAN ACADEMY, BUCHAREST - ROMANIA
UNIVERSITY OF AGRONOMIC SCIENCES AND VETERINARY MEDICINE OF
BUCHAREST (USAMV), BUCHAREST - ROMANIA
RESEARCH CENTRE FOR SUSTAINABLE RURAL DEVELOPMENT OF ROMANIA,
ROMANIAN ACADEMY, TIMISOARA - ROMANIA
FACULTY OF MANAGEMENT AND RURAL TOURISM, UNIVERSITY OF LIFE SCIENCES
“KING MIHAI I”, TIMISOARA - ROMANIA
UNIVERSITY OF BJELJINA, BJELJINA - BOSNIA AND HERZEGOVINA
FEDERAL INSTITUTE OF AGRICULTURAL ECONOMICS, RURAL AND MOUNTAIN
RESEARCH, VIENNA - AUSTRIA
INSTITUTE OF AGRICULTURAL ECONOMICS, SOFIA - BULGARIA
NATIONAL INSTITUTE FOR ECONOMIC RESEARCH, CHISINAU - MOLDOVA
INSTITUTE OF AGRICULTURAL ECONOMICS, BUCHAREST - ROMANIA
THE RESEARCH INSTITUTE FOR AGRICULTURE ECONOMY AND RURAL
DEVELOPMENT (ICEADR), BUCHAREST - ROMANIA
BALKAN ENVIRONMENTAL ASSOCIATION (B.EN.A.), THESSALONIKI - GREECE
RESEARCH NETWORK ON RESOURCES ECONOMICS AND BIOECONOMY (RebResNet),
PLOIESTI – ROMANIA
DIGITAL ECONOMY RESEARCH CENTER, CHONGQING INSTITUTE OF HIT,
CHONGQING - CHINA
STAVROPOL STATE AGRARIAN UNIVERSITY, STAVROPOL – RUSSIAN FEDERATION

HONORARY BOARD

- *Jelena Begović*, Ph.D., Minister of Science, Technological Development and Innovation of the Republic of Serbia.
- *Jelena Tanasković*, Minister of Agriculture, Forestry and Water Management of the Republic of Serbia.
- *Milan Krkobabić*, Minister of Rural Welfare, Co-president of the National Team for the Survival of Serbian Villages.
- Academician *Dragan Škorić*, Ph.D., President of the Academic Committee for the Village of the Serbian Academy of Sciences and Arts (SANU), Co-president of the National Team for the Revival of Serbian Villages, Belgrade - Serbia.
- Academician *Ion Paun Otiman*, Ph.D., Honorary President of the Romanian Academy, Timisoara Branch, Timisoara - Romania.
- Prof. *Nicolae Istudor*, Ph.D., Rector of the Bucharest University of Economic Studies, Bucharest - Romania.
- Prof. *Alexandru Stratan*, Ph.D., Rector, National Institute for Economic Research, Chisinau - Moldova.
- Prof. *Vladimir Simikov*, Ph.D., Rector of the Stavropol State Agrarian University, Stavropol - Russian Federation.
- *Marko Čadež*, President of the Chamber of Commerce and Industry of Serbia, Belgrade - Serbia.
- Prof. *Miroslav Trajanović*, Ph.D., State Secretary in the Ministry of Science, Technological Development and Innovation of Republic Serbia.
- *Vukašin Grozdić*, Ph.Ds., State Secretary in the Ministry of Science, Technological Development and Innovation of Republic Serbia.
- *Marina Soković*, Ph.D., Assistant Minister in the Ministry of Science, Technological Development and Innovation of the Republic of Serbia.
- *Vladimir Radovanović*, M.Sc., Assistant Minister in the Ministry of Science, Technological Development and Innovation of the Republic of Serbia.
- *Vedrana Ilić*, Assistant Minister in the Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia.
- *Aleksandar Bogičević*, Assistant Minister in the Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia.
- Prof. *Zorica Vasiljević*, Ph.D., President of Steering committee of IAE, Belgrade - Serbia.
- Prof. *Aleksandar Rodić*, Ph.D., Member of Steering committee of IAE and Head of Robotics Department, Institute „Mihailo Pupin“, Belgrade - Serbia.
- Prof. *Zora Dajić Stevanović*, Ph.D., Member of Steering committee of IAE and Professor at the Faculty of Agriculture, Belgrade – Serbia.
- *Maja Ignjatov*, Ph.D., Member of Steering committee of IAE and Researcher at the Institute of Field and Vegetable Crops, Novi Sad - Serbia.
- Prof. *Snežana Janković*, Ph.D., Council for Smart Agriculture - Chamber of Commerce and Industry of Belgrade, Belgrade - Serbia.
- Prof. *Mirjana Šijaić Nikolić*, Ph.D., Head of Department of Biotechnological Sciences, Academy of Engineering Sciences of Serbia, Belgrade - Serbia.
- Prof. *Tomo Milošević*, Ph.D., Dean of Faculty of Agronomy, Čačak - Serbia.

- Prof. *Snežana Bogosavljević Bošković*, Ph.D., Faculty of Agronomy, Čačak - Serbia.
- Prof. *Nedeljko Tica*, Ph.D., Dean of the Faculty of Agriculture, Novi Sad - Serbia.
- Prof. *Dušan Živković*, Ph.D., Dean of the Faculty of Agriculture, Belgrade - Serbia.
- Prof. *Ivan Filipović*, Ph.D., Dean of the Faculty of Agriculture, Kruševac - Serbia.
- Prof. *Žaklina Stojanović*, Ph.D., Dean of the Faculty of Economics, Belgrade - Serbia.
- Prof. *Milena Jakšić*, Ph.D., Dean of the Faculty of Economics, Kragujevac - Serbia.
- Prof. *Nebojša Gvozdrenović*, Ph.D., Dean of the Faculty of Economics, Subotica - Serbia.
- Prof. *Drago Cvijanović*, Ph.D., Dean of the Faculty of Hotel Management and Tourism, University of Kragujevac, Vrnjačka Banja - Serbia.
- Prof. *Aleksandar Andrejević*, Ph.D., Rector of the University „EDUCONS“, Novi Sad - Serbia.
- Prof. *Gorica Cvijanović*, Ph.D., Dean of the Faculty for Bio-farming, Megatrend University, Bačka Topola - Serbia.
- Prof. *Tatjana Brankov*, Ph.D., President of Serbian Association of Agricultural Economists, Belgrade - Serbia.
- Prof. *Dragan Soleša*, Ph.D., Rector of the University Business Academy, Novi Sad - Serbia.
- Prof. *Maja Ćuk*, Ph.D., Rector of the University ”Alfa BK”, Belgrade - Serbia.
- Prof. *Goranka Knežević*, Ph.D., Rector of the University “Singidunum”, Belgrade - Serbia.
- Prof. *Nebojša Zakić*, Ph.D., Rector of the University „Union - Nikola Tesla“, Belgrade - Serbia.
- Prof. *Tomislav Brzaković*, Ph.D., Dean of the Faculty of Applied Management, Economics and Finance, Belgrade - Serbia.
- Prof. *Marko Carić*, Ph.D., Dean, Faculty of Economics and Engineering Management, University Business Academy, Novi Sad - Serbia.
- Prof. *Milija Zečević*, Ph.D., Rector, European University, Belgrade - Serbia.
- Prof. *Nikola Milićević*, Ph.D., Faculty of Economics, Subotica - Serbia.
- Prof. *Nikola Tomašević*, Ph.D., Director, Institute Mihajlo Pupin, Belgrade - Serbia.
- *Jovan Zubović*, Ph.D., Director, Institute of Economic Sciences, Belgrade - Serbia.
- *Rade Jovanović*, Ph.D., Director, Institute for Appliance of Science in Agriculture, Belgrade - Serbia.
- *Miodrag Tolimir*, Ph.D., Director, Maize Institute “Zemun Polje”, Belgrade - Serbia.
- *Mirjana Mihailović*, Ph.D., Director of Institute for Biological Research “Siniša Stanković”, Belgrade - Serbia
- *Ljubinko Rakonjac*, Ph.D., Director, Institute of Forestry, Belgrade - Serbia.
- Prof. *Jegor Miladinović*, Ph.D., Director, Institute of Field and Vegetable Crops, Novi Sad - Serbia.
- *Darko Jevremović*, Ph.D., Director, Fruit Research Institute, Čačak - Serbia.
- Prof. *Nenad Đurić*, Ph.D., Director, Institute for Vegetable Crops, Smederevska Palanka - Serbia.
- *Nenad Trkulja*, Ph.D., Director, Institute for Plant and Environmental Protection, Belgrade - Serbia.
- Prof. *Đorđe Mihailović*, Ph.D., Academy of Vocational Studies in Šumadija, Aranđelovac - Serbia.
- *Igor Saveljić*, Ph.D., Director, Institute of Information Technologies, Kragujevac - Serbia.
- *Mira Milinković*, Ph.D., Director, Institute for Soil, Belgrade - Serbia.
- *Dejan Sokolović*, Ph.D., Acting Director, Institute for Forage Crops, Kruševac - Serbia.
- *Milan Beslač*, Ph.D., Serbia, Faculty of Business Economics and Entrepreneurship, Belgrade - Serbia.
- Prof. *Jelena Damjanović*, Ph.D., Director, Novi Sad Business School, Novi Sad - Serbia.

- Prof. *Gojko Rikalović*, Ph.D., President, Association of the Economists of Belgrade, Belgrade - Serbia.
- Prof. *Mihailo Ostojić*, Ph.D., President, Council of Development Academy of Serbian Agriculture (RAPS), Belgrade - Serbia.
- Prof. *Radovan Pejanović*, Ph.D., Honorary President of Balkan Scientific Association of Agricultural Economist, Belgrade - Serbia.
- Prof. *Goran Maksimović*, Ph.D., President of Balkan Scientific Association of Agricultural Economist, Belgrade - Serbia.
- *Aleksandar Bogunović*, Secretary of the Association for Plant Production and Food Industry - Chamber of Commerce and Industry of Serbia, Belgrade - Serbia.
- *Miodrag Veseli*, Council for Smart Agriculture - Chamber of Commerce and Industry of Belgrade, Belgrade - Serbia.
- *Željko Ilić*, Director, Agricultural-Chemical High School in Obrenovac, Belgrade - Serbia.
- *Nikola Mihailović*, President, Cooperative Union of Serbia, Belgrade - Serbia.
- *Jelena Nestorov Bizonj*, President of the Cooperative Union of Vojvodina, Novi Sad - Serbia.
- *Mariana Golumbeanu*, Ph.D., Vice president of the Balkan Environmental Association (B.EN.A.), Thessaloniki - Greece.
- Prof. *Klaus Wagner*, Ph.D., Director of the Federal Institute of Agricultural Economics, Rural and Mountain Research, Vienna - Austria.
- Prof. *Luminita Chivu*, Ph.D., Director, National Institute for Economic Research “Costin C. Kiritescu”, Romanian Academy, Bucharest - Romania.
- Prof. *Gabriel Popescu*, Ph.D., Director of the Center for Study and Research for Agroforestry Biodiversity (CSCBAS), Bucharest - Romania.
- Prof. *Mirela Stoian*, Ph.D., Dean, Faculty of Agro-Food and Environmental Economics, Bucharest University of Economic Studies, Bucharest - Romania.
- Prof. *Ioan Brad*, PhD, Dean, Faculty of Management and Rural Tourism, University of Life Sciences “King Mihai I”, Timisoara - Romania.
- Prof. *Nicoleta Mateoc Sirb*, Ph.D., Director, Research Centre for Sustainable Rural Development of Romania, Romanian Academy, Timisoara - Romania.
- Prof. *Andrei Jean Vasile*, Ph.D., President of the Research Network on Resources Economics and Bioeconomy (RebResNet), Ploiesti - Romania.
- Prof. *Razvan Papuc*, Ph.D., Dean, Faculty of Administration and Business, University of Bucharest, Bucharest - Romania.
- Prof. *Sorin Mihai Cimpeanu*, Ph.D., Rector, University of Agronomic Sciences and Veterinary Medicine of Bucharest (USAMV), Bucharest - Romania.
- *Cecilia Alexandri*, Ph.D., Director, Institute of Agricultural Economics, Bucharest - Romania.
- Prof. *Božidar Ivanov*, Ph.D., Director, Institute of Agricultural Economics, Sofia - Bulgaria.
- *Vili Dragomir*, Ph.D., Director, Institute for Agriculture Economics and Rural Development (ICEADR), Bucharest - Romania.
- Prof. *Agatha Popescu*, Ph.D., University of Agricultural Sciences and Veterinary Medicine of Bucharest, Bucharest - Romania.
- Prof. *Ljiljana Tomić*, Ph.D., Founder of the University of Bijeljina, Bijeljina - Bosnia and Herzegovina.
- Prof. *Boro Krstić*, Ph.D., Dean, Faculty of Agriculture, University of Bijeljina, Bijeljina - Bosnia and Herzegovina.

SCIENTIFIC BOARD

- Prof. *Jonel Subić*, Ph.D., Serbia - President
- Prof. *Wim Heijman*, Ph.D., the Netherlands
- Prof. *Adam Wasilewski*, Ph.D., Poland
- Prof. *Adrian Stancu*, Ph.D., Romania
- Prof. *Agnieszka Wrzochalska*, Ph.D., Poland
- Prof. *Albena Miteva*, Ph.D., Bulgaria
- Prof. *Aleksandar Ostojić*, Ph.D., Bosnia and Herzegovina
- Prof. *Aleksandra Despotović*, Ph.D., Montenegro
- Prof. *Alexandru Stratan*, Ph.D., Moldova
- Prof. *Andras Nabradi*, Ph.D., Hungary
- Prof. *Andreica Marin*, Ph.D., Romania
- Prof. *Anna Ivolga*, Ph.D., Russia
- Prof. *Blagica Sekovska*, Ph.D., Macedonia
- Prof. *Boro Krstić*, Ph.D., Bosnia and Herzegovina
- Prof. *Carmen Dobrota*, Ph.D., Romania
- Prof. *Catalin Dobrea*, Ph.D., Romania
- Prof. *Claudiu Cicea*, Ph.D., Romania
- Prof. *Cosmin Salasan*, Ph.D., Romania
- Prof. *Dan Boboc*, Ph.D., Romania
- Prof. *Donatella Privitera*, Ph.D., Italy
- Prof. *Dorel Dusmanescu*, Ph.D., Romania
- Prof. *Eirik Romstad*, Ph.D., Norway
- Prof. *Ferhat Čejvanović*, Ph.D., Bosnia and Herzegovina
- Prof. *Florentina Constantin*, Ph.D., Romania
- Prof. *Francisco J. Matus*, Ph.D., Chile
- Prof. *Gabriel Popescu*, Ph.D., Romania
- Prof. *Giuseppe Castaldelli*, Ph.D., Italy
- Prof. *Irina Gostin*, Ph.D., Romania
- Prof. *Irina Petrescu*, Ph.D., Romania
- Prof. *Ivo Grgić*, Ph.D., Croatia
- Prof. *Jean Vasile Andrei*, Ph.D., Romania
- Prof. *Jorde Jakimovski*, Ph.D., Macedonia
- Prof. *Julia Doitchinova*, Ph.D., Bulgaria
- Prof. *Karoly Bodnar*, Ph.D., Hungary
- Prof. *Maja Kožar*, Ph.D., Slovenia
- Prof. *Marco Platania*, Ph.D., Italy
- Prof. *Margaret Loseby*, Ph.D., Italy
- Prof. *Marian Podstawka*, Ph.D., Poland
- Prof. *Mariana Eftimie*, Ph.D., Romania
- Prof. *Marina Leshcheva*, Ph.D., Russia
- Prof. *Matteo Vittuari*, Ph.D., Italy
- Prof. *Micol Mastrocicco*, Ph.D., Italy
- Prof. *Mirela Matei*, Ph.D., Romania
- Prof. *Mirela Stoian*, Ph.D., Romania
- Prof. *Natalia Bannikova*, Ph.D., Russia
- Prof. *Novak Jauković*, Ph.D., Montenegro
- Prof. *Raluca Ignat*, Ph.D., Romania
- Prof. *Raluca Ion*, Ph.D., Romania
- Prof. *Raluca Ladaru*, Ph.D., Romania
- Prof. *Richard Simmons*, Ph.D., Scotland
- Prof. *Roxana Patarlageanu*, Ph.D. Romania
- Prof. *Vasilii Erokhin*, Ph.D., Russia
- Prof. *Vesna Gantner*, Ph.D., Croatia
- Prof. *Zvonimir Stienen*, Ph.D., Croatia
- Prof. *Željko Vaško*, Ph.D., Bosnia and Herzegovina
- Doc. *Adis Puška*, Ph.D., Bosnia and Herzegovina
- *Barbara Wieliczko*, Ph.D., Poland
- *Bogdan Bazga*, Ph.D., Romania
- *Dori Pavloska*, Ph.D., Macedonia
- *Ion Certan*, Ph.D., Moldova
- *Klaus Dieter Wagner*, Ph.D., Austria
- *Marek Wigier*, Ph.D., Poland
- *Marius Voicilas*, Ph.D., Romania
- *Monica Tudor*, Ph.D., Romania
- *Pawel Chmielinski*, Ph.D., Poland
- *Vaclav Vilhelm*, Ph.D., Czech Republic
- *Zbigniew Floriańczyk*, Ph.D., Poland
- Prof. *Aleksandra Vujko*, Ph.D., Serbia
- Prof. *Andreja Andrejević*, Ph.D., Serbia
- Prof. *Bojan Dimitrijević*, Ph.D., Serbia
- Prof. *Boris Kuzman*, Ph.D., Serbia
- Prof. *Branislav Vlahović*, Ph.D., Serbia
- Prof. *Danijela Despotović*, Ph.D., Serbia

- Prof. *Dejan Janković*, Ph.D., Serbia
- Prof. *Dejan Molnar*, Ph.D., Serbia
- Prof. *Dejan Sekulić*, Ph.D., Serbia
- Prof. *Dragan Milić*, Ph.D., Serbia
- Prof. *Dragan Nedeljković*, Ph.D., Serbia
- Prof. *Dragana Latković*, Ph.D., Serbia
- Prof. *Gordana Dozet*, Ph.D., Serbia
- Prof. *Gordana Mrdak*, Ph.D., Serbia
- Prof. *Igor Tomašević*, Ph.D., Serbia
- Prof. *Ilija Brčeski*, Ph.D., Serbia
- Prof. *Irena Janković*, Ph.D., Serbia
- Prof. *Ivan Bošnjak*, Ph.D., Serbia
- Prof. *Ivana Domazet*, Ph.D., Serbia
- Prof. *Jasmina Mijajlović*, Ph.D., Serbia
- Prof. *Jugoslav Aničić*, Ph.D. Serbia
- Prof. *Lela Ristić*, Ph.D., Serbia
- Prof. *Leposava Zečević*, Ph.D., Serbia
- Prof. *Ljubinko Jovanović*, Ph.D., Serbia
- Prof. *Marija Kostić*, Ph.D., Serbia
- Prof. *Marija Lakićević*, Ph.D., Serbia
- Prof. *Marija Mandarić*, Ph.D., Serbia
- Prof. *Marija Nikolić*, Ph.D., Serbia
- Prof. *Marija Lazarević*, Ph.D., Serbia
- Prof. *Mića Mladenović*, Ph.D., Serbia
- Prof. *Mihailo Manić*, Ph.D., Serbia
- Prof. *Mihajlo Ratknić*, Ph.D., Serbia
- Prof. *Milena Rikalović*, Ph.D., Serbia
- Prof. *Milica Bošković*, Ph.D., Serbia
- Prof. *Milivoj Ćosić*, Ph.D., Serbia
- Prof. *Miljan Leković*, Ph.D., Serbia
- Prof. *Miljana Barjaktarović*, Ph.D., Serbia
- Prof. *Miodrag Brzaković*, Ph.D., Serbia
- Prof. *Natalija Bogdanov*, Ph.D., Serbia
- Prof. *Nemanja Berber*, Ph.D., Serbia
- Prof. *Nenad Stanišić*, Ph.D., Serbia
- Prof. *Nikola Milićević*, Ph.D., Serbia
- Prof. *Olgica Zečević Stanojević*, Ph.D., Serbia
- Prof. *Rade Popović*, Ph.D., Serbia
- Prof. *Radivoj Prodanović* Ph.D. Serbia
- Prof. *Sanja Mrazovac Kurilić*, Serbia
- Prof. *Sanjin Ivanović*, Ph.D., Serbia
- Prof. *Sladjan Rašić*, Ph.D., Serbia
- Prof. *Sladana Vujčić*, Ph.D., Serbia
- Prof. *Sonja Josipović*, Ph.D., Serbia
- Prof. *Sreten Jelić*, Ph.D., Serbia
- Prof. *Stanislav Zekić*, Ph.D., Serbia
- Prof. *Tamara Paunović*, Ph.D., Serbia
- Prof. *Tanja Stanišić*, Ph.D., Serbia
- Prof. *Tatjana Dimitrijević*, Ph.D., Serbia
- Prof. *Tatjana Jovanić*, Ph.D., Serbia
- Prof. *Todor Marković*, Ph.D., Serbia
- Prof. *Veljko Vukoje*, Ph.D., Serbia
- Prof. *Vera Mirović*, Ph.D., Serbia.
- Prof. *Vesna Rodić*, Ph.D., Serbia
- Prof. *Vladan Pavlović*, Ph.D., Serbia
- Prof. *Vlade Zarić*, Ph.D., Serbia
- Prof. *Vladimir Zakić*, Ph.D., Serbia
- Prof. *Vladislav Zekić*, Ph.D., Serbia
- Prof. *Zoran Njegovan*, Ph.D., Serbia
- Prof. *Zoran Rajić*, Ph.D., Serbia
- Prof. *Zorica Sredojević*, Ph.D., Serbia
- Prof. *Željko Dolijanović*, Ph.D., Serbia
- Prof. *Vera Rajičić*, Ph.D., Serbia.
- Doc. *Dragan Terzić*, Ph.D., Serbia
- Doc. *Gordana Radović*, Ph.D., Serbia
- Doc. *Marija Lukić*, Ph.D., Serbia
- Doc. *Maja Grgić*, Ph.D., Croatia
- Doc. *Mirela Tomaš*, Ph.D., Serbia
- Doc. *Miroslav Nedeljković*, Ph.D., Serbia
- Doc. *Violeta Babić*, Ph.D., Serbia
- Doc. *Vladan Cogoljević*, Ph.D., Serbia
- *Aleksandar Lepasavić*, Ph.D., Serbia
- *Aleksandar Lučić*, Ph.D., Serbia
- *Aleksandra Ivetić*, Ph.D., Serbia
- *Ana Marjanović Jeromela*, Ph.D., Serbia
- *Aneta Buntić*, Ph.D., Serbia
- *Anton Puškarić*, Ph.D., Serbia
- *Biljana Grujić Vučkovski*, Ph.D., Serbia
- *Branko Mihailović*, Ph.D., Serbia
- *Danica Mićanović*, Ph.D., Serbia
- *Dejan Živkov*, Ph.D., Serbia
- *Divna Simić*, Ph.D., Serbia

- *Gordana Radović*, Ph.D., Serbia
- *Isidora Beraha*, Ph.D., Serbia
- *Isidora Ljumović*, Ph.D., Serbia
- *Jelena Maksimović*, Ph. D., Serbia
- *Katica Radosavljević*, Ph.D., Serbia
- *Lana Nastić*, Ph.D., Serbia
- *Ljiljana Rajnović*, Ph.D., Serbia
- *Marijana Jovanović Todorović*, Ph.D., Serbia
- *Marko Jeločnik*, Ph.D., Serbia
- *Mihajlo Ratknić*, Ph.D., Serbia
- *Milena Simić*, Ph.D., Serbia
- *Mirjana Despotović*, Ph.D., Serbia
- *Nataša Kljajić*, Ph.D., Serbia
- *Nataša Papić Blagojević*, Ph.D., Serbia
- *Olivera Jovanović*, Ph.D., Serbia
- *Predrag Vuković*, Ph.D., Serbia
- *Radmila Jovanović*, Ph.D., Serbia
- *Ratibor Štrbanović*, Ph.D., Serbia
- *Robert Radišić*, Ph.D., Serbia
- *Sanja Đurović*, Ph.D., Serbia
- *Sanja Popović Pantić*, Ph.D, Serbia
- *Sladán Stanković*, Ph.D., Serbia
- *Slavica Arsić*, Ph.D., Serbia
- *Slavica Čolić*, Ph.D., Serbia
- *Slavica Stevanović*, Ph.D., Serbia
- *Slobodan Cvetković*, Ph.D., Serbia
- *Sonja Đurićin*, PhD., Serbia
- *Vedran Tomić*, Ph.D., Serbia
- *Vera Popović*, Ph.D., Serbia
- *Vesna Paraušić*, Ph.D., Serbia
- *Vesna Popović*, Ph.D., Serbia
- *Violeta Anđelković*, Ph.D., Serbia
- *Vladan Ugrenović*, Ph.D., Serbia
- *Vladeta Stevović*, Ph.D., Serbia
- *Vladimir Filipović*, Ph.D., Serbia
- *Vladimir Miladinović*, Ph.D., Serbia
- *Vlado Kovačević*, Ph.D., Serbia
- *Zoran Simonović*, Ph.D., Serbia
- *Željko Despotović*, Ph.D., Serbia

ORGANIZATIONAL BOARD

- *Marijana Jovanović Todorović*, Ph.D. - President
- *Doc. Miroslav Nedeljković*, Ph.D. - Vice President
- *Prof. Jonel Subić*, Ph.D.
- *Anton Puškarić*, Ph.D.
- *Biljana Grujić Vučkovski*, Ph.D.
- *Boban Zarić*
- *Bojana Bekić Šarić*, Ph.Ds.
- *Gordana Radović*, Ph.D.
- *Irina Marina*, PhDs.
- *Ivana Vučetić*
- *Lana Nastić*, Ph.D.
- *Ljiljana Rajnović*, Ph.D.
- *Marko Jeločnik*, Ph.D.
- *Milena Marinković*
- *Nada Mijajlović*, M.A.
- *Nataša Kljajić*, Ph.D.
- *Predrag Vuković*, Ph.D.
- *Prof. Boris Kuzman*, Ph.D.
- *Prof. Branko Mihailović*, Ph.D.
- *Prof. Dragan Nedeljković*, Ph.D.
- *Prof. Leposava Zečević*, Ph.D.,
- *Prof. Olgica Zečević Stanojević*, Ph.D.
- *Prof. Zoran Simonović*, Ph.D.
- *Slavica Arsić*, Ph.D.
- *Velibor Potrebić*, Ph.Ds.
- *Vesna Paraušić*, Ph.D.
- *Vesna Popović*, Ph.D.
- *Vesna Stajčić*

CONTENT:

PLENARY SECTION I

1. *Andrei Jean Vasile, Luminita Chivu, Mile Vasić, Madalina Ionescu* - **INVESTIGATING SOME POSSIBLE IMPACTS OF ENERGY USE AND PRICES ON AGRICULTURAL SECTOR DEVELOPMENT** 1
2. *Francisco J. Matus* - **SOIL CARBON SEQUESTRATION: A NATURE-BASED SOLUTION UNDER OUR FEET - PERSPECTIVE FROM THE CHILEAN VOLCANIC SOILS** . . . 2
3. *Georgiana Raluca Ladaru, Ionut Laurentiu Petre* - **ANALYSIS OF THE COMPETITIVENESS OF THE AGRICULTURAL SECTOR IN TERMS OF COMMERCIAL TRADE, PARALLEL ROMANIA - SERBIA** 3
4. *Irina Sashkova, Anna Ivolga* - **ECONOMIC DIVERSIFICATION AS A FACTOR OF SUSTAINABLE RURAL DEVELOPMENT: CASE OF THE STAVROPOL REGION** 4
5. *Karoly Bodnar* - **DOMESTIC RABBIT PRODUCTION IN HUNGARY** 5
6. *Paun Ion Otiman, Nicoleta Mateoc Sirb, Adrian Gheorghe Banes, Cosmin Salasan, Andrea Feher, Miroslav Raicov, Gabriel Suster* - **INNOVATIVE CIRCULAR SOLUTIONS IN THE HOUSING SECTOR** 6
7. *Steliana Rodino* - **ADVANCING BIOECONOMY: A CROSS-COUNTRY PERSPECTIVE ON EUROPE'S SUSTAINABLE FUTURE** 7
8. *Vasilii Erokhin, Gao Tianming* - **REVEALING COMPARATIVE ADVANTAGES IN THE CHINA-SERBIA AGRICULTURAL TRADE.** 8
9. *Vesna Gantner, Ranko Gantner, Zvonimir Steiner, Boro Krstić, Vera Popović* - **DOES CATTLE PRODUCTION AFFECT GLOBAL WARMING?** 9

10. <i>Vili Dragomir</i> - ECONOMIC OPTIMIZATION OF AGRICULTURAL PRODUCTION PROCESSES AS A RESPONSE TO ENVIRONMENTAL CHALLENGES	10
--	-----------

PLENARY SECTION II

1. <i>Jelena Nestorov Bizonj</i> - AGRICULTURAL COOPERATIVES IN THE FUNCTION OF IMPROVEMENT OF MARKET POSITION OF FARMERS IN VOJVODINA.	13
2. <i>Marijana Joksimović</i> - THE INFLUENCE OF FOREIGN DIRECT INVESTMENTS ON THE IMPROVEMENT OF AGRIBUSINESS	14
3. <i>Nenad Trkulja</i> - MULTI-RESISTANCE OF CERCOSPORA BETICOLA TO MBC, DMI AND QoI FUNGICIDES AND IMPACT ON MANAGAMENT	15
4. <i>Radivoj Prodanović, Dragan Ivanišević</i> - ADDING VALUE IN SHEEP FARMING THROUGH THE DEVELOPMENT OF ALTERNATIVE PRODUCTS	16
5. <i>Sanjin Ivanović, Saša Todorović</i> - NEW APPROACHES TO INVESTMENT DECISIONS ON AGRICULTURAL HOLDINGS	17
6. <i>Snežana Cico, Ljiljana Rajnović</i> - SOCIALLY RESPONSIBLE STATE BUSINESS AND AGRICULTURAL LAND RESTITUTION PROCEDURE	18
7. <i>Sonja Đuričin</i> - IMPACT OF RESEARCH AND DEVELOPMENT INVESTMENT ON MEDIUM-SIZED AGRICULTURAL ENTERPRISES' BUSINESS SUCCESS IN SERBIA	19
8. <i>Vedran Tomić, Robert Radišić</i> - ECONOMIC ASPECTS OF MILK PRODUCTION AND COTTAGE CHEESE AS A TRADITIONAL DAIRY PRODUCT ON FAMILY FARMS IN SERBIA	20

I SECTION – AGRIBUSINESS

1. *Aleksandar Miljatić, Veljko Vukoje, Veljko Šarac* - **THE ECONOMIC CHARACTERISTICS OF AGRICULTURAL HOLDINGS IN THE REPUBLIC OF SERBIA** **.23**
2. *Ana Ursu* - **TECHNO-ECONOMIC MODELS FOR ANALYSIS AND OPTIMIZATION OF ECONOMIC PROCESSES IN AGRICULTURE** **.24**
3. *Bianca Florentina Nistoroiu, Stefan Laurentiu Prahoveanu, Sergej Vasić* - **A SUMMERY ANALYSIS OF SUSTAINABLE FAMILY FARMING IN THE EUROPEAN UNION** **.25**
4. *Blagica Sekovska, Vasilka Poposka Trenevka* - **NEGATIVE TRENDS IN AGRICULTURAL LAND MANAGEMENT POLICY IN GENERAL WITH SPECIAL REFERENCE TO MACEDONIA** **.26**
5. *Gheorghe Dan Isbășoiu, Dana Volosevici* - **NON-STANDARD FORMS OF EMPLOYMENT IN THE ROMANIAN AGRICULTURE** . . . **.27**
6. *Jovana Dedić, Radovan Pejanović, Jelica Eremić Dođić* - **TAX ASPECT OF THE ACCOUNTING OF PERENNIAL PLANTINGS**. **.28**
7. *Marko Jeločnik, Lana Nastić, Božo Ilić* - **INVESTMENT IN CREATING THE VALUE ADDED IN LIVESTOCK PRODUCTION** **.29**
8. *Miroslav Nedeljković, Milorad Đokić, Velibor Potrebić* - **SELECTION OF SUSTAINABLE SUPPLIERS IN AGRICULTURAL ENTERPRISES** **.30**
9. *Silviu Beciu, Georgiana Armenița Arghiroiu, Maria Bobeică Colpoș* - **STUDY ABOUT EVOLUTION OF THE ROMANIAN OILSEED MARKET AND ROMANIAN PLACE IN THE INTERNATIONAL TRADE WITH OILSEED**. **.31**
10. *Steliana Mocanu, Ionut Laurentiu Petre, Marilena E. Potârniche Berheci* - **ANALYSIS OF CEREAL FOREIGN TRADE IN EUROPEAN UNION** **.32**

11. *Simona Cosmina Toader, Ioan Brad, Ciprian Ioan Rujescu, Monica Ocnean, Jakub Skorupa* - **AGRIBUSINESS IN TERMS OF EDUCATIONAL OFFER AND EMPLOYMENT OPPORTUNITIES: STUDY CASE ROMANIA** **33**
12. *Vesna Paraušić, Bojana Bekić Šarić, Jasna Babić* - **THE GLOBAL G.A.P. CERTIFICATION SCHEME IN SERBIAN AGRICULTURE: CONSULTANTS' ATTITUDES** **34**
13. *Violeta Sima, Ileana Georgiana Gheorghe* - **AN OVERVIEW OF THE EUROPEAN UNION WINE SECTOR DYNAMICS: AN EMPIRICAL ANALYSIS FROM THE ROMANIAN PERSPECTIVE.** **35**
14. *Vlado Kovacević* - **ANALYSIS OF AGRICULTURAL POLICY DEVELOPMENTS IN SERBIA** **36**
15. *Zoran Simonović, Biljana Ilić* - **COMPLEX BUSINESS SYSTEM MANAGEMENT IN AN AGRO-INDUSTRIAL COMPLEX** . . . **37**

II SECTION - BIOTECHNOLOGY

1. *Angel Sarov, Ekaterina Tzvetanova* - **ECONOMIC EFFECTIVENESS OF APPLICATION OF BIOSTIMULATORS IN SPRING OATS** .41
2. *Georgi Georgiev* - **TESTING THE EFFECT OF AN INNOVATIVE PRODUCT OF THE COMPANY HUMATE ROST FOR VEGETATIVE FOLIAR NUTRITION ON THE DEVELOPMENT OF OIL SUNFLOWER (HELIANTHUS ANNUUS L.) UNDER THE CONDITIONS OF DOBRUDJA.** **42**
3. *Gordana Tamindžić, Sergej Azizbekian, Srđan Zec, Slobodan Vlajić, Dragana Milošević, Dragana Miljaković, Maja Ignjatov* - **FOLIAR APPLICATION OF NANOFERTILIZER IMPROVES SEED QUALITY PERFORMANCE OF TOMATO (SOLANUM LYCOPERSICUM L.).** **43**
4. *Iliyana Petrova, Svetlana Stoyanova, Ralitz Mincheva* - **EFFECT OF FOLIAR TREATMENTS WITH BIOSTIMULANTS IN SPRING OILSEED RAPE CULTIVATION** **45**

5. *Irina Marina, Biljana Grujić Vučkovski, Marijana Jovanović Todorović* - **IMPACT OF INTENSIVE AGRICULTURAL PRODUCTION ON THE ENVIRONMENT** **46**
6. *Maja Ignjatov, Dragana Milošević, Janko Červenski, Slobodan Vlajić, Boris Adamović, Snežana Jakšić, Đorđe Vojnović* - **HEALTHY SOIL - HEALTHY PLANT: CONTAMINATED SOIL AS A SOURCE OF INOCULUM OF *FUSARIUM VERTICILLIOIDES* (SACC.) NIRENBERG** **47**
7. *Marina Đorović, Radojica Rakić, Jela Ikanović, Vera Popović, Zdravka Petković, Dragana Popović, Ljubiša Kolarić* - **SPANISH REED IN THE FUNCTION OF RENEWABLE ENERGY SOURCES AND CIRCULAR ECONOMY** **49**
8. *Nada Mijajlović, Nataša Papić Blagojević, Đorđe Mihailović* - **BEEKEEPING AND HONEY PRODUCTION IN SERBIA IN THE CONTEXT OF SUSTAINABLE RURAL DEVELOPMENT.** **50**
9. *Nataša Kljajić, Jonel Subić, Predrag Vuković* - **NATURAL CHARACTERISTICS AS A BASE FOR THE SUSTAINABLE AGRICULTURAL PRODUCTION – THE MUNICIPALITY OF TEMERIN EXAMPLE** **51**
10. *Ranko Gantner, Igor DelVechio, Zvonimir Steiner, Bishal K. Sitaula, Krešimir Bošnjak, Vesna Gantner* - **MAIZE GRAIN YIELD IN ANIMAL-POWERED FARMING AS AFFECTED BY SOIL FERTILIZATION VARIANT: RESULTS FROM THE 2023 SEASON IN NORTH-EAST CROATIA.** **52**
11. *Slavica Arsić, Ivan Bošnjak, Anton Puškarić* - **PRODUCTS OBTAINED FROM MILK PROCESSING WITH SPECIAL REFERENCE TO WHEY PRODUCTION IN CHEESE PRODUCTION** **53**
12. *Tatjana Dimitrijević, Mihailo Ratknić* - **VALUES OF ECOSYSTEM SERVICES - CARBON STORAGE IN THE FOREST ECOSYSTEMS OF BELGRADE** **54**
13. *Tina Lešnik, Andreja Borec* - **THE INFLUENCE OF THE ORIENTATION AND TYPE OF HEDGEROWS ON SHADING PERCENTAGE OF AGRICULTURAL LAND** **55**

14. *Vera Popović, Marijana Jovanović Todorović, Vesna Gantner, Vera Rajičić, Vladimir Filipović, Dragan Dokić, Gordana Dozet* - **STATE OF ORGANIC PRODUCTION IN WORLD AND FOR US56**
15. *Vesna Gantner, Vera Popović, Zvonimir Steiner, Ranko Gantner, Klemen Potočnik* - **THE DIFFERENCES IN SUBCLINICAL MASTITIS PREVALENCE AND EFFECT ON MILK PRODUCTION DUE TO COWS' BREED AND BREEDING REGION58**
16. *Vladimir Miladinović, Vladan Ugrenović, Mira Milinković* - **PHYTOREMEDIATION AND ELECTROKINETIC SOIL REMEDIATION60**
17. *Zoranka Malešević, Đorđe Ilić, Mirjana Jovović* - **POSSIBILITY OF BIOLOGICAL RECLAMATION OF DEGRADED SOIL IN THE DUMPS OF THE PLJEVLJA MINE61**
18. *Zvonimir Steiner, Ivan Babić, Vesna Gantner, Ranko Gantner* - **EFFECT OF MILK REPLACEMENT ON GROWTH, NUTRITION COEFFICIENT AND OTHER RELEVANT PARAMETERS IN DAIRY CALVES62**

III SECTION – REVITALIZATION OF RURAL AREAS

1. *Aleksandra Vujko, Radmila Bojović, Miroslav Knežević* - **RURAL TOURISM IN THE FUNCTION OF SERBIAN AND EU TOURISM DEVELOPMENT 65**
2. *Aliyu Mansur Sulaiman, Mustapha Umar, Jimoh Abdulrauf Kayode, Rafiu Olalekan Yusuf, Miroslav P. Popović* - **SOCIOECONOMIC EFFECTS OF CATTLE RUSTLING ON THE LIVELIHOOD OF INHABITANTS OF SOME SELECTED RURAL COMMUNITIES IN NORTHERN NIGERIA 66**
3. *Andreea Roxana Firăţoiu, Liviu Mărcuţă, Elena Soare, Irina Adriana Chiurciu* - **THE CONTRIBUTION OF TOURISM TO THE DEVELOPMENT OF THE RURAL AREA IN ILFOV COUNTY: CASE STUDY FOR BUFTEA AREA 67**
4. *Daniela Nicoleta Voicila, Diana Maria Ilie* - **BIBLIOMETRIC ANALYSIS: QUALITY OF LIFE IN RURAL AREA 68**

5.	<i>Gordana Radović, Radovan Pejanović, Zorica Vasiljević -</i> FINANCING THE DEVELOPMENT OF RURAL TOURISM IN SERBIA FROM THE IPARD II PROGRAM.	69
6.	<i>Lela Ristić, Petar Veselinović, Danijela Despotović –</i> GLOBAL TRENDS AND OUTLOOKS IN AGRICULTURAL DEVELOPMENT AND FOOD SECURITY	70
7.	<i>Marija Gjosheva Kovachevikj, Jorde Jakjimoski, Lazo Dimitrov, Despina Popovska Stojanov -</i> REGIONAL DISPARITIES RELATED TO SOCIOECONOMIC DETERMINANTS OF AGRICULTURE AND RURAL DEVELOPMENT IN NORTH MACEDONIA.	71
8.	<i>Marija Indin -</i> CHALLENGES OF THE GREEN TRANSITION IN RURAL AREAS.	72
9.	<i>Marija Popović, Sreten Jelić -</i> SOCIO-DEMOGRAPHIC CHARACTERISTICS OF SERBIAN HOUSEHOLDS AND SUSTAINABLE DEVELOPMENT	73
10.	<i>Radmila Jovanović, Claudete Oliveira Moreira, Debajit Datta</i> - OBSERVING CHANGES OF SETTLEMENT SIZE IN VITICULTURAL ZONES OF SERBIA USING VIIRS NIGHTTIME LIGHT DATA	74
11.	<i>Sara Stanić Jovanović, Dragana Vuković, Nevena Miletović -</i> DEVELOPMENT OF SPECIAL FORMS OF TOURISM WITH THE AIM TO REVITALIZE THE RURAL AREA OF PLJEVLJA MUNICIPALITY	75
12.	<i>Snežana Milićević, Nataša Đorđević, Marija Mandarić -</i> RURAL TOURISM: EMPOWERING RURAL DEVELOPMENT . . .	76
13.	<i>Suzana Lazović, Drago Cvijanović -</i> REVITALIZATION OF RURAL AREAS THROUGH THE APPLICATION OF THE “SMART VILLAGE” CONCEPT.	77

IV SECTION – DIGITALIZATION IN AGRICULTURE

1.	<i>Branko Mihailović, Vesna Popović, Katica Radosavljević -</i> INDOOR SMART GARDEN AS A FACTOR OF SUSTAINABLE DEVELOPMENT IN AGRICULTURE.	81
----	--	-----------

2.	<i>Cosmin Salasan, Carmen Simona Dumitrescu, Iasmina Iosim, Cosmina Toader</i> - DIGITAL LITERACY AND USE OF DIGITAL TECHNOLOGIES BY SMALL FARMERS IN SOUTHEASTERN EUROPE	82
3.	<i>Ferhat Ćejvanović, Adnan Kamerić</i> - THE ECONOMIC SIGNIFICANCE OF DIGITIZATION IN AGRIBUSINESS	83
4.	<i>Katarina Stojanović, Radovan Pejanović</i> - URBAN AGRICULTURE, IMPLEMENTATION POSSIBILITIES IN THE BUILT ENVIRONMENT AND SMART CITY	84
5.	<i>Mirjana Dejanović, Sanja Popović Pantić, Ana Kovačević</i> - THE SIGNIFICANCE OF DIGITAL TRANSFORMATION IN AGRICULTURE FOR SUSTAINABLE DEVELOPMENT.	85
6.	<i>Nedeljko Prdić, Boris Kuzman, Sara Kostić</i> - DIGITALIZATION OF THE SALE OF AGRICULTURAL PRODUCTS AS A CHALLENGE TO THE CRISIS	86
7.	<i>Olgica Zečević Stanojević, Dragan Nedeljković, Leposava Zečević, Boris Stanojević</i> - SIGNIFICANCE OF INNOVATIONS AND APPLICATION OF INFORMATION - COMMUNICATION TECHNOLOGIES IN AGRICULTURE AND RURAL DEVELOPMENT OF SERBIA	87
8.	<i>Sladjan Stanković, Vedran Tomić, Cosmin Salasan</i> - PERSPECTIVES OF DIGITAL TOOLS IN THE AGRICULTURAL ADVISORY WORK.	88
9.	<i>Tina Bobić, Maja Gregić, Pero Mijić, Vesna Gantner</i> - INFORMATION AND COMMUNICATION TECHNOLOGYS IN CATTLE LAMENESS DETECTION.	89
10.	<i>Vladimir Pejanović, Boris Stanojević, Gordana Radović</i> - NEW TECHNOLOGIES IN AGRICULTURE AND SMART VILLAGES	90

PREFACE

The Book of Abstracts is prepared as the result of the scientific research supported by the Ministry of Science, Technological Development and Innovations of the Republic of Serbia.

The Book of Abstracts includes selected articles presented at the International Scientific Conference – Sustainable Agriculture and Rural Development IV, which was held in Belgrade on December 14-15th, 2023.

In the Book of Abstracts are included abstracts from Serbia, along with the invited and other abstracts from abroad, prepared by foreign authors, which are IAE, Belgrade associates, and whose institutions have close scientific, professional and technical cooperation with the IAE, Belgrade.

The Book of Abstracts addresses the wider audience by being scientifically and practically focused on all segments of sustainable agriculture and rural development, but also biotechnology and digitalization in agriculture.

Publisher and editors are not responsible for the content of the abstracts of scientific papers and opinions published in the Book of Abstracts, as they represent the author's point of view. Publishing of the Book of Abstracts was financially supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia.

In Belgrade,
December, 2023.

Editors:
Jonel Subić, Ph.D.
Miroslav Nedeljković, Ph.D.
Marijana Jovanović Todorović, Ph.D.
Jean Vasile Andrei, Ph.D.

BOOK OF ABSTRACTS

PLENARY SECTION I
(14th December 2023)

INVESTIGATING SOME POSSIBLE IMPACTS OF ENERGY USE AND PRICES ON AGRICULTURAL SECTOR DEVELOPMENT

Andrei Jean Vasile¹, Luminita Chivu², Mile Vasić³, Madalina Ionescu⁴

Abstract

The impact of energy use and prices on the development of a sustainable agricultural sector has been highlighted by recent developments and changes in the modern agricultural sector. Energy has a dual importance for agriculture, being not only an economic efficiency issue but also an environmental issue. The massive mechanization of farming practices and production has led to a corresponding increase in energy consumption in the sector, which is a critical factor in shaping future competitive advantages. The paper examines some of the possible impacts of energy consumption and prices on the development of the agricultural sector from different perspectives. It identifies realities, trends and paradigms. The results provide relevant insights for both practitioners and policy makers.

Key words: agriculture, energy consumption, intensity; price, paradigm, volatility, fuels.

-
- 1 Jean Vasile Andrei, Ph.D., Full Professor, Petroleum-Gas University of Ploiesti, 39, B-dul Bucuresti, Ploiesti, 100680 and Researcher, National Institute for Economic Research 'Costin C. Kiritescu', Romanian Academy, Bucharest, Romania, Phone: +40727615540, E-mail: andrei_jeanvasile@yahoo.com ORCID ID (<https://orcid.org/0000-0002-8332-6537>)
 - 2 Luminita Chivu, Ph.D, Senior Researcher, National Institute for Economic Research 'Costin C. Kiritescu', Romanian Academy, Casa Academiei, Calea 13 Septembrie nr. 13, Sector 5, Bucharest, 050711, Romania, E-mail: chivu@ince.ro, ORCID ID (<https://orcid.org/0000-0003-3661-2626>)
 - 3 Mile Vasić, Ph.D., Full Professor., European Marketing and Management Association, Knežopoljska 5, Banja Luka 78000, Banja Luka, Bosnia and Herzegovina, E-mail: vasic.mile@gmail.com, ORCID ID (<https://orcid.org/0000-0002-5637-9289>)
 - 4 Madalina Ionescu, M.A, Research Network on Resources Economics and Bioeconomy. (RebResNet), Ploiesti, Prahova, Romania, E-mail: madyionescu2005@yahoo.com

SOIL CARBON SEQUESTRATION: A NATURE-BASED SOLUTION UNDER OUR FEET - PERSPECTIVE FROM THE CHILEAN VOLCANIC SOILS

Francisco J. Matus¹

Abstract

Soil carbon sequestration (SCS) is a method of reducing atmospheric carbon to mitigate global warming by managing agricultural and forestry practices. Although there is a consensus that SCS is possible, the implementation of initiatives to promote it is often hindered by political and economic barriers. The most popular SCS techniques, such as land use change and afforestation, do not guarantee that all desired carbon will be sequestered in the soil. In this presentation, we will discuss the mechanisms of SCS that depend on soil type and its use for agriculture in Chile. It is believed that the maximum level of SCS that can be achieved depends on the input of carbon and the soil's sequestration capacity. In the first case, the level is reached by an equilibrium that responds to the carbon input, whereas in the second case, the maximum depends on the soil carbon saturation that does not allow more accumulation, and the soil becomes a source of carbon to the atmosphere. To establish the capacity of SCS at a global scale, we built a database from the main factors that affect the maximum levels of carbon storage. Out of a total of 2240 articles reviewed between 1960 and 2021, 32 studies were selected that strictly met eligibility criteria for volcanic and non-volcanic soils. In non-volcanic soils (temperate, subtropical, and tropical), the soil carbon is related to the carbon content in the silt and clay. However, volcanic soils (recent volcanic ash), it is related to the carbon of the organo-mineral complexes and allophanic clays. This presentation demonstrates that two possible mechanisms determine the maximum carbon accumulation in Chilean soils.

Key word: *allophanic soils, carbon stabilization, carbon saturation.*

1 Prof. Dr Francisco J. Matus, Laboratory of Conservation and Dynamics of Volcanic Soils, Department of Chemical Sciences and Natural Resources, University of La Frontera; Temuco, Chile, e-mail: francisco.matus@ufrontera.cl

ANALYSIS OF THE COMPETITIVENESS OF THE AGRICULTURAL SECTOR IN TERMS OF COMMERCIAL TRADE, PARALLEL ROMANIA - SERBIA

Georgiana Raluca Ladaru¹, Ionut Laurentiu Petre²

Abstract

The aim of this research is to analyze the competitiveness of the agricultural sector in Romania and Serbia according to the external trade activity of each country. For this purpose, data provided by international databases, namely the International Trade Centre, will be used, which will refer to the value of imports and exports of agricultural products and to the total level, these data being processed quantitatively and analyzed from the perspective of the trade balance. Then, in order to determine the competitiveness of the sector in each country, certain indicators will be calculated which can measure competitiveness, both at collective level (of the agricultural sector) and at individual level according to the main groups of agri-food products.

Key words: *agri-food competitiveness, Serbia, Romania, foreign trade.*

-
- 1 Georgiana Raluca Ladaru, Professor PhD, The Bucharest University of Economic Studies, Piata Romana no. 6, Bucharest, Romania, telephone number: +0213191900/249, e-mail: raluca.ladaru@eam.ase.ro
 - 2 Ionut Laurentiu Petre, PhD, Postdoctoral School ASE-IOSUD, The Bucharest University of Economic Studies, Faculty of Agro-food and Environmental Economics, 6, Piata Romana, Sector 1, Bucharest, Romania, phone: 0213191900/249, e-mail: laurentiu.petre@eam.ase.ro

ECONOMIC DIVERSIFICATION AS A FACTOR OF SUSTAINABLE RURAL DEVELOPMENT: CASE OF THE STAVROPOL REGION

Irina Sashkova¹, Anna Ivolga²

Abstract

Diversification of the rural economy is necessary to reduce the burden on agriculture in the face of growing demographic pressure, to obtain economies of scale resulting from complementary enterprises or growth links between enterprises, to expand employment opportunities for the rural masses, and so on. A review of the literature on this topic opens up many opportunities for a critical and retrospective analysis of existing works. Consequently, due to the apparent lack of scientific research and inadequate empirical data on diversification and other aspects of the rural economy, the topic of the study seems relevant. To conduct a study of rural diversification, a region with a pronounced agricultural specialization, having an average level of economic diversification, was selected – the Stavropol Territory. The research is aimed at forming models of diversified rural development and determining the most effective structure of the rural economy by clustering territories according to selected criteria. The study includes the collection and analysis of both quantitative and qualitative data. The quantitative phase represents by statistical indicators, the qualitative phase represents by the results of a survey of representatives of the region and the analysis of information in open web.

Key words: *sustainable rural development, rural economy, economic diversification, rural population, clusters.*

1 Sashkova Irina – PhD student, Stavropol State Agrarian University, Address: 12, Zootekh-
nichesky Side-Street, Stavropol, 355017, Russian Federation, tel.: 89614766471, e-mail:
boomblow@mail.ru

2 Ivolga Anna – PhD in Economics, Associate Professor, Stavropol State Agrarian Univer-
sity, Address: 12, Zootekhnichesky Side-Street, Stavropol, 355017, Russian Federation,
tel.: 89280053542, e-mail: annya_iv@mail.ru

DOMESTIC RABBIT PRODUCTION IN HUNGARY

Karoly Bodnar¹

Abstract

The study presents the current situation of rabbit production in Hungary. The work affects issues of breeding, feeding, animal health, slaughter and processing, and consumption. In addition to the subsidies available to producers, the author also deals with measures to stimulate consumption and conditions that make the work of the sector difficult.

Key words: *domestic rabbit, rabbit production, rabbit meat, support of producers, marketing.*

1 Karoly Bodnar Dr. habil. Bodnár Károly, Professor, Hungarian University of Agriculture and Life Sciences, Institute of Environmental Sciences, 5540 Szarvas, Szabadság u. 1-3, Hungary, e-mail: bodnar.karoly.lajos@uni-mate.hu

INNOVATIVE CIRCULAR SOLUTIONS IN THE HOUSING SECTOR

Paun Ion Otiman¹, Nicoleta Mateoc Sirb^{1,2}, Adrian Gheorghe Banes¹, Cosmin Salasan^{1,2}, Andrea Feher^{1,2}, Miroslav Raicov¹, Gabriel Suster^{1,2}

Abstract

The housing sector is a major contributor to the current global problems of resource depletion and climate change. It represents one of the most important consumer sectors at EU level: 50% of all extracted materials, 40% of final energy consumption, 33% of water consumption and 33% of all waste produced. The blockage of today's linear business models causes many environmental problems and is one of the major barriers in the transition to a circular economy. The article proposes an innovative paradigm shift towards a circular economy for the housing sector, demonstrating the feasibility of using wool in housing insulation. The aim is to encourage the housing value chain to redesign traditional business models towards circular ones.

Key word: *circular economy, housing sector, wool, innovation.*

-
- 1 Romanian Academy - Timisoara Branch, Research Center for Sustainable Rural Development of Romania, Timisoara, Romania.
 - 2 University of Life Sciences "King Mihai I" from Timisoara, Romania, Corresponding author email address: andreafeher@usvt.ro

ADVANCING BIOECONOMY: A CROSS-COUNTRY PERSPECTIVE ON EUROPE'S SUSTAINABLE FUTURE¹

Steliana Rodino^{2,3}

Abstract

The concept of a bioeconomy is rapidly gaining importance across European countries as a pathway towards a more sustainable and resilient future. This approach encourages a transition from a fossil fuel-dependent economy to one based on renewable and environmentally friendly resources. The concepts of bioeconomy and agri-environmental schemes are closely linked in Europe as both aim to promote sustainability and environmentally friendly practices in the agricultural sector. This article provides an overview of the progress and strategies of several European countries in the pursuit of a bioeconomy, with a specific touch on European Union's Common Agricultural Policy. The comparative approach will be used to assess the differences and commonalities in the implementation of agri-environmental schemes across European nations, with a focus on their impact on the bioeconomy. By analyzing these case studies, we can draw conclusions about the extent to which these schemes contribute to the development of a circular and sustainable agricultural system that aligns with bioeconomic principles.

Key words: *bioeconomy, environmental conservation, agriculture, sustainable practices.*

1 This research was realised with the support of Ministry of Agriculture and Rural Development, financed from Project ADER 22.1.4.

2 Institute of Research for Agriculture Economy and Rural Development, Bd Marasti, nr 61, Bucharest, Romania.

3 National Institute of Research and Development for Biological Sciences, Bucharest, Romania, e-mail: steliana.rodino@yahoo.com

REVEALING COMPARATIVE ADVANTAGES IN THE CHINA-SERBIA AGRICULTURAL TRADE

Vasilii Erokhin¹, Gao Tianming²

Abstract

Against the background of the growth of trade and economic ties between Serbia and China in recent decades, the contribution of the agricultural sector to the trade turnover may seem modest. The Serbia-China agricultural trade faces a number of imbalances that do not allow farmers to leverage their competitive advantages. There is a need to identify those commodity categories that might increasing trade turnover. The paper analyzes the parameters of the Serbia-China trade in major agricultural products in 2000-2022 to identify, compare, and match comparative advantages of the two countries. The study employs the sequential calculation of the index of concentration of foreign trade, the index of diversification of foreign trade, the index of market concentration of foreign trade, and the index of structural changes. The obtained index values are then compared with the values of the revealed comparative advantages index. A number of sectors are identified in which the comparative disadvantages of one country can be compensated by the comparative advantages of another in order to increase the Serbia-China agricultural trade.

Keywords: *Agriculture, comparative advantage, competitive advantage, trade.*

-
- 1 Vasilii Erokhin, Associate Professor, School of Economics and Management, Harbin Engineering University, Address: 145 Nantong Street, Harbin 150001, China, ORCID: 0000-0002-3745-5469, Phone: +8615636709072, E-mail: vasilii_erokhin@hrbeu.edu.cn
 - 2 Prof. Gao Tianming, School of Economics and Management, Harbin Engineering University, Address: 145 Nantong Street, Harbin 150001, China, ORCID: 0000-0002-5202-8684, Phone: +86-156-3670-9072, E-mail: gaotianming@hrbeu.edu.cn

DOES CATTLE PRODUCTION AFFECT GLOBAL WARMING?

Vesna Gantner¹, Ranko Gantner², Zvonimir Steiner³, Boro Krstić⁴,
Vera Popović⁵

Abstract

A strong livestock and cattle production sector is a necessary prerequisite for ensuring a reliable supply of quality food in all developed countries. Recent publications indicate that the global livestock industry is responsible for 14.5% of anthropogenic emissions, with the cattle sector accounting for 65%. Despite contributing to total emissions, the livestock sector has the potential to mitigate climate change by 14% to 41%. It is noteworthy that the livestock production sector is vital to food production, which is fundamental to human existence. However, the accuracy of these estimates is often called into question. There is currently a highly aggressive campaign against the livestock and cattle production sector, and it is essential to ascertain the interest groups behind this campaign and their motivations.

The question must be raised: would there be a push for artificial or vegan “meat” if there were no aggressive campaign against livestock production as the perceived cause of climate change?

Key words: *Cattle production, GHG emission, artificial meat, vegan.*

-
- 1 Vesna Gantner, Ph.D., Full professor, J.J. Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia, E-mail: vgantner@fazos.hr
 - 2 Ranko Gantner, Ph.D., Full professor, J.J. Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia, E-mail: rgantner@fazos.hr
 - 3 Zvonimir Steiner, Ph.D., Full professor, J.J. Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia, E-mail: zsteiner@fazos.hr
 - 4 Boro Krstić, Ph.D., Associate professor, Bijeljina University, Pavlovica street 024, Bijeljina, BiH, E-mail: direktor@ubn.rs.ba
 - 5 Vera Popović, Ph.D., Principal research fellow, Institute of Field and Vegetable Crops, Maksima Gorkog 30, Novi Sad, Serbia, E-mail: vera.popovic@ifvcns.ns.ac.rs

ECONOMIC OPTIMIZATION OF AGRICULTURAL PRODUCTION PROCESSES AS A RESPONSE TO ENVIRONMENTAL CHALLENGES¹

*Vili Dragomir*²

Abstract

Agriculture sector is a vital component of the global economy, providing the necessary food for a growing population. However, agriculture faces a dual challenge: on one hand, it must continue to ensure food security for a growing population, and on the other hand, it must address environmental challenges such as climate change, soil degradation, and pollution. The economic optimization of agricultural production processes is a key element to strike a balance between these two requirements. In this article, we will explore methods and strategies that can help agriculture become more economically efficient and environmentally friendly. Moreover, an overview of statistical indicators related to environment practices in Romania will be presented.

Key words: *economic efficiency; agriculture; optimization, development scenarios.*

1 This paper realised with the support of Ministry of Agriculture and Rural Development, financed from Project ADER 22.1.1 Designing technical-economic analysis models for the resilience and sustainability capacity of agricultural sector and the production processes optimization.

2 Vili Dragomir, PhD, Institute of Research for Agriculture Economy and Rural Development, Bd Marasti, nr 61, Bucharest, Romania, e-mail: vili.dragomir@iceadr.ro

PLENARY SECTION II
(15th December 2023)

AGRICULTURAL COOPERATIVES IN THE FUNCTION OF IMPROVEMENT OF MARKET POSITION OF FARMERS IN VOJVODINA

Jelena Nestorov Bizonj¹

Abstract

Cooperative movement in Vojvodina has a long and rich history. Agricultural cooperatives have been, since their beginnings to today, the predominant type of cooperatives. Considering the long tradition of agricultural production in Vojvodina, as well as the fact that the largest part of the cultivated land is owned by family agricultural holdings which are small, organizing farmers into cooperatives has been the imperative way of improving their market position.

Organizing farmers into cooperatives and merging their offer and demand through joint market appearance, improves their market position, in comparison to an independent market appearance. Equipping cooperatives with property and other capacities directly affects the scope of services a cooperative can offer to its cooperative members, for the purpose of improving their market position to the greatest extent.

Key words: *agricultural cooperatives, farmers, market position.*

1 M.Sc., Jelena Nestorov Bizonj, Cooperative Union of Vojvodina, Novi Sad, Serbia, Phone: +381641410570, E-mail: zsvoffice@gmail.com

THE INFLUENCE OF FOREIGN DIRECT INVESTMENTS ON THE IMPROVEMENT OF AGRIBUSINESS

Marijana Joksimović¹

Abstract

The current financial situation in the world as a result of Covid-19 and the war in Ukraine has a great impact on foreign direct investments (FDI) and thus on the improvement of agribusiness in the European Union and the Republic of Serbia. The dimensions of the national economy, such as the packages for attracting FDI, the competitiveness of the economy of the observed countries in relation to the countries in the region, have a great influence on their attraction.

In the paper, the author investigates the impact of FDI on the improvement of agribusiness. In order to draw adequate conclusions, the data used in the paper are official data of the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Conference on Trade and Development (UNCTAD). The time series used in the paper includes data relating to the period from 2017 to 2021. All data used from 2017 to 2021 in the paper are annual.

Key words: *Foreign direct investment, Agribusiness, European Union, Republic of Serbia and Economy.*

1 Ph.D., Marijana Joksimović, Full Time Professor, Alfa BK University, Faculty of Finance, Banking and Auditing, Belgrade, Serbia, E- mail: joksimovicmarijana80@gmail.com; ORCID: <https://orcid.org/0000-0002-5939-5137>

MULTI-RESISTANCE OF *CERCOSPORA BETICOLA* TO MBC, DMI AND QoI FUNGICIDES AND IMPACT ON MANAGMENT¹

Nenad Trkulja²

Abstract

Cercospora leaf spot (CLS) caused by Cercospora beticola in Serbia occurs annually causing severe yield losses of sugar beet, which requires intensive use of fungicides. Over the last four years we have observed unsatisfactory control of CLS at the main sugar beet growing regions. Sugar beet production in Serbia was faced with dramatic decrease in efficacy of fungicides intended for Cercospora beticola control. CLS management over the years included intensive use of three groups of fungicides with different modes of action i.e. benzimidazole (MBC), triazole (DMI) and strobilurin (QoI), consequently imposing C. beticola resistance selection pressure. Multi-resistant populations to QoI, DMI and MBC were detected. The genetic basis underlying the resistance was tested by characterizing the cyt b, CYP51 and β -tubulin genes, associated with resistance to QoI, DMI and MBC fungicides, respectively. Isolates that were resistant to QoI fungicides had the G143A mutation within the cyt b gene. Characterization of CYP51 gene revealed seven diverse haplotypes; however, no correlation with sensitivity or resistance to DMI fungicides could be identified. Resistance to MBC fungicides was associated with presence of the E198A mutation in the β -tubulin gene of all resistant isolates. Depending on the resistance development three multi-resistant phenotypes were identified: MR1 - resistant to QoI and DMI fungicides, sensitive to MBC fungicides; MR2 - DMI and MBC resistant, sensitive to QoI; and MR3, resistant to all three groups (QoI, DMI and MBC) of fungicides. This finding provides a new insight on development of multi-resistance of C. beticola to MBC, QoI and DMI fungicides which had a strong impact on CLS managment.

Key word: *Cerospora leaf spot (CLS), fungicides, Serbia.*

-
- 1 Project: Ministry of Education, Science and Technological Development, Republic of Serbia, Grant no. 200010 (Institute for Plant Protection and Environment, Belgrade) (RS-200010)
 - 2 Ph.D., Trkulja Nenad, Senior research Associate, Institute for Plant Protection and Environment, Teodora Drajzera 9, 11000 Belgrade, Serbia, e-mail: trkulja_nenad@yahoo.com

ADDING VALUE IN SHEEP FARMING THROUGH THE DEVELOPMENT OF ALTERNATIVE PRODUCTS

Radivoj Prodanović¹, Dragan Ivanišević²

Abstract

The goal of the research was to identify opportunities and strategies for improving sheep farming through the development of alternative products, with a special focus on creating additional value.

The research was based on a qualitative method, using interviews. Interviews were conducted with farmers involved in sheep farming, who were also engaged in the development of alternative products.

The results indicate that selling sheep is not the most profitable option, and it would be good to find alternative ways to generate income from sheep farming. Opportunities to create additional value include: processing sheep meat, selling breeding animals, and using sheep in rural tourism. The interviewees mentioned that, in addition to meat, milk, cheese, leather, wool, and wool products, profit can also be made from meat processing and involving sheep in tourism. Other recommendations included focusing on specific high-value products, such as dried sheep meat and other processed products, or even using sheep for therapeutic purposes.

There are numerous additional benefits for consumers from the development of alternative sheep farming products. People would bring their children to the countryside and have higher-quality food, as sheep meat, or lamb, is a culinary specialty.

Diversifying production and adding value in sheep farming can contribute to sustainable economic development in rural communities and strengthen competitiveness in the agro-industrial sector.

Key words: *sheep farming, added value, alternative product.*

- 1 Radivoj Prodanovic, Ph.D., Assistant Professor, University Business Academy in Novi Sad, Faculty of Economics and Engineering Management in Novi Sad, Cvecarska 2, 21000 Novi Sad, Serbia, Phone: +381 21 400 484, E-mail: rprodanovic@fimek.edu.rs
- 2 Dragan Ivanišević, Ph.D., Assistant Professor, International Center of Professional Studies (ICEPS), Pariske komune 24, 11000 Belgrade, Serbia, Phone: +381 21 523 107, E-mail: ivanisevicdragan67@gmail.com

NEW APPROACHES TO INVESTMENT DECISIONS ON AGRICULTURAL HOLDINGS

Sanjin Ivanović¹, Saša Todorović²

Abstract

Managers of agricultural holdings often have to make decisions related to investments in fixed assets. The most common approach to evaluate investment effectiveness is application of discounting methods, such as Net Present Value (NPV) and Internal Rate of Return (IRR). Nevertheless, it is known that these methods face certain issues, primarily when it comes to evaluation of mutually exclusive projects. At the same time, one of the most important concerns is related to reinvestment rate which is applied for NPV and IRR calculation. Therefore, this research deals with possibilities and problems of using some innovative investment evaluation approaches, primarily Modified Internal Rate of Return (MIRR). Authors discussed an example of investment in fixed assets specific for agricultural production to analyze reinvestment rate assumptions and its influence on investment decisions. At the same time, authors recognized a need to question basic assumption related to MIRR approach, and discussed possible solutions to the problem.

Key words: *capital budgeting, managerial decisions, NPV, IRR, MIRR, reinvestment rate.*

-
- 1 Sanjin Ivanović, Ph.D., Full Professor, University of Belgrade, Faculty of Agriculture, Nemanjina 6, 11080 Belgrade – Zemun, Serbia, e-mail: sanjinivanovic@agrif.bg.ac.rs; Phone: +381 11 441 3426, ORCID ID 0000-0002-2005-9910
 - 2 Saša Todorović, Ph.D., Assistant Professor, University of Belgrade, Faculty of Agriculture, Nemanjina 6, 11080 Belgrade – Zemun, Serbia, e-mail: sasat@agrif.bg.ac.rs; Phone: +381 11 441 3413, ORCID ID 0000-0002-9897-473X

SOCIALLY RESPONSIBLE STATE BUSINESS AND AGRICULTURAL LAND RESTITUTION PROCEDURE

Snežana Cico¹, Ljiljana Rajnović²

Abstract

In this paper, the authors analyze the conditions and procedure for returning confiscated agricultural land to the previous owners, that is, their heirs, and the state's attitude towards the said procedure. The obligation to return the land represents a kind of correction of the injustice that was done to the previous owners, and in this connection a just compensation of the owner of the restitution. However, based on the analysis of cases and publicly available information, the authors determined that it cannot be said that the state is consistent in respecting the principle of justice, when considering the amount of state land in local self-government units that are eligible for return in the restitution procedure and quantity intended for return. Considering the obligation of socially responsible behavior in all, including in this procedure, all business entities, and especially the state, which should be an example of respecting the rules of social responsibility and morality, the authors came to the conclusion that the state must show much more conscientiousness and fairness in return procedures confiscated property.

Key words: *socially responsible business, the state's attitude towards restitution, restitution, agricultural land, property.*

1 Snežana Cico, Ph.D., Research Associate, PUK Prostor Sombor, Sombor, Serbia, phone: 0648568699, e-mail: snezanacico@gmail.com

2 Ljiljana Rajnović, Ph.D., Senior Research Associate, Institute for Agricultural Economics, Volgina 15, Belgrade, Serbia, phone: 063273237, e-mail: rajnoviclj@gmail.com

IMPACT OF RESEARCH AND DEVELOPMENT INVESTMENT ON MEDIUM-SIZED AGRICULTURAL ENTERPRISES' BUSINESS SUCCESS IN SERBIA

Sonja Đuričin¹

Abstract

Research and development (R&D) investment marks a company's initial foray into fostering innovation. Through R&D, companies have the chance to enhance existing processes and create novel business processes, products, and services. Innovative processes, products, and services bestow a competitive edge, result in time, and resource savings, and promote diversified operations, rendering businesses less vulnerable to market fluctuations. The research objective is to assess how R&D investments affect the success of medium-sized agricultural businesses in the Republic of Serbia between 2020 and 2021. The subject of the research is the key financial performance of medium-sized agricultural enterprises in 2020-2021. The performance value was determined by applying financial analysis. The data were collected from the official financial reports of all medium-sized agricultural enterprises that are registered in the Republic of Serbia. The research is grounded in the hypothesis that medium-sized agricultural enterprises, which allocate resources to research and development, achieve superior financial performance compared to the average performance observed among all medium-sized enterprises. The research findings have practical implications for policy development in this area and are of great importance to business leaders in developing operational and strategic business goals.

Key words: *research and development, medium-sized agricultural enterprises, financial performance, business success.*

1 Sonja Đuričin, Ph.D., Senior Research Associate, Institute of Economic Sciences, Zmaj Jovina 12, Belgrade, Serbia, phone: +381 11 2622 357, e-mail: sonja.djuricin@ien.bg.ac.rs

ECONOMIC ASPECTS OF MILK PRODUCTION AND COTTAGE CHEESE AS A TRADITIONAL DAIRY PRODUCT ON FAMILY FARMS IN SERBIA

Vedran Tomić¹, Robert Radišić²

Abstract

Serbia's advantageous natural conditions support livestock production, particularly cow's milk production, with an annual average of 1.5 billion liters, primarily from small farms. However, only 35.1% of the total milk production undergoes processing. Research focuses on the economic aspects of milk production and its transformation into cottage cheese on family farms.

A model for traditional milk product production on family farms was developed and analyzed using analytical calculations based on variable costs. The results revealed a €0.24 difference in production cost per liter between raw and processed milk, and a €0.68 difference in selling price. The study suggests that farms with up to 15 dairy heads should consider milk processing and product finalization. This research sheds light on the potential benefits of processing milk on family farms, offering valuable insights for the dairy industry in Serbia.

Key words: *economic aspects, dairy farms, milk production and processing, competitiveness, production costs.*

-
- 1 Vedran Tomić, Ph.D., Scientific Associate, Institute for Science Application in Agriculture, 68b Blvd. despot Stefan, 11000 Belgrade, Serbia, Phone: +381 11 27 51 622, E-mail: vtomic@ipn.bg.ac.rs, ORCID ID (<https://orcid.org/0000-0003-2383-721X>)
 - 2 Robert Radišić, Ph.D., Scientific Associate, Institute for Science Application in Agriculture, 68b Blvd. despot Stefan, 11000 Belgrade, Serbia, Phone: +381 11 27 51 622, E-mail: rradisic@ipn.bg.ac.rs, ORCID ID (<https://orcid.org/0000-0002-7161-1269>)

I SECTION - AGRIBUSINESS

THE ECONOMIC CHARACTERISTICS OF AGRICULTURAL HOLDINGS IN THE REPUBLIC OF SERBIA¹

Aleksandar Miljatović², Veljko Vukoje³, Veljko Šarac⁴

Abstract

The aim of the research is to analyse and evaluate trend of basic production and economic indicators of agricultural holdings in the Republic of Serbia. The focus is on the comparative analysis of agricultural holdings according to type of farming. The study is based on the Serbian FADN data for the period from 2017 to 2021. The research results have shown that farm net value added per annual work unit and family farm income per family unit both had strong growth tendency. Namely, these indicators increased in comparison to the last year for even 63.9% and 78.6% respectively, while the increase was even higher compared to 2017, 198.5% and 226.6% respectively. The highest values of analysed indicators were recorded in the field crop farming system, followed by poultry and pig production. On the other side, holdings specialising in grazing livestock had the worst results, because of the extensive production they were involved into and the fact that is mostly about holdings in mountain and areas with natural constraints.

Key words: *comparative analysis, agricultural holdings, farm net value added, family farm income.*

-
- 1 The research was supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia (grant number: 451-03-47/2023-01/200117).
 - 2 Aleksandar Miljatović, MAgREc, Teaching Assistant, University of Novi Sad, Faculty of Agriculture, Trg Dositeja Obradovića 8, 21000 Novi Sad, Serbia, Phone: +381 21 485 3239, E-mail: aleksandar.miljatovic@polj.uns.ac.rs
 - 3 Veljko Vukoje, Ph.D., Full Professor, University of Novi Sad, Faculty of Agriculture, Trg Dositeja Obradovića 8, 21000 Novi Sad, Serbia, Phone: +381 21 485 3397, E-mail: vukoje@polj.uns.ac.rs
 - 4 Veljko Šarac, MAgREc, Teaching Assistant, University of Novi Sad, Faculty of Agriculture, Trg Dositeja Obradovića 8, 21000 Novi Sad, Serbia, E-mail: veljko.sarac@polj.uns.ac.rs

TECHNO-ECONOMIC MODELS FOR ANALYSIS AND OPTIMIZATION OF ECONOMIC PROCESSES IN AGRICULTURE

Ana Ursu¹

Abstract

In the economic processes in agriculture, methods and techniques of analysis are used which contribute to the understanding of the mechanisms of elaboration and rationale of the different activities related to the technology of plant cultivation and/or animal husbandry, of physical and value quantification of the measurable units entering the production process, as well as of their optimization in order to maximize economic efficiency. The aim of the paper is to present the mechanisms that make up the logical and relational steps that define production systems in agriculture and to simulate techno-economic models of analysis and optimization useful in the knowledge and management of agricultural production systems. The conclusions of the paper define the information resulting from the processing of the data and the decisions that the economic agent must adopt in relation to the objectives pursued.

Key words: *agriculture, methods and techniques, simulation, optimization, decision.*

1 Ana Ursu, Ph.D., Institute of Agricultural Economics and Rural Development, Marasti Avenue no 61, Bucharest, Romania, Phone: + 40740093984, E-mail: ursu.ana@iceadr.ro

A SUMMERY ANALYSIS OF SUSTAINABLE FAMILY FARMING IN THE EUROPEAN UNION

*Bianca Florentina Nistoroiu¹, Stefan Laurentiu Prahoveanu²,
Sergej Vasić³*

Abstract

This study examines aspects of sustainable family farming in the context of the European Union (EU). Considering the significant global challenges of food security, biodiversity erosion, and climate change, this project aims to investigate the contribution of family farms in the EU agricultural landscape to sustainability, resilience, and socioeconomic development. The study will also examine the impact of EU support programs and policies on the adoption of sustainable farming practices by family farms. In addition, the study will analyze the potential overlaps or conflicts between sustainable agriculture and broader EU policy objectives, including the European Green Deal and the Common Agricultural Policy (CAP). The main conclusions are anticipated to add to the body of knowledge on sustainable agriculture by shedding light on the particular difficulties encountered by family-owned farms in the EU and making suggestions for changes to legislation and other actions. In the end, the study aims to deepen its understanding of the complex interplay between sustainability and family farming, offering a basis for well-informed policy development and decision-making in the drive for a more resilient and environmentally sound agricultural sector in the European Union.

Key words: *farming, sustainability, environment, policy, objectives.*

-
- 1 Bianca Florentina Nistoroiu, Ph.D. student, Bucharest University of Economic Studies, Doctoral School Economics II, Mihail Moxa, Str., No. 5-, Bucharest, Romania, E-mail: nistoroiu-bianca@yahoo.com
 - 2 Stefan Laurentiu Prahoveanu, Ph.D. student, School of Advanced Studies of the Romanian Academy, Bucharest, Romania, E-mail: mafteiprahoveanu@yahoo.com
 - 3 Sergej Vasić, M.A., MCI The Entrepreneurial School, Innsbruck, Universitaetsstrasse 15, 6020 Innsbruck, Austria, E-mail: sergej.vasic@gmail.com

NEGATIVE TRENDS IN AGRICULTURAL LAND MANAGEMENT POLICY IN GENERAL WITH SPECIAL REFERENCE TO MACEDONIA

Blagica Sekovska¹, Vasilka Poposka Trenevskaa²

Abstract

In last several decades one phenomenon regarding land policy occurred. In the past decade, more than 81 million acres of land worldwide—an area the size of Portugal—has been sold off to foreign investors. Some of these deals are what’s known as land grabs: The term “land grabs” was defined in the Tirana Declaration (2011) by the International Land Coalition, consisting of 116 organizations from community groups to the World Bank. Land grabbing is the large-scale acquisition of land through buying or leasing of large pieces of land by domestic and transnational companies, governments, and individuals. Land grabbing occurs mostly in countries with dysfunctional and corrupt governments. Without arable land, small farmers cannot produce any food, and fair compensation, jobs, and appropriate wages for hard work on the new plantations turn out to be empty promises.

Balkan countries are not exception of this trend. The case in Romania is especially significant regard land grabbing. Macedonia is also facing the appetites of domestic and foreign companies interested in purchasing agricultural land. The law on agricultural land has been subject to change several times, until now.

Key words: *land grabbing, agricultural land policy, food security.*

-
- 1 Blagica Sekovska Ph.D., Full time professor, Department of rural economy, management and biostatistics, Faculty of veterinary medicine, University “St. Cyril and Methodius” – Skopje, Republic of Macedonia, e-mail: bsekovska@fvm.ukim.edu.mk
 - 2 Vasilka Poposka Trenevskaa Ph.D., Full time professor, Department of rural economy, management and biostatistics, Faculty of veterinary medicine, University “St. Cyril and Methodius” – Skopje, Republic of Macedonia, e-mail: vpreneska@fvm.ukim.edu.mk

NON-STANDARD FORMS OF EMPLOYMENT IN THE ROMANIAN AGRICULTURE

Gheorghe Dan Isbășoiu¹, Dana Volosevici²

Abstract

In traditional agricultural countries such as Romania, employment in agriculture is still high. This article examines the ways in which employment relationships in the field of agriculture are translated into contractual forms, particularly because the specificity of agricultural activities necessitates the use of non-standard forms of employment, to ensure flexibility and to respect the seasonal nature of work. However, excessive flexibility may have negative effects on the security of employment relationships and the career management of workers. Additionally, non-standard forms of employment are associated with lower-skilled occupations and are used to a significant extent for vulnerable groups, such as young people and women. For these reasons, a scrutiny of the types of contracts and the number of employees involved in this type of employment relationship is necessary and could contribute to improving the legislative framework, aiming to enhance the legal situation of employees involved in agricultural activities.

Key words: *employment, flexibility, agriculture.*

1 Prof. Gheorghe Dan Isbășoiu, Ph.D., Petroleum-Gas University of Ploiesti, Faculty of Economic Sciences, Ploiesti, Romania, e-mail: dan.g.isbasoiu@gmail.com

2 Ph.D. Dana Volosevici, Lecturer, Petroleum-Gas University Ploiesti, Ploiesti, Romania, e-mail: dana.volosevici@vplaw.ro

TAX ASPECT OF THE ACCOUNTING OF PERENNIAL PLANTINGS

Jovana Dedić¹, Radovan Pejanović², Jelica Eremić Đodić³

Abstract

Taxable profit is determined by applying the provisions of the Law on Profit Tax. It primarily depends on the amount of accounting profit before taxation. In the Republic of Serbia, obligees of the implementation of the Law on Accounting apply three different accounting regulations (IFRS, IFRS for SMEs and Rulebook for micro and other legal entities) which treat fruit-bearing plants (which include most perennial plantings) in different ways.

This difference affects the earlier or later recognition of gains or losses related to fruit-bearing plants, and thus affects the periodic allocation of income tax liability and consequently affects cash flows.

The aim of this paper is to express that by choosing the appropriate accounting regulations, tax expenses and liabilities can be managed, and consequently the related cash flows, which can contribute to a more successful business of the entity. In our work, we use basic scientific methods: the method of analysis and synthesis, the inductive and deductive method, the method of description and the method of comparison.

Key words: *perennial plantings, fruit-bearing plants, profit tax, accounting regulation, IFRS.*

1 Jovana Dedić, Ph.D. student, Singidunum University, Belgrade, Serbia, phone: 0642546843, e-mail: jovana_dedic@yahoo.com;

2 Radovan Pejanović, Ph.D., Full professor in retirement, University in Novi Sad, Faculty of Agriculture, phone. +381 63 600 217, e-mail: radovan.pejanovic0603@gmail.com

3 Jelica Eremić Đodić, Ph.D., University Educons, Sremska Kamenica, Serbia, phone: 061/253-2123, e-mail: jelicaerdjo01@gmail.com

INVESTMENT IN CREATING THE VALUE ADDED IN LIVESTOCK PRODUCTION¹

Marko Jeločnik², Lana Nastić³, Božo Ilić⁴

Abstract

Livestock production is one of the most important sectors that generally increases overall profitability gained in agriculture. It could be a good alternative to farms that have available large areas under the crop production. Special segment of livestock growing is milk production and further gaining of value added through the milk processing. Locally, within the dairy production traditionally appears full-fat cow cheese. In performed research was tested the economic justification of initial investment in cow milk production and later milk processing into the full-fat cheese that will enable the sustainability and increase in gained profits at observed farm located in northern part of Montenegro. Investment analysis involves appliance of usual set of indicators, mainly NPV, IRR and DPBP. Gained results have been showed that the investment decision could be considered as fully justified for the farmer.

Key words: *investment, livestock production, value added, full-fat cow cheese production.*

1 Paper is a part of research financed by the MSTDI RS, agreed in decision no. 451-03-47/2023-01/200009 from 3.2.2023.

2 Marko Jeločnik, Ph.D., Senior Research Associate, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 64 66 88 357, E-mail: marko_j@iep.bg.ac.rs

3 Lana Nastić, Ph.D., Research Associate, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 63 88 73 826, E-mail: лана_n@iep.bg.ac.rs

4 Božo Ilić, Ph.D., Associate Professor of Professional Studies, Director of Rico Training Centre, Belgrade, Serbia, Academy of Professional Studies Šumadija, Department in Aranđelovac, Josifa Pančića Street no. 11, 34300 Aranđelovac, Serbia, Phone: +381 64 614 83 05, E-mail: ilicdirektor@gmail.com

SELECTION OF SUSTAINABLE SUPPLIERS IN AGRICULTURAL ENTERPRISES¹

Miroslav Nedeljković², Milorad Đokić³, Velibor Potrebić⁴

Abstract

The aim of the work was to select sustainable suppliers for the agricultural enterprise according to predetermined criteria. The subject of choice was mineral fertilizer, given that the company is registered for the production and sale of grain wholesale and retail. For the purpose of selection, we used multi-criteria decision-making, that is, the MABAC method of multi-criteria decision-making. The decision makers were employed engineers in the company in question. The work focused on five suppliers and ten criteria, and the criteria “pollution control” and “quality” received the highest value when evaluating the criteria. The results showed that the fifth selected supplier best met the set criteria. Future research should be based on the development of new decision-making methods in order to make rational decisions that are particularly important for this sector of the economy.

Key words: *suppliers, multi-criteria decision-making, MABAC method, agricultural enterprise, sustainability.*

1 Paper is a part of research financed by the MSTD I RS, agreed in decision no. 451-03-47/2023-01/200009 from 3.2.2023.

2 Miroslav Nedeljković, Ph.D., Research Associate, Institute of Agricultural Economics, Belgrade, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 65 447 1201, E-mail: miroslav_n@iep.bg.ac.rs

3 Milorad Đokić, Ph.D., Assistant Professor, Faculty of Agriculture, Bijeljina University, Pavlovica Street no. 24, 76300 Bijeljina, BiH, Phone: +381 65 685 9337, E-mail: milorad59@yahoo.com

4 Velibor Potrebić, M.Sc., Senior Professional Research, Institute of Agricultural Economics, Belgrade, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 11 69 72 858, E-mail: velibor_p@iep.bg.ac.rs

STUDY ABOUT EVOLUTION OF THE ROMANIAN OILSEED MARKET AND ROMANIAN PLACE IN THE INTERNATIONAL TRADE WITH OILSEED

Silviu Beciu, Georgiana Armenița Arghiroiu, Maria Bobeică Colpoș¹

Abstract

This paper is focused on the analyse of the Romanian oilseed market evolution during recent years and its contribution in the international trade with oilseed. The research method is related with the quantitative methods, based on official available time data series about oilseed production and trade. The results indicated that Romania became a top producer and exporter on EU oilseed market, and many Romanian farmers focused in the last years on oilseed production, due the high imports demand on worlds markets and attractive national production and trade context.

Key words: *trade, oilseed market, Romania.*

1 Silviu Beciu, Georgiana Armenița Arghiroiu, Maria Bobeică Colpoș, University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone: +40213182564, Fax: +40213182888, Mobile: +40723165907, E-mails: beciu.silviu@gmail.com, armenitaarghiroiu@gmail.com, maria.colpos18@gmail.com

ANALYSIS OF CEREAL FOREIGN TRADE IN EUROPEAN UNION

Steliana Mocanu¹, Ionut Laurentiu Petre², Marilena E. Potârniche Berheci³

Abstract

Given the fact that worldwide, cereal grains are considered a major component of the diet (Awika, 2011), and in 2022 the harvested production of cereals for the production of grain (including seed) was 270.942 thousand tones, this market deserve to be investigated. In brief, this paper will provide a snapshot of the current situation on cereal market, the more so as the economic context (the war between Ukraine and Russia) changed the dynamics of this market in the last years. The research involves also a bibliographic analysis on the subject of „foreign trade” which was made using VOSviewer software, based on Web of Science database query that revealed 12.297 scientific documents that contains the term “fish market”. In this detailed context, we consider that the paper brings an important status about the situation of fish foreign trade in European Union.

Key words: *foreign trade, bibliometric analysis, cereals, European Union.*

-
- 1 Steliana Mocanu, Ph..D. student, Bucharest University of Economic Studies, Piata Romana no. 6, Bucharest, Romania, phone: +40784634265, e-mail: mocanusteliana18@stud.ase.ro
 - 2 Ionut Laurentiu Petre, Ph.D., Postdoctoral School ASE-IOSUD, Bucharest University of Economic Studies, Faculty of Agro-food and Environmental Economics, 6 Piata Romana, Sector 1, Bucharest, Romania, phone: 0213191900/249, e-mail: laurentiu.petre@eam.ase.ro
 - 3 Marilena E. Potârniche Berheci, Ph.D. student, Bucharest University of Economic Studies, Piata Romana no. 6, Bucharest, Romania, Phone: +40722229243, e-mail: marilenaberheci@gmail.com

AGRIBUSINESS IN TERMS OF EDUCATIONAL OFFER AND EMPLOYMENT OPPORTUNITIES - STUDY CASE ROMANIA

*Simona Cosmina Toader¹, Ioan Brad², Ciprian Ioan Rujescu³,
Monica Ocnean⁴, Jakub Skorupa⁵*

Abstract

Agribusiness as part of the study program combines principles of economics, agriculture, processing, trade and management, indispensable for increasing the opportunities for graduates to enter the labor market. Starting from the educational offer and the availability of jobs in the field of agribusiness, the article includes an analysis at the level of the 4 macro-regions in Romania of the employment opportunities in the field under study. The study involves the collection, processing and analysis of information found in national statistics, such as the number of available jobs, the number of companies active in the agribusiness field and the share occupied by the agricultural area. The purpose of the article is to determine the correlation between the number of study programs, the number of jobs and the agricultural potential at the level of the 4 macro-regions of Romania.

Key words: *Agribusiness, study programe, jobs, Romania.*

-
- 1 Toader Cosmina Simona, University of Life Sciences "King Mihai I" from Timisoara, Faculty of Management and Rural Tourism, Timisoara, Romania, e-mail: cosminatoader@usab-tm.ro
 - 2 Brad Ioan, University of Life Sciences "King Mihai I" from Timisoara, Faculty of Management and Rural Tourism, Timisoara, Romania.
 - 3 Rujescu Ciprian-Ioan, University of Life Sciences "King Mihai I" from Timisoara, Faculty of Management and Rural Tourism, timisoara, Romania.
 - 4 Ocnean Monica, University of Life Sciences "King Mihai I" from Timisoara, Faculty of Management and Rural Tourism, Timisoara, Romania.
 - 5 Skorupa Jakub, University of Economics and Business, Poznań, Poland.

THE GLOBALG.A.P. CERTIFICATION SCHEME IN SERBIAN AGRICULTURE: CONSULTANTS' ATTITUDES¹

Vesna Paraušić², Bojana Bekić Šarić³, Jasna Babić⁴

Abstract

The authors examine the progress of Serbia in the implementation of the GLOBALG.A.P IFA standard, as well as the quality of the business environment for its implementation. Data on the number of certified producers were obtained from the GLOBALG.A.P. organisation which is the standard's owner. The business environment was assessed based on the results of the interviews with six representatives of domestic consulting companies which provide support to farmers in certification processes. The results show that although Serbia is making progress in this field (considering the number of GLOBALG.A.P. certified producers according to indicators), the percentage share of certified farmers in the total number of farmers is extremely low and can be expressed by parts per thousand. The authors identified numerous systemic problems in the process of the standard implementation, as well as the limitations related to high implementation and certification costs.

Key words: *Sustainable agriculture, farm certification scheme, Serbia, business environment.*

-
- 1 The paper is a part of research financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia (decision No. 451-03-47/2023-01/200009).
 - 2 Vesna Paraušić, Ph.D., Institute of Agricultural Economics, Volgina 15, Belgrade, Serbia, e-mail: vesna_pa@iep.bg.ac.rs; vparausic@gmail.com
 - 3 Bojana Bekić Šarić, Ph.D. student, Institute of Agricultural Economics, Volgina 15, Belgrade, Serbia, e-mail: bojana_b@iep.bg.ac.rs
 - 4 Jasna Babić, Ph.D., Faculty of Economics and Business, University of Belgrade, Kamenička 6, Belgrade, Serbia, e-mail: jasna.babic@ekof.bg.ac.rs

AN OVERVIEW OF THE EUROPEAN UNION WINE SECTOR DYNAMICS: AN EMPIRICAL ANALYSIS FROM THE ROMANIAN PERSPECTIVE

Violeta Sima¹, Ileana Georgiana Gheorghe²

Abstract

The European Union is the world's largest producer and exporter of wine, the wine sector being the export leader among the EU's agri-food sectors. Climate challenges, along with the increase in the price of electricity and the decrease in purchasing power, have challenged the world of wine. This paper aims to evaluate the general aspects of the European Union wine sector dynamics from the Romanian perspective. For the analysis, we used the following indicators: the area cultivated with grapes, wine production, in total and by region, wine export and consumption, the number of vineyards, the average surface area of the vineyard, the age of the vineyard and the ratio between area dedicated to superior quality wine and that which belongs to table wine. The main results of the analysis could serve as input for decision-makers in developing agricultural guidelines in terms of functionality and application in understanding developments in the wine sector.

Key words: *Wine sector; wine production, vineyard surface area, wine consumption.*

1 Violeta Sima, Ph.D., Associate Professor, Petroleum-Gas University of Ploiesti, 39, B-dul Bucuresti, Ploiesti, 100680, Romania, E-mail: vsima@upg-ploiesti.ro, ORCID ID (<https://orcid.org/0000-0001-5958-8222>)

2 Ileana Georgiana Gheorghe, Ph.D., Associate Professor, Petroleum-Gas University of Ploiesti, 39, B-dul Bucuresti, Ploiesti, 100680, Romania, E-mail: ileghe2016@gmail.com, ORCID ID (<https://orcid.org/0000-0002-5220-9864>)

ANALYSIS OF AGRICULTURAL POLICY DEVELOPMENTS IN SERBIA¹

Vlado Kovačević²

Abstract

The aim of the paper is to analyze the measures of agricultural policy and provide recommendations for its improvement. The Republic of Serbia implements agricultural policy measures at the national level, at the level of the Autonomous Province of Vojvodina, local self-governments and within the framework of the IPARD program. In addition to the above, the arrector also has other measures of support from various donors. In the work, the research method of literature review of legal regulations, the scope and measure of subsidies and the effects of the mentioned measures was supported. The most significant results that have been evidenced are the dominance of directly coupled subsidies, while the share of rural development measures has decreased. Furthermore, the legal framework was analyzed and the existence of numerous systemic limitations are evidenced, negatively affect the Serbian agriculture competitiveness, protection of the environment and human health. The need to improve the legal framework is particularly significant in the sector of farmers' interest associations, regulation of GMO, control of pesticide traffic, etc.

Key words: *Agricultural support, IPARD, Rural development.*

1 Paper is a part of research financed by the MSTDI RS, agreed in decision no. 451-03-47/2023-01/200009 from 3.2.2023.

2 Vlado Kovačević Ph.D., Senior Research Associate, Institute of Agricultural Economics, Volgina 15 Street, 11000 Belgrade, Serbia, phone: +38163554414, e-mail: vlado_k@iep.bg.ac.rs

COMPLEX BUSINESS SYSTEM MANAGEMENT IN AN AGRO-INDUSTRIAL COMPLEX¹

Zoran Simonović², Biljana Ilić³

Abstract

Management of business functions in the business system also includes management in agricultural production. It indicates that the production process, other company operations (procurement, sales, and finance), and the work, means of production, products of production, and technology are all harmonized. Production management's primary objective is to maximize the economic benefits; all other secondary goals (technological, social, and production) must serve this primary objective. When achieving goals, it should also take care of ecology. The management model of a complex business system connected to the agro-industrial complex, which will comprise independent variables and constraint matrices, will be the main topic of the study.

Key words: *Agricultural management, business system, economic objective, independent variables, constraint matrices.*

1 Paper is a part of research financed by the MSTDI RS, agreed in decision no. 451-03-47/2023-01/200009 from 3.2.2023.

2 Zoran Simonović, Ph.D., Senior Scientific Associate, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 11 697 28 58, E-mail: zoki@medianis.net.

3 Biljana Ilić, Ph.D., Associate professor, Educons University, Faculty of Project and Innovation Management „Petar Jovanovic”, Belgrade, Bozidar Jankovic Street no. 14, 11000 Belgrade, Serbia, Phone: +381 62 33 1077, E-mail: bilja0110@gmail.com

II SECTION - BIOTECHNOLOGY

ECONOMIC EFFECTIVENESS OF APPLICATION OF BIOSTIMULATORS IN SPRING OATS¹

Angel Sarov², Ekaterina Tzvetanova³

Abstract

The use of biostimulants in agriculture is a key approach to organic production in the context of fulfilling the EU Green Deal objectives. The aim of the present study is to determine the economic effect of applying foliar organic fertilizers to spring oats. Biostimulants are developed based on chitosan, vermicompost extract, and a naturally identical growth regulator. An economic-mathematical analysis model is applied, for which a system of inequalities and constraints is used. The analyzes of the scientific team are based on the hypothesis that it is possible to apply biostimulants to significantly increase the yield of spring oats per unit area, but not to increase the profit of the agricultural holding as a whole. The research team accepts that those biostimulants that increase the economic efficiency of the farm are considered beneficial. It was derived conclusions.

Key words: *Economic effectiveness, biostimulants, spring oats.*

1 The present study was carried out with the financial support of the Project “Use of biostimulants in biological cultivation of agricultural crops - evaluation of the contribution to the bioeconomy”, financed by Contract No. KP-06-H46/6 of 27.11.2020 from Nauch. Scientific Research Fund of the Ministry of Education and Science.

2 Angel Sarov, Associate Professor, Ph.D., Institute of Agricultural Economics, Sofia, Bulgaria, e-mail: angelsarov@abv.bg

3 Ekaterina Tzvetanova, Associate Professor, Ph.D., New Bulgarian University, Sofia, Bulgaria

TESTING THE EFFECT OF AN INNOVATIVE PRODUCT OF THE COMPANY HUMATE ROST FOR VEGETATIVE FOLIAR NUTRITION ON THE DEVELOPMENT OF OIL SUNFLOWER (*HELIANTHUS ANNUUS L.*) UNDER THE CONDITIONS OF DOBRUDJA

Georgi Georgiev¹

Abstract

The experiments were carried out at the experimental plot of Dobrudja Agricultural Institute, Dobrudja. General Toshevo. The soil type is Haplic Chernozems. The ancestor is wheat. The sowing was carried out in the optimal time - 20. 05. 2023. The sowing was done manually at a row spacing of 0.70cm. The trial was seeded with a plot size of 30m² The trials were laid out using the block method in 2 replicates randomized. The observations were carried out according to the accepted UPOV methodologies. The metrics were taken from all the options with the aim of analysing the yield structure. The following phenological parameters were recorded during the vegetation of sunflower: sowing, emergence, 2-3 leaf stage, budding, beginning of flowering, flowering, end of flowering, flowering period, technical maturity and growing period number of days. The following structural characters were also studied: plant height (cm), cake diameter (cm), mass per 1000 seeds (g.), number of full seeds, number of empty seeds, number of seeds per plant, yield kg/ha, % oil, % oil in absolute dry matter, % moisture, % oleic acid.

The boron content of the preparation has the effect of increasing pollen viability, which in turn results in more full seeds and fewer empty seeds in the comb. The organic fertilizer HumateGrowth increases the resistance of plants to adverse conditions-drought, etc. the plants have very good architecture, larger leaves, greater height compared to the untreated control. No pest or disease infestation was found during testing of the hybrids. This shows the very good efficiency of this organic fertilizer.

Key words: *Vegetation, sunflower, sowing, yield, plant height, head diameter.*

1 Georgi Georgiev, Ph.D., Agriculture Academy- Sofia, Dobroudzha Agriculture Institute- Bulgaria, e-mail: georgi_d4@abv.bg

FOLIAR APPLICATION OF NANOFERTILIZER IMPROVES SEED QUALITY PERFORMANCE OF TOMATO (*SOLANUM LYCOPERSICUM* L.)¹

Gordana Tamindžić¹, Sergei Azizbekian², Srđan Zec¹, Slobodan Vlajić¹,
Dragana Milošević¹, Dragana Miljaković¹, Maja Ignjatov¹

Abstract

Many reports emphasized the role of calcium fertilizers in tomato production as a key nutrient for enhancing productivity and its positive relationship with quality attributes. The application of nanotechnology in modern agriculture has gained significant attention recently due to the recent discovery of nanochemicals as potentially effective pesticides, fertilizers, and promising agents for plant growth. Recent scientific data indicated the positive effects of calcium nanoparticles (NPs) on plant growth and development, and subsequent yield and yield quality of many crops. However, there is a lack of information on their effect on tomato seed quality and initial plant growth.

The purpose of this study was to assess how tomato seed quality and initial plant growth were affected by the foliar application with two fertilizers containing different forms of calcium, i.e. the conventional fertilizer YaraLiva – Calcinit (Yara Suomi OI, Finland) containing 15,5 % of the total N and 26,3 % calcium (CaO) and nanofertilizer Nanoplant Ca-Si (JSC “ECO – Vlit“, Lithuania), which contains nanoparticles of calcium and silicium. The experimental materials included seeds of seven tomato lines which differed genetically (S49, S50, N4, N7, N9, N14, N16). Tomato plants were treated during the growing season with the aforementioned products in the manufacturer’s recommended doses. Following harvest, tomato seeds were collected for analysis. Untreated tomato seeds were used as control. The evaluation of the seed quality and initial plant growth was done using the germination test.

1 This study was supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, grant number: 451-03-47/2023-01/200032. Institute of Field and vegetable Crops, National institute of the republic of Serbia, Novi Sad, Serbia

2 Institute of Physical Organic Chemistry, National Academy of Sciences of Belarus, Minsk, Belarus

* Corresponding author: gordana.tamindzic@ifvcns.ns.ac.rs

In comparison to the control and treatment with conventional fertilizer, the foliar application of calcium and silicium NPs significantly improves seed quality parameters, such as germination energy and final germination. Calcium and silicium in nano size act more quickly and efficiently on tomato seed characteristics, as evidenced by the significant increases in seedling length, fresh and dry biomass accumulation, and seedling vigour index. These findings suggest that applying nanofertilizers could be advantageous over conventional fertilizers in seed production.

Key words: *Solanum lycopersicum L., foliar application, Calcium, nanofertilizer, conventional fertilizer, seed quality, initial plant growth.*

EFFECT OF FOLIAR TREATMENTS WITH BIOSTIMULANTS IN SPRING OILSEED RAPE CULTIVATION

Iliyana Petrova¹, Svetlana Stoyanova², Ralitza Mincheva³

Abstract

In modern crop production, the importance of biostimulant application technologies is progressively increasing, due to the established versatile positive effects of their impact. Regarding the evaluation of their efficacy under field conditions, the results are mixed. This determines the need for testing in specific agro-ecological regions. The increased demands of consumers oriented towards organic produce and foods with added biological value has focused interest in testing the effectiveness of stimulants developed based on natural sources.

The conducted research presents results on the influence of foliar treatment with biostimulants developed on the basis of vermicompost extracts, chitosan and a naturally-identical auxin-type growth regulator and production parameters in spring oilseed rape cultivation. The effect was tested under organic rape cultivation on leached black soil in a region of Northern Bulgaria. For 2 harvest years, field experiments have been done, according to the randomly assessed block design, with plot size of 10 m² and 4 replications per variant. The results found varying degrees of positive effect on biometric indicators and yield depending on dose, type of stimulant and harvest year.

Key words: *Spring oilseed rape, biostimulants, foliar treatment, biometrics, yield.*

-
- 1 Iliyana Petrova, Institute of Cryobiology and Food Technology - Sofia, Agricultural academy - Sofia, Bulgaria, E-mail: iliyana.an.petrova@gmail.com
 - 2 Institute of Agriculture and Seed Science «Obraztsov Chiflik» - Rousse, Agricultural academy - Sofia, Bulgaria
 - 3 Institute of Agriculture and Seed Science «Obraztsov Chiflik» - Rousse, Agricultural academy - Sofia, Bulgaria

IMPACT OF INTENSIVE AGRICULTURAL PRODUCTION ON THE ENVIRONMENT¹

*Irina Marina*², *Biljana Grujić Vučkovski*³, *Marijana Jovanović Todorović*⁴

Abstract

Today, intensive agricultural production is presented as a key production system for maintaining global food security, but at the same time it brings with it numerous challenges that affect the environment. This paper will analyze the impact of intensive agriculture on the environment, investigating how these processes can have different effects on ecosystems. The positive and negative impacts of technological progress will be analyzed. In which aspects of water and air pollution, loss of biodiversity and climate change will be included. Also, aspects of enabling increased productivity and food security for the world's population, more efficient use of resources, as well as the possibility of producing higher yields on smaller areas. This paper will also present a set of measures that directly affect the reduction of the negative impact of intensive agriculture, enabling the sustainability of agricultural production.

Key words: *Intensive agriculture, environment, climate change.*

-
- 1 Article as research is financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia no 451-03-47/2023-01/200009 from 03.02.2023 and results on project no. U 01/2023 Green economy in the era of digitization, Faculty of Finance, Banking, and Auditing, Alpha BK University in Belgrade.
 - 2 Irina Marina, M.Sc., Research Trainee, Institute of Agricultural Economics, Volgina 15, 11060 Belgrade, Serbia, Phone: +381116972858, e-mail: irina_m@iep.bg.ac.rs
 - 3 Biljana Grujić Vučkovski, Ph.D., Scientific Associate, Institute of Agricultural Economics, Volgina 15, 11060 Belgrade, Serbia, Phone: +381116972858, e-mail: biljana_g@iep.bg
 - 4 Marijana Jovanović Todorović, Ph.D., Research Assistant, Institute of Agricultural Economics, Volgina 15, 11060 Belgrade, Serbia, Phone: +381116972858, e-mail: marijana_j@iep.bg

HEALTHY SOIL - HEALTHY PLANT: CONTAMINATED SOIL AS A SOURCE OF INOCULUM OF *FUSARIUM VERTICILLIOIDES* (SACC.) NIRENBERG

Maja Ignjatov¹, Dragana Milošević¹, Janko Červenski¹, Slobodan Vlajić¹,
Boris Adamović², Snežana Jakšić¹, Đorđe Vojnović²

Abstract

A wide occurrence of wilt and rot caused by Fusarium species has been observed in the last few years in many vegetable-growing areas in the Republic of Serbia. Symptoms of rot and wilt of celery, garlic, and onion were noticed and after determination, Fusarium spp. was identified as the main causal agent of the disease. Most of the Fusarium species that cause disease on vegetable crops (garlic, onion, celery) overwinter in soil debris and soil. This study was conducted to isolate and identify Fusarium from soil samples by conventional and molecular methods. Soil samples were taken under the diseased plant, and 25 samples were collected in order to perform isolation of Fusarium species that cause rot and wilt during production. Each soil sample (10 g) was transferred to a glass bottle with 100 ml of sterile distilled water and put in a shaker for 30 min. An extract (0.2 ml) from each sample was placed on the bottom of the Petri dish and then a liquid medium of potato dextrose agar – PDA, was added and incubated at 28°C. After seven days all isolates were examined morphologically and re-isolated completing Koch's postulates. Colony morphology was recorded from cultures grown on PDA and CLA. Nine isolates, when grown on PDA, develop fast-growing, abundant, vinaceous aerial mycelium-producing dark violet pigments. Only microconidia are attached to each other in long chains. Macroconidia and chlamydospores were absent. Based on the morphological characteristics, compared with positive control and literature description isolates were identified as Fusarium verticillioides (Sacc.) Nirenberg. To perform molecular confirmation, total genomic DNA was extracted from the mycelium with a DNeasy Plant Mini Kit (Qiagen, Hilden, Germany). Following DNA extraction, the translation elongation factor TEF1-alpha region was amplified by PCR with the primer pair EF1 and EF2. A positive control isolates previously

- 1 Ph.D. Maja Ignjatov; Ph.D. Dragana Milošević, Ph.D. Janko Červenski, M.Sc. Slobodan Vlajić, Ph.D. Snežana Jakšić - Institute of Field and Vegetable Crops, Maksima Gorkog 30, 21000 Novi Sad, Serbia; e-mail: maja.ignjatov@ifvcns.ns.ac.rs
- 2 Ph.D. Boris Adamović, Ph.D. Đorđe Vojnović - Faculty of Agriculture, University of Novi Sad, Trg Dositeja Obradovića 8, 21000 Novi Sad, Serbia.

identified as *F. verticillioides* (NCBI code MH496027) was used. The sequences were compared with those in GenBank. The *TEF1*-alpha gene sequences of the Serbian isolates showed the highest identity of 100% with a Argentinian isolate (OR529768) and South African *F. verticillioides* isolates Accession No.: OR498563, OR498540 and OR498543-44. These species can infect vegetable plants through, contaminated seeds, or through spores carried over by wind, water, and insects. *F. verticillioides* is a well-known soil- and seed-borne facultative endophyte and can enter systemically through the root system from the soil. Hence, this species is known to produce mycotoxins severe for human health and monitoring in Serbia will be continued.

Key words: *Fusarium verticillioides*, soil, *TEF1*-alpha gene, sequencing.

SPANISH REED IN THE FUNCTION OF RENEWABLE ENERGY SOURCES AND CIRCULAR ECONOMY

*Marina Đorović¹, Radojica Rakić², Jela Ikanović³, Vera Popović⁴,
Zdravka Petković⁵, Dragana Popović⁶, Ljubiša Kolarić⁷*

Abstract

In order to ensure security in the supply of necessary energy sources, most countries in the world direct their research in the direction of finding the most rational way of using renewable energy sources and the circular economy. The paper analyzed the Spanish reed as a significant source of all forms of energy, from biogas, to solid biofuels and vegetable coal, and as an alternative source of plant fibers. The separated cellulose is most often used for paper production, but also in the textile industry, as a substitute for cotton, flax and kenaf fibers. The fact that Spanish cane can be cultivated and in marginal agro-ecological conditions provides us with opportunities to establish perennial grass areas on unused and degraded areas.

Thanks to the development of new technologies for the processing of biological waste into energy through the circular economy, the rate of increase in the use of alternative fuels is growing significantly, and Spanish cane, thanks to its modest requirements for water and heat, can be classified as a desirable energy crop. Spanish reed is one of the best crops for soil protection against all types of erosion, then for phytoremediation, absorption of harmful gases from the atmosphere, and it is valued in the construction industry and as an ornamental plant.

Key words: *Renewable energy sources, circular economy, Spanish cane as energy crop, biofuel and biogas, phytoremediation.*

-
- 1 Institute for Medicinal Plants Research “Dr. Josif Pančić”, Belgrade, Republic of Serbia
 - 2 University of Belgrade, Faculty of Agriculture; Zemun. Republic of Serbia
 - 3 University of Belgrade, Faculty of Agriculture; Zemun. Republic of Serbia,
 - 4 Institute of Field and Vegetable Crops, Maksima Gorkog 30, 21000 Novi Sad, Rep. of Serbia
 - 5 University of Bijeljina, Faculty of Agriculture, Pavlovića put bb, Bijeljina, B&H
 - 6 University of Novi Sad, Faculty of Economics in Subotica, Novi Sad, Republic of Serbia.
 - 7 University of Belgrade, Faculty of Agriculture; Zemun. Republic of Serbia
- Corresponding author: vera.popovic@ifvcns.ns.ac.rs

BEEKEEPING AND HONEY PRODUCTION IN SERBIA IN THE CONTEXT OF SUSTAINABLE RURAL DEVELOPMENT¹

Nada Mijajlovic², Nataša Papić Blagojević³, Đorđe Mihailović⁴

Abstract

Beekeeping is an economic branch of the Republic of Serbia with significant export potential. This paper aims to indicate the current state of beekeeping and honey production in Serbia in the context of sustainable rural development. The production of honey in the previous ten years and all important parameters such as the number of hives, the amount of honey produced and marketed in different markets will be discussed. Regarding the diversification of agricultural production in the context of sustainable rural development in Serbia, more and more farms opt for this type of additional activity that can bring significant profit. At the republican level, appropriate legislation is being established that is in line with world standards in honey production. Beekeeping organizations in Serbia are important factors that contribute to the improvement of honey production and better marketing of honey and honey products on the domestic and world markets. In Serbia, there are natural prerequisites for beekeeping and the production of certain high-quality types of honey (acacia, meadowsweet, sunflower).

Key words: *Beekeeping, honey, sustainable rural development.*

-
- 1 The paper is the result of scientific research funded by the Ministry of Education, Science and Technological Development, Republic of Serbia, based on the decision no. 451-03-68/2022-14 from 17.01.2022.
 - 2 Nada Mijajlović, M.Sc., Expert Associate, Institute of Agricultural Economics, Volgina no. 15, 11060 Belgrade, Serbia, Phone: +381 11 69 72 854, E-mail: nada_m@iep.bg.ac.rs
 - 3 Nataša Papić-Blagojević, Ph.D., Professor of Applied Studies, Novi Sad School of Business, Serbia, E-mail: npapic.blagojevic@gmail.com; npapic.blagojevic@vps.ns.ac.rs
 - 4 Đorđe Mihailović. Ph.D., Professor, Academy of Professional Studies Sumadija, Josifa Pančića 11, 34300 Arandjelovac, Serbia, E-mail: djordje.mihailovic@vsar.edu.rs

NATURAL CHARACTERISTICS AS A BASE FOR THE SUSTAINABLE AGRICULTURAL PRODUCTION – THE MUNICIPALITY OF TEMERIN EXAMPLE¹

Nataša Kljajić², Jonel Subić³, Predrag Vuković⁴

Abstract

The climate, pedological and hydrological characteristics as a base for planning agricultural production in the region of Vojvodina (the Municipality of Temerin area, the South-Backa administrative district) were represented in this paperwork. This research goal was to show the summarized data on the climate parameters, the representation of soil types, hydrological resources, number of agricultural husbandries and the utilised agricultural land in this research area. The data were collected from the relevant strategic and statistical documents, as well as the scientific paper works in which a similar topic has been studied. According to the results obtained from the research and discussions has concluded that this area of the South-Backa administrative district has been very favourable for the diverse agricultural production. These results are also significantly important for further planning of agricultural production and its intensification by the farmers in the Temerin Municipality.

Key words: *climate indicators, pedological characteristics, hydrological characteristics, the utilised agricultural area.*

-
- 1 Paper is a part of research financed by the MSTDI RS and agreed in decision no. 451-03-47/2023-01/200009 from 03.02.2023.
 - 2 Nataša Kljajić, Ph.D., Senior Research Associate, Institute of Agriculture Economics, Volgina No. 15 11060 Belgrade, Serbia, phone: +381-11-6972-847, e-mail: natasa_k@iep.bg.ac.rs, ORCID ID <https://orcid.org/0000-0003-2245-8285>
 - 3 Prof. Jonel Subic, Ph.D., Principal Research Fellow, Institute of Agriculture Economics, Volgina No. 15, 11060 Belgrade, Serbia, phone: 381-11-6972-858, e-mail: jonel_s@iep.bg.ac.rs ORCID ID <https://orcid.org/0000-0003-1342-1325>
 - 4 Predrag Vuković, Ph.D., Senior Research Associate, Institute of Agricultural Economics, Belgrade, e-mail: predrag_v@iep.bg.ac.rs

MAIZE GRAIN YIELD IN ANIMAL-POWERED FARMING AS AFFECTED BY SOIL FERTILIZATION VARIANT: RESULTS FROM THE 2023 SEASON IN NORTH-EAST CROATIA

Ranko Gantner¹, Igor DelVechio², Zvonimir Steiner³, Bishal K. Sitaula⁴,
Krešimir Bošnjak⁵, Vesna Gantner⁶

Abstract

*The objective of this study was to investigate maize grain productivity in a low-input farming system as affected by the variant of soil fertilization. All the agrotechnical operations in this field research were powered solely by draft horses and by the use of traditional horse-drawn implements (plow, tine-harrow, seeding machine and inter-row cultivator), except the modern horse-drawn roller-cutter made for green-manures and cover crops management prior to establishment of cash crops, and a small reconstructed (halved) disc-harrow (initially made for a small tractor). Tested soil fertilization variants were: Zero fertilization, horse farmyard manure application (FYM), green manuring with crimson clover (*Trifolium incarnatum* L.) (GMC), FYM + GMC, and full dose mineral NPK fertilization. Maize grain yields in this research were lower than in previous field trials in the north-east Croatia, most likely because of later seeding term, but not due to source of powering. The highest yielding was NPK variant (7.60 t/ha) which was significantly higher than the lowest Zero variant (2.01 t/ha). FYM (6.67 t/ha), FYM+GMC (6.24 t/ha) and GMC (4.60 t/ha) were intermedium but not significantly different from the NPK.*

Key words: *Maize, yield, soil fertilization, animal power, sustainability.*

-
- 1 Ranko Gantner, Ph.D., Full professor, J.J. Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia, E-mail: rgantner@fazos.hr
 - 2 Igor DelVechio, dr.vet.med., draft horses breeder, Croatian Federation of Heavy Draft Horse Breeders Association, Jelengradska 13, Popovača, Croatia, E-mail: zujo.macak@gmail.com
 - 3 Zvonimir Steiner, Ph.D., Full professor, J.J. Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia, E-mail: zsteiner@fazos.hr
 - 4 Bishal K. Sitaula, Ph.D., Full professor Norwegian University of Life Sciences, Department of International Environment and Development Studies, Ås, Norway, E-mail: bishal.sitaula@nmbu.no
 - 5 Krešimir Bošnjak, Ph.D., Full professor University of Zagreb, Faculty of Agriculture, Svetošimunska cesta 25, Zagreb, Croatia, E-mail: kbosnjak@agr.hr
 - 6 Vesna Gantner, Ph.D., Full professor, J.J. Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia, E-mail: vgantner@fazos.hr

PRODUCTS OBTAINED FROM MILK PROCESSING WITH SPECIAL REFERENCE TO WHEY PRODUCTION IN CHEESE PRODUCTION¹

Slavica Arsić², Ivan Bošnjak³, Anton Puškarić⁴

Abstract

For the economy of every country, milk represents one of the strategic products, therefore the aspiration is to ensure sufficient quantities to meet the needs of the population with the development of primary milk production. Analyzes have established that of the total milk produced in Serbia, about 1.5 billion liters of milk per year, almost half (50%) is purchased by the processing industry, which is focused on the production of products that do not require a lot of time and for which the technological processes are not complex and long-lasting. These products are the most used in the market, even though they have a short shelf life.

The paper will show that in the process of cheese production, whey is created as a side product, which is one of the insufficiently used side products of the dairy industry. Also, the production of cow's milk as well as the products obtained in dairies for realization on the market for the period from 2015 to 2021 will be processed, with special reference to the use of whey in the food industry, where it is most often used as concentrated or whey powder.

Key words: *Milk, cheese, whey and its use in production.*

-
- 1 Paper is a part of research financed by the MSTDI RS and agreed in decision no. 451-03-47/2023-01/200009 from 03.02.2023.
 - 2 Slavica Arsić, Ph.D., Research Associate, Institute of Agricultural Economics, Volgina 15, 11060 Belgrade, Serbia, e-mail: slavica_a@iep.bg.ac.rs
 - 3 Ivan Bošnjak, Ph.D., Doctor of veterinary sciences, Senior lecturer, Academy of Educational Medical Vocational Studies, department Kruševac, Cyril and Methodius Street no. 22, 37000 Kruševac, Serbia, Phone: +381 63 8635 494, E-mail: ivanbosnjak74@gmail.com
 - 4 Anton Puškarić, Ph.D., Research Associate, Institute of Agricultural Economics, 15 Volgina Street, 11060 Belgrade, Serbia, e-mail: anton.puskaric@gmail.com

VALUES OF ECOSYSTEM SERVICES - CARBON STORAGE IN THE FOREST ECOSYSTEMS OF BELGRADE

Tatjana Dimitrijević¹, Mihailo Ratknić²

Abstract

Forest and agricultural ecosystems play a significant role in the global carbon cycle. The concentration of methane increased more than 2.5 times (1908 ppb), and the concentration of nitrogen compounds by 25% (334.5 ppb). According to the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol and the Paris Agreement, the Republic of Serbia is obliged to reduce greenhouse gas emissions by 9.8% by 2030. The Paris Agreement implies a periodic update of the National Contribution. For climate mitigation, forests (in addition to agriculture) play a key role. Fixed carbon in forest ecosystems represents an important economic parameter in the concept of ecosystem services. In the development plan of the European Union until 2030, forestry (and agriculture) is given greater importance in the fight against climate change, as a consequence of the worrying trend of reduction of bound carbon in European forests. The following amount of bound carbon was determined in the urban forests of Belgrade: in above-ground biomass 1143686 t/ha, in underground biomass 185094 t/ha, in dead wood biomass 57184 t/ha, in forest floor 391816 t/ha, in soil 2537519 t/ha, i.e. a total of 4315299 t/ha (Ratknić T et al., 2022). Measurements must be performed on the basis of satellite images due to possible automation and monitoring of changes on a daily basis. Wood has different prints depending on the product, i.e. whether it is used to make paper, building material, furniture, fuel or biomass (pellet). It is necessary to develop a certification concept that would be based on the principles of the circular economy. It is predicted that by 2050 the net emissions of greenhouse gases will be equal to zero. Given the large percentage of forests in private ownership, a method of incentives should be established for their inclusion in the carbon sequestration process (by storage or afforestation).

Key words: *Ecosystem services, carbon storage, urban forests, City of Belgrade.*

1 Tatjana Dimitrijević, Ph.D., Research associate, Institute of forestry, Kneza Višeslava 3, Belgrade, Serbia, phone: +381655203548, e-mail: tatjanaratknic@yahoo.com

2 Mihailo Ratknić, Ph.D., Full member of „Sigma Xi“, Earth Climate Change Team (EC-CTeam), New Jersey, USA, e-mail: mihailoratknic@yahoo.com

THE INFLUENCE OF THE ORIENTATION AND TYPE OF HEDGEROWS ON SHADING PERCENTAGE OF AGRICULTURAL LAND

Tina Lešnik, Andreja Borec¹

Abstract

Hedgerows are recognised as linear structures of woody and shrubby vegetation occurring in different agricultural ecosystems. The general public primarily identifies the conservation and environmental values, which have been extensively researched with numerous studies available. When farmers manage hedgerows within their cultivated areas, they often face challenges as hedgerows can obstruct their farming activities. Farmers emphasize that shading crops primarily reduces the cultivated area, increases competition for soil moisture and nutrients between agricultural crops and hedgerow. For calculating the percentage of shading, we use ArborShadow R4 software for two different types of hedgerows: a tree hedgerow with a height of 20 meters and a shrub hedgerow with a height of 5 meters. The input data were latitude and longitude, hedgerow orientation, tree composition, time and date. The results indicate a strong correlation between shading percentage of agricultural land, type and orientation of the hedgerows.

Key words: *Hedgerow, shading, agricultural land, agriculture.*

1 Ph.D. Tina Lešnik, Ph.D. Andreja Borec, University of Maribor, The Faculty of Agriculture and Life Sciences, Pivola 10, 2311 Hoče, Slovenia, e-mail: tina.lesnik5@um.si

STATE OF ORGANIC PRODUCTION IN WORLD AND FOR US¹

Vera Popović², Marijana Jovanović Todorović³, Vesna Gantner⁴,
Vera Rajičić⁵, Vladimir Filipović⁶, Dragan Dokić⁷, Gordana Dozet⁸

Abstract

Sustainable resource management ensures stability and quality of agricultural production on the global food market. Organic production ensures are health-safe products, economic benefit, preserving the environment and health. In study is analyzed organic production in the World, Serbia, Montenegro, Croatia, Bosnia and Herzegovina, Slovenia and North Macedonia. The organic agricultural area records a growth trend in 2021, of 1.7%. This is indicated by data from 191 countries and more than 76 million hectares of agricultural land, which is 1.6 percent of the total agricultural land. The regions with the largest organic agricultural land areas are Oceania (36 mill. ha or 47%) and Europe (17.8 mill. ha, 23%) followed by Latin America (9.9 mill. ha, 13%), Asia (6.5 mill. ha, 8.5 percent), Northern America (3.5 mill. ha, 4.6%) and Africa (2.7 mill. ha, 3.5%). The ten countries with the largest organic agricultural areas have a combined total of 59.6 million hectares and constitute almost 80 percent of the world's organic agricultural land: Australia, 35.69 mill. ha, Argentina, 4.07 mill. ha, France, 2.78 mill. ha, China, 2.75 mill. ha, Uruguay, 2.74 mill. ha, India, 2.66 mill. ha, Spain, 2.64 mill. ha, USA, 2.33 mill. ha, Italy, 2.19 mill. ha, Germany, 1.8 mill. ha. Serbia, Croatia, Slovenia, B&H and North Macedonia recorded a trend of area growth in 2021 compared to 2020. Macedonia recorded the largest increase in area (7794 ha), of 109.1%, followed by B&H (2495 ha, 47.5%), Serbia (23527 ha, 21.8%), Croatia (121924 ha, 12.3%). In Slovenia, the stagnation of surface area (52078 ha) was

-
- 1 Article as research is financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia no 451-03-47/2023-01/200009 from 03.02.2023
 - 2 Prof. Dr. Vera Popović, Full Professor, Principal Research Fellow; Institute of Field and Vegetable Crops, Novi Sad, Serbia; Corresponding author: vera.popovic@ifvcns.ns.ac.rs
 - 3 Dr. Marijana Jovanović Todorović, Institute of Agricultural Economics Belgrade, Serbia
 - 4 Prof. Dr. Vesna Gantner, Full Professor, University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia
 - 5 Prof. Dr. Vera Rajičić, Principal Research Fellow, University of Niš, Faculty of Agriculture, Kruševac, Serbia
 - 6 Dr. Vladimir Filipović, Institute for Medicinal Plants Research “Dr Josif Pancic”, Belgrade, Serbia
 - 7 Dr. Dragan Dokić, Erdut Municipality, Bana Josipa Jelačića 4, Dalj, Croatia
 - 8 Prof. Gordana Dozet, Megatrend University, Faculty of Biofarming, Belgrade, Serbia

recorded, while Montenegro recorded a decrease in surface area in 2021 (4404 ha) compared to 2020 (4823 ha), by 418.8 ha ie. for 8.7%. Thanks to our excellent geographical position and good quality land, we have excellent conditions for the growth of organic production, which would be our great export opportunity.

Key words: *Organic production, trend growth, health-safe products.*

THE DIFFERENCES IN SUBCLINICAL MASTITIS PREVALENCE AND EFFECT ON MILK PRODUCTION DUE TO COWS' BREED AND BREEDING REGION

Vesna Gantner¹, Vera Popović², Zvonimir Steiner³, Ranko Gantner⁴,
Klemen Potočnik⁵

Abstract

The objective of this study was to investigate how breed (Holstein or Simmental) and breeding region (Central, Eastern, and Mediterranean) affect the prevalence of subclinical mastitis and its impact on milk production. To achieve this, the study analysed a total of 4,922,751 test-day records of Simmental cows and 3,953,637 test-day records of Holstein cows. As indicator of subclinical mastitis, the daily lactose content was used.

The results of the study indicated that there were significant differences in subclinical mastitis rates based on both breeding region and breed. Holstein cows from the Eastern region had the lowest prevalence. Furthermore, the lowest daily milk yield was observed on the test-day when subclinical mastitis was detected in both breeds and all regions. However, subsequent milk recordings showed an increase in milk yield that varied based on the breed and breeding region. The highest total increase in milk production was observed in Holstein cows from the Eastern region.

These findings suggest that recovery potential varies significantly based on breed and breeding region. Holstein cows from farms in the Eastern region had the lowest incidence of mastitis-related issues and the highest chance of recovery and restoration of production to their genetic potential. Therefore, this study suggests

- 1 Vesna Gantner, Ph.D., Full professor, J.J. Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia, E-mail: vgantner@fazos.hr
- 2 Vera Popović, Ph.D., Principal research fellow, Institute of Field and Vegetable Crops, Maksima Gorkog 30, Novi Sad, Serbia, E-mail: vera.popovic@ifvcns.ns.ac.rs
- 3 Zvonimir Steiner, Ph.D., Full professor, J.J. Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia, E-mail: zsteiner@fazos.hr
- 4 Ranko Gantner, Ph.D., Full professor, J.J. Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia, E-mail: rgantner@fazos.hr
- 5 Klemen Potočnik, Ph.D., University of Ljubljana, Biotechnical faculty, Department of Animal Science, Groblje 3, Domžale, Slovenia, E-mail: klemen.potocnik@bf.uni-lj.si

that dairy cows recover more effectively when bred at large, specialized dairy farms that are prevalent in the Eastern region.

Key words: *Dairy cows, subclinical mastitis, prevalence, daily milk production.*

PHYTOREMEDIATION AND ELECTROKINETIC SOIL REMEDIATION

Vladimir Miladinović¹, Vladan Ugrenović², Mira Milinković³

Abstract

An efficient and sustainable way of removing organic and inorganic pollutants from soil using plants is possible through the biotechnological process of phytoremediation. Depending on the type of pollutant, degree of pollution and environmental conditions, there are several mechanisms of phytoremediation, such as: phytodegradation, phytoaccumulation, phytostabilization, rhizodegradation and rhizofiltration.

The application of phytoremediation is not expensive, it can be applied on large areas and does not lead to soil damage. The disadvantage of this application is the potential shelf life of the process, as the development of the plants is monitored in one or more years. Also, the removal of pollutants from the soil is carried out in the depth zone of the plant's root system, which is directly affected by the physical and chemical properties of the soil and the pollutant itself.

The method of improvement is the application of the phytoremediation process in combination with electrokinetics. The application of electrokinetics is the use of low-intensity electric current using electrodes (anode and cathode), in the immediate vicinity of plant roots and the creation of an electric field. The result is greater mobility and bioavailability of pollutants, which is a consequence of the processes of electroosmosis and electromigration. As the bioavailability of pollutants in the soil increases, the efficiency of the phytoremediation process also increases. AC or DC currents and different voltage levels can be used.

Key words: *Phytoremediation, electrokinetic remediation, soil pollutants.*

-
- 1 Vladimir Miladinović, Ph.D., Expert advisor, Institute for Soil, Belgrade, Drajzerova No.7, Serbia, Phone: 381 64 30 95 208, e-mail: vladimir.miladinovic33@gmail.com
 - 2 Vladan Ugrenović, Ph.D., Senior Research Associate, Institute for Soil, Belgrade, Drajzerova no. 7., Belgrade, Serbia, phone: 381 64 88 14 412, e-mail: vladan.ugrenovic@gmail.com
 - 3 Mira Milinković, Ph.D., Senior Research Associate, Institute for Soil, Belgrade, Drajzerova No. 7, Phone: 381 64 22 58 575, e-mail: miramilinkovic@yahoo.com

POSSIBILITY OF BIOLOGICAL RECLAMATION OF DEGRADED SOIL IN THE DUMPS OF THE PLJEVLJA MINE¹

Zoranka Malešević², Đorđe Ilić³, Mirjana Jovović⁴

Abstract

The aim of this work is to carry out biological remediation on the reclaimed land of The Pljevlja Coal Mine, primarily focusing on the process in which soil suitable for the development and cultivation of medicinal plants is applied to the rocky material. Lavender, sage, and balm were planted in the experimental fields. During the two-year study, the mechanical and chemical properties of degraded soil, soil with the addition of shale and humus, as well as the chemical properties of the control soil, were monitored. An analysis of the content of microelements and heavy metals in the soil, shale, and humus was conducted, as well as an analysis of the content of microelements and heavy metals in the dry plant mass. The soil undergoing reclamation had a alkaline reaction. The analysis of shale, soil, and humus samples revealed an increased content of nickel (Ni) as the only heavy metal. The results of the analysis of medicinal plants from the experimental fields did not show an increased quantity of heavy metals. Bacteriological analysis detected the presence of common saprophytic microflora (fungi from the genus Mucor). Reclamation with plant crops is possible on deposited materials from surface mines.

Key words: *Reclamation, biological remediation, heavy metal.*

1 Paper is part of project funded by Rico training centre, Belgrade and Institute of Agricultural Economics (IAE), Belgrade

2 Zoranka Malešević, Ph.D., Associate professor, Academy of Professional Studies – Sumadija, Josifa Pančića 11, 34300 Arandjelovac, Serbia, E-mail: zorankamalesevic@mn.com, ORCID ID: <https://orcid.org/0000-0001-8616-2470>

3 Đorđe Ilić, Master of Pharmacy, Ph.D. student, Medical School, University of Kragujevac, Serbia, E-mail: djordjeilicph@gmail.com

4 Mirjana Jovović, Ph.D., Associate professor, Faculty of Agriculture, Vuka Karadžića 30, 71123 East Sarajevo, Bosnia and Herzegovina, E-mail: mirjanamojevic@gmail.com, ORCID ID: <https://orcid.org/0000-0002-5720-4421>

EFFECT OF MILK REPLACEMENT ON GROWTH, NUTRITION COEFFICIENT AND OTHER RELEVANT PARAMETERS IN DAIRY CALVES

Zvonimir Steiner¹, Ivan Babić², Vesna Gantner³, Ranko Gantner⁴

Abstract

*The aim of this research was to determine the influence of different milk substitutes on the production performance of Holstein calves. The research was conducted on 239 calves, of which 119 were fed with the milk substitute enriched with yeast microorganisms (*Saccharomyces cerevisiae*) (experimental group) for 49 days, and 120 during the first 21 days with the regular milk. Growth in the first period was higher in the control group (21.3:20.7 kg). In the second period, the calves of the experimental group had a higher growth (33.1:31.9 kg of body weight). At the end of the experiment, looking at the total gain, the calves of the experimental group had a higher gain compared to the calves of the control group (54.13:53.23), although there was no statistically significant difference. There is a significantly higher increase from the 30th to the 59th day in the calves in the experimental group (Student's t-test, $p < 0.001$), as well as the total amount of milk substitute consumed in the experimental group, which is 33.3 kg. The cost price per kilogram of gain calculated on the basis of consumption of milk substitute is higher in the experimental group (1.09 eur/kg) than in the control group (0.972 eur/kg). Also, the price of the feeding day in the experimental group (1.0 eur/FD) is higher than the control group (0.877 eur/FD). The cost price per calf calculated on the basis of the consumption of milk substitute is higher in the experimental group (59.05 eur) compared to the control group (51.81 eur).*

Key words: Calves, milk substitute, gain, weight, cost price.

- 1 Zvonimir Steiner, Ph.D., Full professor, J.J. Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia, E-mail: zsteiner@fazos.hr
- 2 Ivan Babić, Belje d.d., P.C. Mliječno govedarstvo, Darda 31326, Croatia, E-mail: ivan.babic@belje.hr
- 3 Vesna Gantner, Ph.D., Full professor, J.J. Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia, E-mail: vgantner@fazos.hr
- 4 Ranko Gantner, Ph.D., Full professor, J.J. Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia, E-mail: rgantner@fazos.hr

III SECTION – REVITALIZATION OF RURAL AREAS

RURAL TOURISM IN THE FUNCTION OF SERBIAN AND EU TOURISM DEVELOPMENT

Aleksandra Vujko¹, Radmila Bojović², Miroslav Knežević³

Abstract

Tourism, as one of the world's largest socio-economic phenomena, is one of the leading factors in the rapid transformation and growth of rural destinations. Billions of tourists around the world spend thousands of billions of dollars each year on domestic and international rural tourism. In recent years, there has been an increasing number of recognizable rural tourist destinations, and the reason for this growth is in marketing activities, cultural heritage, the work of various development agencies supported by countries, the formation of EU structural funds, and increased awareness of new trends among tourists. The emergence of new forms of tourism in rural areas. The paper presents an analysis of the state of rural tourism in Serbia and EU countries, in accordance with the basic indicators. The culture of work, the culture of housing, the culture of food, the culture of clothing and forms of folk art (naive painting and sculpture, folklore, music) are among those values of the rural community that especially attract tourists. Realizing that these values are important for the development of tourism, decision makers will seek through marketing to preserve these traditional values, and thus contribute.

Key words: *Rural tourism, rural development, Serbia, EU.*

-
- 1 Aleksandra Vujko, Ph.D., Associate Professor, Singidunum University, Faculty of Tourism and Hospitality Management, Danijelova 32, Belgrade 11000, Serbia, University of Business Studies, Faculty of Tourism and Hotel Management, Jovana Dučića 23a, Banja Luka 78000, Republic of Srpska, BiH, Phone: +381 64 914 2645, E-mail: avujko@singidunum.ac.rs; aleksandravujko@yahoo.com; ORCID ID (0000-0001-8684-4228)
 - 2 Radmila Bojović, Ph.D., Assistant Researcher, Independent Researcher, Belgrade 11000, Serbia, Phone: +381 63 233599, E-mail: radmilab@yahoo.com
 - 3 Miroslav Knežević, Ph.D., Associate Professor, Singidunum University, Faculty of Tourism and Hospitality Management, Danijelova 32, Belgrade 11000, Serbia, Phone: +381 64 2318101, E-mail: mknezevic@singidunum.ac.rs

SOCIOECONOMIC EFFECTS OF CATTLE RUSTLING ON THE LIVELIHOOD OF INHABITANTS OF SOME SELECTED RURAL COMMUNITIES IN NORTHERN NIGERIA

Aliyu Mansur Sulaiman¹, Mustapha Umar², Jimoh Abdulrauf Kayode³, Rafiu Olalekan Yusuf⁴, Miroslav P. Popovic⁵

Abstract

A reconnaissance survey on socioeconomic effects of cattle rustling on livelihood of inhabitants of selected communities in Northern Nigeria was conducted. Total of 390 questionnaires were administered. The data obtained was statistically analyzed. The structure of the respondents had the following prevalence: males over females, younger over mid-aged/older, married over unmarried/widowed, and most of them being farmers, with little or no formal education. There is a high level of starvation, loss of investment, decreased income, mental distress, injury and death at Relative Importance Index 66.3% to 84.9%. Least negative impact of rustling affects trading 4.4%, with high negative impact to farming 56.4%. Cattle rustling showed various negative consequences to the inhabitants by devastating their livelihood. The concerned security outfit of the state should be strengthened to curtail the menace in the affected areas.

Key words: *Cattle, Rustling, Livelihood, Rural, Northern Nigeria.*

-
- 1 Aliyu Mansur Sulaiman, Department of General Studies, Nigerian Institute of Leather and Science Technology, Zaria, Kaduna, Nigeria, E-mail: harandemansur4@gmail.com
 - 2 Mustapha Umar, Department of Science Laboratory Technology, Nigerian Institute of Leather and Science Technology, Zaria, Kaduna, Nigeria.
 - 3 Jimoh Abdulrauf Kayode, Department of Geography, Federal College of Education, Zaria, Kaduna, Nigeria.
 - 4 Rafiu Olalekan Yusuf, Department of Geography, Ahmadu Bello University, Zaria, Kaduna, Nigeria
 - 5 Miroslav P. Popovic, Department of Environment and Sustainable Development Studies, Singidunum University, Belgrade, Serbia

THE CONTRIBUTION OF TOURISM TO THE DEVELOPMENT OF THE RURAL AREA IN ILFOV COUNTY: CASE STUDY FOR BUFTEA AREA

Andreea Roxana Firăţoiu, Liviu Mărcuţă, Elena Soare, Irina Adriana Chiurciu¹

Abstract

The paper highlights the evolution of accommodation units in the period 2015-2021 in Ilfov County, which is a part of the Bucharest Ilfov Development Region. Ilfov County stretches around Bucharest and is the smallest County in Romania. In the town of Buftea, located in the northern part of the county, there are some tourist attractions with national importance, which are points of attraction for tourists from the country and abroad. In order to achieve the goal pursued, the paper analyzes a series of indicators such as: the number of tourists and reception structures at the level of the analyzed development region and for Ilfov County, by categories of comfort and tourist destinations; accommodation capacity and the utilization index of tourist accommodation capacity by comfort category. The used and processed data in the paper were taken from the website of the National Institute of Statistics.

Key words: *Accommodation units, Buftea area, Ilfov County, tourism.*

1 Andreea Roxana Firăţoiu, Liviu Mărcuţă, Elena Soare, Irina Adriana Chiurciu, Faculty of Management and Rural Development, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania, corresponding author: chiurciu.irina@managusamv.ro

BIBLIOMETRIC ANALYSIS: QUALITY OF LIFE IN RURAL AREA

Daniela Nicoleta Voicila¹, Diana Maria Ilie²

Abstract

The study of quality of life focuses on elucidating and investigating various aspects of population existence, individuals' satisfaction with their living standards, evaluating different facets of quality of life, and policy initiatives aimed at improving these aspects. The present research aims to primarily investigate the current state of studies conducted on the quality of life in rural environments at the European and global levels. Within this work, a bibliometric analysis of research papers registered in the Web of Science database was conducted, starting from the aforementioned topic. For the analysis, the VOSviewer software was utilized, enabling the creation of a descriptive part of the data, providing an overview of the research theme through the visualization of the connections established. The conclusion of this study indicates that this theme has been thoroughly addressed in various fields in recent years.

Key words: *Quality of life, rural area, bibliometric analysis.*

1 Daniela Nicoleta Voicila, Scientific Researcher, Research Institute for Agricultural Economics and Rural Development Bucharest, Bdul Marasti, no. 61, sector 1, Bucharest, Romania, e-mail: badan.daniela@iceadr.ro

2 Diana Maria Ilie, Scientific Researcher Grade II, Research Institute for Agricultural Economics and Rural Development Bucharest, Bdul Marasti, no. 61, sector 1, Bucharest, Romania, e-mail: necula.diana@iceadr.ro

FINANCING THE DEVELOPMENT OF RURAL TOURISM IN SERBIA FROM THE IPARD II PROGRAM¹

Gordana Radović², Radovan Pejanović³, Zorica Vasiljević⁴

Abstract

The financing of the development of rural tourism in Serbia is realized with the support of the IPARD II program from 2020. For the purpose of implementing Measure 7 of the IPARD II program, two calls were published, through which investments that contribute to the development of rural tourism are supported, as an activity that most effectively encourages the diversification of rural economies. The aim of the paper is to present the contribution of Measure 7 of the IPARD II program to the development of rural tourism in Serbia. The paper uses the method of analysis, synthesis, historical, desk research, as well as the descriptive method. The authors conclude that in order to make a more significant contribution of the EU pre-accession fund to the development of rural tourism in Serbia, greater available financial resources are needed, as well as better education of the inhabitants of rural areas for writing projects.

Key words: *Rural tourism, financing, development, Measure 7 of the IPARD II program, Serbia.*

-
- 1 Paper is a part of research financed by the MSTDI RS, agreed in decision no. 451-03-47/2023-01/200009 from 3.2.2023.
 - 2 Gordana Radović, Ph.D, Research associate, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 64 13 78 643, E-mail: gordana.radovic09@gmail.com.
 - 3 Radovan Pejanović, Ph.D., Full professor in retirement, University Novi Sad, Faculty of Agriculture, Novi Sad, Serbia, phone: +381 63 600 217, e-mail: radovan.pejanovic0603@gmail.com
 - 4 Zorica Vasiljević, Ph.D., Full professor in retirement, Belgrade University, Faculty of Agriculture, Nemanjina 6, Belgrade, Serbia, phone: +381 64 1439 942, E-mail: zoricav1313@gmail.com

GLOBAL TRENDS AND OUTLOOKS IN AGRICULTURAL DEVELOPMENT AND FOOD SECURITY

Lela Ristić¹, Petar Veselinović², Danijela Despotović³

Abstract

The development of agricultural sector and therefore food security in the world, today take place under very changed and quite difficult circumstances. Accordingly, the subject of research in this paper are contemporary global trends in the development of agriculture and expectations in this sector. Thereby, the impact of global environment on food security in the world is also researched, along with assessments of future trends and perspectives in this field. The aim of the research is to indicate the state and the most important tendencies in development of agriculture and food security in the modern global society. The selected issues are researched by using the methods of analysis, synthesis, description and comparison, primarily on the basis of FAO and OECD data. The results of the research show that global factors today greatly influence the development of agriculture and food security around the world, while also determine outlooks in this fields.

Key words: *Agriculture, food, world market, contemporary global challenges, sustainable development.*

-
- 1 Lela Ristić, Full professor, Ph.D., University of Kragujevac - Faculty of Economics, Liceja Kneževine Srbije 3, 34000 Kragujevac, Serbia, Phone: +381 034 303 552, E-mail: lristic@kg.ac.rs
 - 2 Petar Veselinović, Full professor, Ph.D., University of Kragujevac - Faculty of Economics, Liceja Kneževine Srbije 3, 34000 Kragujevac, Serbia, Phone: +381 034 303 569, E-mail: pveselinovic@kg.ac.rs
 - 3 Danijela Despotović, Full professor, Ph.D., University of Kragujevac - Faculty of Economics, Liceja Kneževine Srbije 3, 34000 Kragujevac, Serbia, Phone: +381 034 303 574, E-mail: dspotovic@kg.ac.rs

REGIONAL DISPARITIES RELATED TO SOCIOECONOMIC DETERMINANTS OF AGRICULTURE AND RURAL DEVELOPMENT IN NORTH MACEDONIA

*Marija Gjosheva Kovachevikj¹, Jorde Jakjimoski², Lazo Dimitrov³,
Despina Popovska Stojanov⁴*

Abstract

In North Macedonia, planning regions exhibit significant variations in socioeconomic structure, leading to unequal conditions for agriculture and rural development. To address this disparity the study aims to assess the determinants of agriculture and rural development in the statistical planning region, focusing on ten key socio-economic indicators, including Gross value added in agriculture, Agricultural land, Unemployment rate in rural areas, Rural net migration, Investments and Wages in agriculture, Aging index, Young population, Road infrastructure and Social benefit recipients. Utilizing the Hull Score Method based on normalized indicators, the study provides valuable insights into the relative performance of each region. The results reveal Skopje and Pelagonia Region with the highest Hull Score consequently, indicating superior overall performance, while Northeast and Southwest Region obtain the lowest score, indicating scope for improvement. Policymakers can leverage these findings to identify strengths and prioritize targeted interventions for enhancing agricultural and rural development across regions.

Key words: *Socioeconomic disparity, normalized indicators, hull score method, regional performance, statistical planning regions.*

-
- 1 Gjosheva Kovachevikj Marija, University Ss. Cyril and Methodius in Skopje, Institute of Agriculture, Skopje, North Macedonia, Corresponding author: m.kovachevikj@zeminst.edu.mk
 - 2 Jorde Jakjimoski, University Ss. Cyril and Methodius, Institute for Sociological, Political and Juridical Research – Skopje, North Macedonia
 - 3 Lazo Dimitrov, University Ss. Cyril and Methodius in Skopje, Institute of Agriculture, Skopje, North Macedonia
 - 4 Despina Popovska Stojanov, University Ss. Cyril and Methodius in Skopje, Institute of Agriculture, Skopje, North Macedonia

CHALLENGES OF THE GREEN TRANSITION IN RURAL AREAS

*Marija Indjin*¹

Abstract

Investing in the development of rural areas is important for every country, in order to encourage balanced economic growth in all regions of the country. By investing in the development of rural areas, conditions are created for the return and revival of underdeveloped parts of the country and the prevention of population migration to larger cities, so that the local population could live decently from their work. We have witnessed that on a global level it is desirable, almost necessary, for new technologies to include the so-called green approach in solving technological processes. As a rule, such investments in the application of green technologies require larger or significantly larger investments. Due to this fact, investments in the revitalization of rural areas further complicate the significant activity of the state, because it is necessary to ensure an additional increase in funds for the implementation of such projects.

Key words: *Green technology, rural area, employment, investments.*

1 Marija Indjin, M.A., Assistant, University Metropolitan Belgrade, Tadeuša Košćuška 63, 11158 Belgrade, Serbia, phone: +381 11 2030885, e-mail: marija.indjin@metropolitan.ac.rs

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF SERBIAN HOUSEHOLDS AND SUSTAINABLE DEVELOPMENT

Marija Popović¹, Sreten Jelić²

Abstract

The main goal of the work is the analysis of the socio-demographic features of Serbian households according to the 2022 census, and then the changes that have occurred since the beginning of this century (census 2002, 2011) until today and sustainable development. Data analysis showed that the number of households increased in the inter-census period in urban settlements, and decreased in other settlements. There are more and more households with 1 and 2 members, and the number of households with 4 or more members is decreasing from the total number of households. The structure of households was analyzed according to the type of settlement, gender, schooling in Serbia and by region. Sustainable development has become one of the most important factors today in the face of significant climate change, growing population pressures and limited natural resources. Our country is affected by climate change and limited natural resources where households play an important role in sustainable development.

Key words: *Households, characteristics, Serbia, regions, sustainable development.*

-
- 1 Marija Popović, Ph.D. student, Faculty of Agriculture, University of Belgrade, Nemanjina 6, 11080 Zemun, Serbia, phone: +381 64 4099 865, e-mail: marija.popovic11@gmail.com
 - 2 Sreten Jelić, Full professor, Faculty of Agriculture, University of Belgrade, Nemanjina 6, 11080 Zemun, Serbia, telephone: +381 63 8044 778, e-mail: sjelic@agrif.bg.ac.rs

OBSERVING CHANGES OF SETTLEMENT SIZE IN VITICULTURAL ZONES OF SERBIA USING VIIRS NIGHTTIME LIGHT DATA

Radmila Jovanović¹, Claudete Oliveira Moreira², Debajit Datta³

Abstract

Nighttime lights (NTL) data provides a comprehensive view of the spatial distribution of global human activities, especially in terms of population concentration, level of urbanization, estimation of economic growth, population mobility, determination of depopulation areas, etc. This article aims to map the spatio-temporal distribution of night lights of settlements in the wine-growing areas of Serbia using VIIRS NTL datasets from 2012 to 2015, explore the emerging spatial patterns, and compare these patterns with the database of census years 2011 and 2022. Results reveal that the wine-growing areas in Serbia illustrate population redistribution and settlement size change, as it includes larger cities as per the last wine-growing rezoning, reflecting the spatial redistribution of populations. Moreover, urbanization pattern and settlement size variations occur in cities or at their vicinities, with a prominent decrease in settlement size as people move away from cities, indicating a clear depopulation and delimitation of city areas.

Key words: *Geospatial analysis, Settlement size, Spatial analysis, VIIRS data, Viticulture zone.*

-
- 1 Radmila Jovanović, Ph.D., Institute of Agricultural Economics, Belgrade, Serbia; Faculty of Tourism, University of Malaga, Malaga, Spain, e-mail: jogurada@yahoo.com
 - 2 Claudete Oliveira Moreira, University of Coimbra, CEGOT – Centre of Studies in Geography and Spatial Planning, Portugal
 - 3 Debajit Datta, Landscape Ecology Laboratory, Department of Geography, Jadavpur University, Kolkata-700032, India

DEVELOPMENT OF SPECIAL FORMS OF TOURISM WITH THE AIM TO REVITALIZE THE RURAL AREA OF PLJEVLJA MUNICIPALITY

Sara Stanić Jovanović¹, Dragana Vuković², Nevena Miletović³

Abstract

The municipality of Pljevlja is the third largest municipality in the northern part of Montenegro. The administrative center of the municipality is the town of Pljevlja, which is one of the highest settlements in Montenegro. The southwestern part of the municipality of Pljevlja is partially located on the territory of the Durmitor National Park. The proximity of the route E-763 (Belgrade-South Adriatic) stands out as a special advantage of the municipality's location, in the form of opportunities for transit tourists on the way to the Montenegrin coast, and especially for those who want to avoid the dangerous section of the road through the Morača Canyon and use an alternative sea direction Pljevlja-Žabljak-Nikšić-Boka Kotorska. From the image aspect, and based on natural resources and anthropogenic values, the municipality of Pljevlja can be positioned in the minds of consumers as a peaceful and small tourist destination with preserved authentic, autochthonous, unique and traditional attributes, which are based on specific tourist products. The development of some of the special forms of tourism (agro, event, hunting, fishing, apitourism, tourism of special interests, etc.), along with numerous economic benefits, will contribute to the revitalization of the rural area of the municipality of Pljevlja.

Key words: *Revitalization, tourism, village, development, possibilities, Pljevlja.*

-
- 1 Sara Stanić Jovanović, Ph.D., Scientific Associate, Geographical Institute Jovan Cvijić SANU, Lecturer, Academy of Vocational Studies Šumadija, Department Arandelovac, Josifa Pančića 11, 34300 Arandelovac, Serbia, phone: 064/2432-711, e-mail: sjovanovic@asss.edu.rs
 - 2 Dragana Vuković, M.A., Assistant Lecturer, Academy of Vocational Studies Šumadija, Department Arandelovac, Josifa Pančića 11, 33400 Arandelovac, Serbia, e-mail: dvukovic@asss.edu.rs
 - 3 Nevena Miletovic, M.A., Lecturer, Academy of Vocational Studies Šumadija, Department Arandelovac, Josifa Pančića 11, 33400 Arandelovac, Serbia, e-mail: nevena.miletovic@vsar.edu.rs

RURAL TOURISM: EMPOWERING RURAL DEVELOPMENT

Snežana Milićević¹, Nataša Đorđević², Marija Mandarić³

Abstract

Rural tourism is an activity that directly and indirectly contributes to the development of rural areas. It encompasses various activities and services provided by rural residents on their properties to generate additional income. Rural tourism significantly stimulates entrepreneurship, fosters the establishment of small family businesses, and contributes to employment and improved living standards for rural populations. It promotes local culture and the traditional hospitality of rural communities. Developing rural tourism requires good communal and transportation infrastructure, enhancing the overall quality of life in local communities. This study aims to analyze the role of rural tourism in the development of rural areas. Best practices in Europe are presented to showcase the contribution of rural tourism to rural development.

Key words: *Rural tourism, development, rural areas.*

-
- 1 Snežana Milićević, Ph.D., Full professor, University of Kragujevac, Faculty of Hotel Management and Tourism in Vrnjačka Banja, Vojvodanska 5A, Vrnjačka Banja 36210, Serbia, phone: +381365150021, e-mail: snezana.milicevic@kg.ac.rs
 - 2 Nataša Đorđević, Ph.D., Teaching assistant, University of Kragujevac, Faculty of Hotel Management and Tourism in Vrnjačka Banja, Vojvodanska 5A, Vrnjačka Banja, 36210, Serbia, phone: +381365150021, e-mail: natasa.djordjevic@kg.ac.rs
 - 3 Marija Mandarić, Full professor, University of Kragujevac, Faculty of Hotel Management and Tourism in Vrnjačka Banja, Vojvodanska 5A, Vrnjačka Banja, 36210, Serbia, phone: +381365150021, e-mail: mmandaric@kg.ac.rs

REVITALIZATION OF RURAL AREAS THROUGH THE APPLICATION OF THE “SMART VILLAGE” CONCEPT

Suzana Lazović¹, Drago Cvijanović²

Abstract

The revitalization of rural areas represents a very important segment of the overall development at the national level and should be based on knowledge and new technologies. The paper aims to analyze the significance of the application of the “smart village” concept in rural areas, which would contribute to the formation of new use values and the solution of current problems related to economic and cultural backwardness, depopulation, migration to urban areas, departure of young people abroad, abandonment of engaged in agricultural production, lack of application of modern technological solutions and insufficiently educated staff in providing services in rural areas.

Key words: “Smart village”, rural areas, revitalization.

-
- 1 Suzana Lazović, M.Sc., Junior Research Assistant, Faculty of Hotel Management and Tourism, University of Kragujevac, Vrnjačka Banja, Serbia, phone: +381 62 14 11 967, e-mail: [suza.borovic@gmail.com](mailto:suzanaborovic@gmail.com)
 - 2 Drago Cvijanović, Ph.D., Full professor, Principal research fellow, Faculty of Hotel Management and Tourism, University of Kragujevac, Vrnjačka Banja, Serbia, phone: +381 63 295 111, e-mail: dvcmmv@gmail.com

IV SECTION – DIGITALIZATION IN AGRICULTURE

INDOOR SMART GARDEN AS A FACTOR OF SUSTAINABLE DEVELOPMENT IN AGRICULTURE¹

Branko Mihailović², Vesna Popović³, Katica Radosavljević⁴

Abstract

The rapid growth of the global population and increasing environmental concerns have heightened the need for sustainable agricultural practices. The emergence of indoor smart gardens, integrating advanced technologies in controlled environments, offers promising solutions for sustainable development in agriculture. This paper aims to explore the role of indoor smart gardens as a factor of sustainable agricultural development. By employing a systematic literature review approach, we analyze the benefits and challenges associated with these systems. Indoor smart gardens provide optimized growing conditions, overcoming limitations imposed by external factors. The integration of smart technologies, such as IoT devices, sensors, automation, and data analytics, enables precise control over environmental parameters, resulting in enhanced resource efficiency and reduced environmental impact. This study contributes to the ongoing discourse on sustainable agriculture by highlighting the potential of indoor smart gardens in achieving sustainable development goals and fostering resource-efficient agricultural practices.

Key words: *Indoor smart garden, sustainable development, agriculture, controlled environment, resource efficiency, smart technologies.*

-
- 1 The paper is the result of research funded by the RS budget, the Agreement of the Ministry of Education, Science and Technological Development on the implementation and financing of scientific research NIO in 2023, number: no. 451-03-47/2023-01/200009 from February 3, 2023.
 - 2 Branko Mihailović, Ph.D. in Economics, Scientific Advisor, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, phone: 011 69 79 858, e-mail: brankomih@neobee.net, ORCID ID (<https://orcid.org/0000-0002-2398-6568>)
 - 3 Vesna Popović, Ph.D. in Economics, Scientific Advisor, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, phone: 011 69 79 858, e-mail: vesna_p@iep.bg.ac.rs, ORCID ID (<https://orcid.org/0000-0003-1018-2461>)
 - 4 Katica Radosavljević, Ph.D. in Economics, Senior Research Associate, Faculty of Economics, Kamenička Street no. 6, 11000 Belgrade, Serbia, phone: 069 8066 384, e-mail: katica@ekof.bg.ac.rs, ORCID ID (<https://orcid.org/0000-0002-5609-8399>)

DIGITAL LITERACY AND USE OF DIGITAL TECHNOLOGIES BY SMALL FARMERS IN SOUTHEASTERN EUROPE

*Cosmin Salasan¹, Carmen Simona Dumitrescu², Iasmina Iosim³,
Cosmina Toader⁴*

Abstract

The digital gap as identified between rural and urban and between primary and the other sectors has been shifting considerably over the past two decades. If accessibility used to be the primary driver for the use of digitally powered platforms and applications, the knowledge and habits are replacing its position. Accessibility, in terms of infrastructure are no longer a topic when Agriculture 4.0 benefits from 5G services and uses server farms to store large data harvested daily from different plots. Yet the picture is slightly different when approaching the small and medium size farms and the agricultural households. Here again, the age differences could create an a priori placing the largest share of farmers into the “no use” category. The results of the survey during the implementation of a project demonstrate that expectations are far away from the current reality. Farmers are making use of different digital tools during their day-to-day activities, sometimes even involving specialized applications to ease the specific tasks in farming activities. Results are depicting the shares and types of applications used by the category not even near agriculture 4.0 still making use of small digital things, sometimes not even related to agriculture, to improve the time allocation and the efficiency of their activities.

Key words: *Digital agriculture, applications, small and medium size farms.*

-
- 1 Dr. Cosmin Salasan, Romanian Academy, Branch of Timisoara, Research Centre for Sustainable Rural Development of Romania, 24 Bv. Mihai Viteazu, RO-300223 Timisoara, Romania, E-mail: cosminsalasan@usvt.ro, phone: +40722419475
 - 2 Dr. Carmen Simona Dumitrescu, University of Life Sciences “King Mihai I” from Timisoara, Faculty of Management and Rural Tourism, 119 Calea Aradului, RO-300645 Timisoara, Romania, E-mail: carmendumitrescu@usvt.ro, phone: +40742094707
 - 3 Dr. Iasmina Iosim, University of Life Sciences “King Mihai I” from Timisoara, Faculty of Management and Rural Tourism, 119 Calea Aradului, RO-300645 Timisoara, Romania, E-mail: iasminaiosim@usvt.ro, phone: +40723013511
 - 4 Dr. Cosmina Toader, University of Life Sciences “King Mihai I” from Timisoara, Faculty of Management and Rural Tourism, 119 Calea Aradului, RO-300645 Timisoara, Romania, E-mail: cosminatoader@usvt.ro, phone: +40740465231

THE ECONOMIC SIGNIFICANCE OF DIGITIZATION IN AGRIBUSINESS

Ferhat Čejvanović¹, Adnan Kamerić²

Abstract

Precision agriculture is a concept of integrating new technologies, supported by information systems and agricultural industries. Accordingly, it represents an integrated management system that is supposed to harmonise production materials with the optimum needs of agricultural crops. A special contribution of precision agriculture lies in combining information and technology for the purpose of identifying a proper management system of the cultivation of agricultural crops, optimising profits, and it particularly affects the protection of natural resources and land. It is particularly important that new information technologies are helpful in making better decisions on various aspects of agricultural production. The paper uses data collected through its own research, published scientific and professional articles dealing with this issue. Based on the collected data, scientific methods were used: desk research, descriptive methods, analysis and synthesis methods, induction and deduction methods, as well as comparative analysis methods. Objectives of the work are to look at the economic impact precision agriculture is to optimise the management and distribution of inputs, but taking into account the specifics of each locality with the increase in production efficiency. The fact is that farmers who effectively use the information provided by precision agriculture achieve higher yields and effects than those who do not use the advantages and possibilities of precision agriculture.

The results of the research reflect, viewed from an economic point of view, that precise and smart agriculture provides the possibility of receiving information for making optimal decisions about the management of agricultural production and complete agribusiness, starting from production, processing to distribution of agricultural products and food.

Key words: *New technologies, precision and smart agriculture, integrated management system.*

1 Ferhat Čejvanović, Ph.D., European University Brčko and European University “Kallos” Tuzla, Bosnia and Herzegovina, e-mail: ferhat.cejvanovic@gmail.com

2 Adnan Kamerić, Ph.D., European University “Kallos” Tuzla, Bosnia and Herzegovina

URBAN AGRICULTURE, IMPLEMENTATION POSSIBILITIES IN THE BUILT ENVIRONMENT AND SMART CITY

Katarina Stojanović¹, Radovan Pejanović²

Abstract

Urban agriculture is the cultivation of crops, horticulture and raising animals in special cases in cities, which as a green infrastructure is a very revolutionary agenda and emerging paradigm. Since it is new, there is a need to define the framework and model of its spatio-temporal implementation, as well as to overcome the many obstacles it faces. The aim of the paper is to research examples of urban planning that includes urban agriculture, on the basis of which typologies for changing the environment would be defined. Through the analysis of case studies and comparison, models of food landscapes for communities would be established, which could be an example for Serbia in overcoming the increasing problems of lack of greenery in big cities, as well as problems in the agricultural sector. The implementation, cohesion and interpolation of these disciplines would solve some of the problems that are currently in different areas, sustainability, climate change, overpopulation, lack of food, disappearing agricultural land, etc. The concept of smart agriculture within the framework of smart cities, connecting new technologies and a traditional branch of the economy such as agriculture, enables the functioning and easier overcoming of some integration obstacles.

Key words: *Built environment, smart agriculture, urban planning, urban agriculture, green infrastructure.*

1 Prof. Katarina Stojanović, Ph.D., State University of Novi Pazar, Serbia

2 Radovan Pejanović, Ph.D, Full professor in retirement, University Novi Sad, Faculty of Agriculture, Novi Sad, Serbia, phone: +381 63 600 217, e-mail: radovan.pejanovic0603@gmail.com

THE SIGNIFICANCE OF DIGITAL TRANSFORMATION IN AGRICULTURE FOR SUSTAINABLE DEVELOPMENT

Mirjana Dejanović¹, Sanja Popović Pantić², Ana Kovačević³

Abstract

This paper examines the pivotal role of digital transformation in the agricultural sector for global sustainability and progress. Focusing on the integration of advanced technologies such as precision farming, data analytics, and artificial intelligence, the study explores their impact on optimizing processes and increasing productivity. The paper emphasizes how digital transformation empowers farmers with real-time data, facilitating informed decision-making on crop management, resource utilization, and environmental conservation. It also discusses the socio-economic benefits, including improved market access for smallholder farmers and rural development. In the context of the COVID-19 pandemic, the paper highlights the significance of digital technology in communication, knowledge-sharing, and virtual platforms for trade. Additionally, it emphasizes the importance of application of digital technologies in agricultural education, particularly for remote rural areas. The article also addresses the challenges within the agricultural supply chain and investigates the current state of blockchain technology, focusing on its potential to transform agriculture.

Key words: *Digital transformation, Agriculture, Sustainable development, Artificial intelligence (AI), Education, Blockchain technology.*

-
- 1 Mirjana Dejanović, Ph.D., Scientific associate, Institute Mihailo Pupin, Science and Technology Policy Research Center (STPRC), Volgina 15, Belgrade, Serbia, e-mail: mirjana.dejanovic@pupin.rs
 - 2 Sanja Popović Pantić, Ph.D., Senior research associate, Institute Mihailo Pupin, Science and Technology Policy Research Center (STPRC), Volgina 15, Belgrade, Serbia, e-mail: sanjap.pantic@pupin.rs
 - 3 Ana Kovačević, M.Sc., Institute Mihailo Pupin, Science and Technology Policy Research Center (STPRC), Volgina 15, Belgrade, Serbia, e-mail: ana.kovacevic@pupin.rs

DIGITALIZATION OF THE SALE OF AGRICULTURAL PRODUCTS AS A CHALLENGE TO THE CRISIS¹

Nedeljko Prdić², Boris Kuzman³, Sara Kostić⁴

Abstract

The paper presents a study of the crises impact on the sale of agricultural products. The purpose of the performed research is to analyse adjustment of local agricultural producers to the sale of products in crisis. The analysis was conducted after the Covid-19 Pandemic as a basis for studying sales in the period of crisis. The aim of this work paper is based on the focus of digitization of the sale of agricultural products of small local producers. The conducted research is based on special knowledge methods application and marketing research methods. The theoretical research is based on the historical method. The method of survey was used for analysing experiences and attitudes of local agricultural producers and sellers at the Kvantaška market in Novi Sad. The research conclusion implies to changes in urban areas buyers' habits when it comes to crisis situations, and also the tendency to digitize purchase. The limitation of the research is connected to the disorganized digital sale of agricultural products and therefore the impossibility of overall effects measurement.

Key words: *Agriculture products, digital sales, agriculture producers, urban environments, challenges of the crisis.*

-
- 1 The paper is the result of research funded by the RS budget, the Agreement of the Ministry of Education, Science and Technological Development on the implementation and financing of scientific research NIO in 2023, number: no. 451-03-47/2023-01/200009 from February 3, 2023.
 - 2 Nedeljko Prdić, Ph.D., Associate Professor., JKP Tržnica, 4 Žike Popovića, 21000 Novi Sad, Serbia, Phone: +381 63 500 818, E-mail: nedeljko.prdicns@gmail.com, ORCID ID <https://orcid.org/0000-0003-3199-1188>
 - 3 Boris Kuzman, Ph.D., Associate Professor, Institute of Agricultural Economics, 15 Volgina Street, 11060 Belgrade, Serbia, Phone: +381 63 590 129, E-mail: kuzmanboris@yahoo.com, ORCID ID <https://orcid.org/0000-0002-8661-299333>
 - 4 Sara Kostić, Ph.D. student, University of Novi Sad, Faculty of Economics, 9-11 Segedinski put, 24000 Subotica, Serbia, Phone: +381 63 572 260, E-mail: sara97kostic@gmail.com, ORCID ID <https://orcid.org/0000-0002-5079-1096>

SIGNIFICANCE OF INNOVATIONS AND APPLICATION OF INFORMATION - COMMUNICATION TECHNOLOGIES IN AGRICULTURE AND RURAL DEVELOPMENT OF SERBIA¹

*Olgica Zečević Stanojević², Dragan Nedeljković³,
Leposava Zečević⁴, Boris Stanojević⁵*

Abstract

Innovations and the application of information and communication technologies have a driving role in the efficient development of smart agriculture. The application of new information and communication technologies and the digitalization of the agricultural sector represent a great potential for improving rural development through increasing profitability, productivity, sustainability and competitiveness. Modern communication approaches and technologies, from artificial intelligence and robotics to the Internet of Things (IoT), enable significant support and assistance to agricultural holdings and businesses. The results of the research in the paper indicate the possibilities of encouraging rural development based on the use of information and communication technologies through reducing the digital divide, solving existing challenges in terms of creating reliable access to modern communication technologies, strengthening resources for the application of technologies, encouraging awareness, developing skills and training human resources in rural areas.

Key words: *Innovation, rural development, smart agriculture, information and communication technologies, IoT-Internet of Things.*

-
- 1 Paper is a part of research funded by the MSTRİ RS, defined by the contract no. 451-03-47/2023-01/200009 from 3rd February 2023.
 - 2 Olgica Zečević Stanojević, Ph.D., Research Associate, Institute of Agricultural Economics, Volgina 15, 11000 Belgrade, Serbia, phone: +381116972858, e-mail: olgicazs@gmail.com, ORCID: 0000-0002-0689-4709
 - 3 Dragan Nedeljković, Ph.D., Research Associate, Institute of Agricultural Economics, Volgina 15, 11000 Belgrade, phone: +381116972858, e-mail: draganedeljkovic62@gmail.com, ORCID: 0000-0002-8391-9703
 - 4 Leposava Zečević, Ph.D., Research Associate, Institute of Agricultural Economics, Volgina 15, 11000 Belgrade, Serbia, phone: +381116972858, e-mail: bekaz70@gmail.com, ORCID: 0000-0002-7103-3577.
 - 5 Boris Stanojević, Ph.D., Research Associate, Research and Development Institute, Vojvode Dobrnjca 15, 11000 Belgrade, Serbia, phone: +381113225598, e-mail: boris@sezampro.rs, ORCID: 0000-0002-6940-9328

PERSPECTIVES OF DIGITAL TOOLS IN THE AGRICULTURAL ADVISORY WORK

Sladān Stanković¹, Vedran Tomić², Cosmin Salasan³

Abstract

Agricultural advisory services aim to enhance farmers' productivity, profitability, and sustainable use of natural resources, with both public and private sectors providing support. However, reaching remote farming households has proven challenging, limiting the impact of these services. Digital tools, such as mobile phones and the internet, have emerged as effective solutions, significantly improving the efficiency, relevance, and reach of advisory services.

Analysis of successful digital agricultural advisory services in four regions revealed several key points for improving their reach and sustainability. Successful services address user needs, incorporate bundled services, form multiple partnerships, and have robust business models. However, challenges exist in user involvement during the design phase, particularly for individuals with low ICT literacy. Policy frameworks for promoting digital advisory services vary across regions, with public-led services facing operational challenges and private sector-driven initiatives encountering funding issues. Sequential public-private partnerships may offer a way forward to enhance the impact of digital agricultural advisory services.

Key words: *Digital tools, advisory service, sustainability, information and communication technology.*

-
- 1 Sladān Stanković, Ph.D., Senior Research Associate, Institute for Science Application in Agriculture, 68b Blvd. despot Stefan, 11000 Belgrade, Serbia, Phone: +381 11 27 51 622, E-mail: stankovic@ipn.bg.ac.rs, ORCID ID (<https://orcid.org/0000-0001-7002-3601>)
 - 2 Vedran Tomić, Ph.D., Scientific Associate, Institute for Science Application in Agriculture, 68b Blvd. despot Stefan, 11000 Belgrade, Serbia, Phone: +381 11 27 51 622, E-mail: vtomic@ipn.bg.ac.rs, ORCID ID (<https://orcid.org/0000-0003-2383-721X>)
 - 3 Cosmin Salasan, Ph.D., Associate Professor, University of Life Sciences "King Mihai I" from Timisoara, 119 Calea Aradului, 300645 Timisoara, Romania, ORCID ID (<https://orcid.org/0000-0002-7370-1778>)

INFORMATION AND COMMUNICATION TECHNOLOGYS IN CATTLE LAMENESS DETECTION

Tina Bobić¹, Maja Gregić², Pero Mijić³, Vesna Gantner⁴

Abstract

Since the problem of lameness is very common on dairy farms, it is necessary to apply technologies that can contribute to reducing the frequency of lameness. The application of information and communication technologies (ICT) technology in the detection and prevention of lameness in dairy cows is possible and has a future. With automated lameness detection methods, a large amount of data can be collected in short period of time, which can improve lameness prediction accuracy. Various ICT technologies are present on the market, and can be useful in detection and prevention of cow's lameness. Those technologies can improve dairy production, lower costs and improve animal welfare. It is necessary to include more factors and various experts from different fields to ensure the success of the application of such advanced and expensive technology.

Key words: *ICT, cattle, lameness detection, dairy farms.*

-
- 1 Tina Bobić, Ph.D., Associate professor, Faculty of Agrobiotechnical Sciences Osijek, Croatia, Phone: +385 31 554 859, E-mail: tbobic@fazos.hr
 - 2 Maja Gregić, Ph.D., Assistant professor, Faculty of Agrobiotechnical Sciences Osijek, Croatia, Phone: +385 31 554 860, E-mail: mgregic@fazos.hr
 - 3 Pero Mijić, Ph.D., Full professor, Faculty of Agrobiotechnical Sciences Osijek, Croatia, Phone: +385 31 554 858, E-mail: pmijic@fazos.hr
 - 4 Vesna Gantner, Ph.D., Full professor, J.J. Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia, E-mail: vgantner@fazos.hr

NEW TECHNOLOGIES IN AGRICULTURE AND SMART VILLAGES¹

Vladimir Pejanović², Boris Stanojević³, Gordana Radović⁴

Abstract

By new technologies, we mean, above all, precision agriculture and digitization. Precision agriculture and digitization of agriculture lead to the realization of the concept of smart villages. If the digitization of the villages succeeds, through Internet possibilities such as remote work, e-learning, better health care or shopping via e-commerce, rural areas can gain the attraction that big cities have, and which they have partially lost, which would stop depopulation and deagrarianization of villages. Multiple services can be implemented in a smart village in order to improve the quality of life, living standards of the local population, implement and improve the model of sustainable development and establish effective resource management. The sensors are related to the collection of various data related to weather conditions, soil moisture, soil electrical conductivity, soil pH and crop monitoring. Technical solutions will depend on factors such as the size of the village, available resources and the desired level of data analysis and storage capabilities. All this is important, as well as digitization, for the realization of the concept of smart villages.

Key words: *New technologies in agriculture, smart villages, precision agriculture, digitization, technical solutions and sensors.*

-
- 1 Paper is a part of research financed by the MSTD I RS, agreed in decision no. 451-03-47/2023-01/200009 from 3.2.2023.
 - 2 Vladimir Pejanović, M.Sc, Master of Engineering Management, Master of Electrical Engineering, Faculty of Technical Sciences, University of Novi Sad, Trg Dositeja Obradovića 6, Novi Sad, Serbia, Phone: +381 63 843 55 27, E-mail: vladimirpejanovic@uns.ac.rs
 - 3 Boris Stanojević, Ph.D, Evropski Univerzitet, Beograd, Serbia, Phone: +381 63233004, E-mail: boris@sezampro.rs
 - 4 Gordana Radović, Ph.D, Research associate, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381641378643, E-mail: gordana.radovic09@gmail.com

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

631:502.121.1(048)

005.591.6:631(048)

338.432(048)

INTERNATIONAL scientific conference Sustainable agriculture and rural development (4 ; 2023 ; Beograd)

Book of abstracts / IV international scientific conference Sustainable agriculture and rural development, December, 2022 Belgrade ; [organizers] Institute of Agricultural Economics ... [et al.] ; [editors Jonel Subić ... [et al.]]. - Belgrade : Institute of Agricultural Economics, 2023 (Novi Sad : NS Mala knjiga +). - XIX, 90 str. ; 24 cm

Tiraž 200. - Str. XIX: Preface / editors.

ISBN 978-86-6269-132-3

1. Subić, Jonel, 1964- [уредник]

а) Пољопривреда -- Научно-технолошки развој -- Апстракти б) Пољопривреда -- Економски аспект -- Апстракти в) Пољопривреда -- Одрживи развој -- Апстракти г) Пољопривредна производња -- Апстракти д) Рурални развој -- Апстракти

COBISS.SR-ID 132365577

