



National Institute for Economic Research

**CO-ORGANIZERS
& PARTNERS:**



CONFERENCE PROCEEDINGS

International Scientific-Practical Conference

Economic Growth in the Face of Global Challenges

*Strategies for Sustainable Growth,
Demographic Resilience, and Social Equity*

Volume II

XIXth edition · October 9-10, 2025



Chisinau, 2025



National Institute for Economic Research

**CO-ORGANIZERS
& PARTNERS:**



International Scientific-Practical Conference

**ECONOMIC GROWTH IN THE FACE OF
GLOBAL CHALLENGES.
STRATEGIES FOR SUSTAINABLE GROWTH,
DEMOGRAPHIC RESILIENCE,
AND SOCIAL EQUITY**

XIXth Edition

October 09-10, 2025

Conference proceedings

Volume II

Chisinau, 2025

CZU 3(082)

E 15

*Approved by the Scientific Council of the National Institute for Economic Research,
minutes no. 4, October 24, 2025*

Scientific Coordinator:

Angela TIMUȘ, PhD, Associate Professor, National Institute for Economic Research, Academy of Economic Studies of Moldova

Eugenia LUCAȘENCO, PhD, National Institute for Economic Research, Academy of Economic Studies of Moldova

Tatiana COLESNICOVA, PhD, Associate Professor, National Institute for Economic Research, Academy of Economic Studies of Moldova

Contributing Editors:

Tatiana IAȚIȘIN, PhD, National Institute for Economic Research, Academy of Economic Studies of Moldova

Ecaterina HEGHEA, PhD, National Institute for Economic Research, Academy of Economic Studies of Moldova

Index and bibliographic editing:

Silvia GORCEAG, **Angelina CATANA**, **Nionila DALNIȚCHII**, **Elena MIGUNOVA**, **Olga CHIRILOV**, Republican Technical-Scientific Library, NIER, AESM

Computerized layout design:

Silvia GORCEAG, editorial service, NIER, AESM

Alexandru SANDULESCU, editorial service, NIER, AESM

The Volume II includes papers, presented within Session „*Advancing sustainability and modernization in future agriculture and rural development*” and Session „*Well-being, inclusion and the reduction of social inequalities*”. These sections were carried out within the research subprogram 030101 „*Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union*”.

All articles included in this volume have undergone a scholarly peer-review process, carried out anonymously by independent experts in the field. Publication was approved only after completing the review procedure and integrating the reviewers’ recommendations.

The authors are responsible for the content and correctness of the texts.

DESCRIEREA CIP A CAMEREI NAȚIONALE A CĂRȚII DIN REPUBLICA MOLDOVA

"Economic Growth in the Face of Global Challenges. Strategies for Sustainable Growth, Demographic Resilience, and Social Equity", international scientific-practical conference (19 ; 2025 ; Chișinău). International Scientific-Practical Conference "Economic Growth in the Face of Global Challenges. Strategies for Sustainable Growth, Demographic Resilience, and Social Equity", 19th Edition, October 9-10, 2025, [Chișinău] : Conference proceedings / scientific coordinator: Angela Timuș. – Chișinău : SEP ASEM, 2025 – . – ISBN 978-9975-168-60-1.

Vol. 2. – 2025. – 162 p. : fig. color., tab. – Antetit.: Academy of Economic Studies of Moldova, National Institute for Economic Research. – Referințe bibliogr. la sfârșitul art. –

ISBN 978-9975-168-65-6 (PDF).

3(082)

E 15

ISBN 978-9975-168-65-6 (PDF).

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19>

©Academy of Economic Studies of Moldova, 2025

© National Institute for Economic Research, 2025

©Editura ASEM, 2025

SCIENTIFIC COMMITTEE

President:

STRATAN Alexandru, *Habilitated Doctor, University Professor, Academician of ASM, Rector of the Academy of Economic Studies of Moldova*

Vice Presidents:

TIMUŞ Angela, *PhD, Associate Professor, Director of National Institute for Economic Research, AESM*

GAGAUZ Olga, *Habilitated Doctor, Associate Professor, National Institute for Economic Research, AESM*

BELOSTECINIC Grigore, *Habilitated Doctor, Academician of ASM, Academy of Economic Studies of Moldova*

CASIAN Angela, *PhD, Associate Professor, First Vice-rector, Academy of Economic Studies of Moldova*

COCIUG Victoria, *PhD, Associate Professor, Vice Rector, Academy of Economic Studies of Moldova*

CHIVU Luminița, *PhD, professor, General Director of National Institute for Economic Research, Romanian Academy*

ALBU Lucian-Liviu, *Academician, Director, Institute for Economic Forecasting, Romanian Academy*

GURSKII Vasili, *Habilitated Doctor, director, Institute of Economics, National Academy of Sciences of Belarus*

MOAGĂR POLADIAN Simona, *Habilitated Doctor, Director, Institute for World Economy, Romanian Academy*

DRAGOMIR Vili, *PhD, Director, Institute of Research for Agricultural Economics and Rural Development, Romania*

VASILE Valentina, *PhD, Director, Institute of National Economy, Romanian Academy*

HERZFELD Thomas, *PhD, Professor, Director, Leibniz Institute of Agricultural Development in Transition Economies, Germany*

TESELEANU George, *PhD, Professor, Titular member of the Technical Sciences Academy of Romania*

NIȚOI Mihai, *Habilitated Doctor, Institute for World Economy, Romanian Academy*

BUCIUCEANU-VRABIE Mariana, *PhD, Associate Professor, Scientific Secretary, National Institute for Economic Research, AESM*

MIGLIACCIO Guido, *PhD, Associate Professor, University of Sannio, Italy*

NEMAN Muradli, *PhD, Vice-Rector, State University of Economics, Azerbaijan*

NIKOLOV Dimitre, *PhD, Professor, Director, Institute of Agricultural Economics, Bulgaria*

ŞAVGA Larisa, *Habilitated Doctor, University Professor, Rector of TCUM, Moldova*

DINGA Emil, *PhD, Professor, "Victor Slăvescu" Centre for Financial and Monetary Research, Romanian Academy*

VARESE Erica, *PhD, Associate Professor, University of Turin, Italy*

ALEXANDRI Cecilia, *PhD, Director, Institute of Agricultural Economics, Romanian Academy*

PERCIUN Rodica, *Habilitated Doctor, Associate Professor, National Institute for Economic Research, AESM*

POLCYN Jan, *Habilitated Doctor, Stanislaw Staszic State University of Applied Sciences in Pila, Poland*

SUBIĆ Jonel, *PhD, Director, Institute of Agricultural Economics, Serbia*

GOJAYEVA Elmira, *PhD, Associate Professor, State University of Economics, Azerbaijan*

ILIAŞ Nicolae, *PhD, Professor, University of Petrosani, Romania*

KURILO Irina, *Habilitated Doctor, M.V. Ptukha Institute for Demography and Social Studies, National Academy of Sciences of Ukraine*

RODINO Steliana, *PhD, Scientific Director, Institute of Research for Agricultural Economics and Rural Development, Romania*

VASA Laszlo, *PhD, Professor, Szent István University, Hungary*

IGNAT Gabriela, *Habilitated Doctor, Associate Professor, Iasi University of Live Sciences, Romania*

AVRAM Alina-Cerasela, *PhD, Senior Researcher, Institute for World Economy, Romanian Academy*

CLICHICI Dorina, *PhD, Associate Professor, Institute for World Economy, Romanian Academy*

MANOLE Alexandru Lucian, *PhD, professor, Rector, „ARTIFEX” University of Bucharest, Romania*

LAKOV Plamen Marinov, *PhD, Professor, University of Agribusiness and Rural Development, Plovdiv, Bulgaria*

COBZARI Ludmila, *Habilitated Doctor, University Professor, Dean, Academy of Economic Studies of Moldova*

MIHAI Costică, *PhD, Professor, Alexandru Ioan Cuza University of Iasi, Romania*

BLYZNIUK Viktoriia, *Habilitated Doctor, Institute for Economics and Forecasting, National Academy of Sciences of Ukraine*

KOMOROWSKI Piotr, *PhD, Associate Professor, Cardinal Stefan Wyszyński University of Warsaw, Poland*

URSU Ana, *PhD, Institute of Research for Agricultural Economics and Rural Development, Romania*

CZYŻEWSKI Bazyli, *PhD, Professor, Poznań University of Economics and Business, Department of Macroeconomics and Agricultural Economics, Poland*

POPESCU Raluca, *PhD, Associate professor, University of Bucharest, Romania*

GAVRILESCU Camelia, *PhD, Senior researcher, Institute of Agricultural Economics, Romanian Academy*

CIOBANU Ghenadie, *PhD, Associate professor, National Scientific Research Institute for Labour and Social Protection, Romania*

HĂMURARU Maria, *PhD, Associate Professor, Dean MSU, Moldova*

ULIAN Galina, *Habilitated Doctor, University Professor, MSU, Moldova*

VINOGRADOVA Natalia, *PhD, Associate Professor, National Institute for Economic Research, AESM*

COLESNICOVA Tatiana, *PhD, Associate Professor, National Institute for Economic Research, AESM*

IORDACHI Victoria, *PhD, Associate Professor, National Institute for Economic Research, AESM*

LUCAȘENCO Eugenia, *PhD, National Institute for Economic Research, AESM*

NOVAC Alexandra, *PhD, Associate Professor, National Institute for Economic Research, AESM*

TIMOFEI Olga, *PhD, Associate Professor, National Institute for Economic Research, AESM*

POPA Viorica, *PhD, Senior Researcher, National Institute for Economic Research, AESM*

UNGUR Cristina, *PhD, Senior Researcher, National Institute for Economic Research, AESM*

ORGANIZING COMMITTEE

President:

TIMUȘ Angela, *PhD, Associate Professor, Director of National Institute for Economic Research, AESM*

GAGAUZ Olga, *Habilitated Doctor, Associate Professor, National Institute for Economic Research, AESM*

Vice President:

BUCIUCEANU-VRABIE Mariana, *PhD, Associate Professor, Scientific Secretary, National Institute for Economic Research, AESM*

PERCIUN Rodica, *Habilitated Doctor, Associate Professor, National Institute for Economic Research, AESM*

COLESNICOVA Tatiana, *PhD, Associate Professor, NIER, AESM*

VINOGRADOVA Natalia, *PhD, Associate Professor, NIER, AESM*

LUCAȘENCO Eugenia, *PhD, National Institute for Economic Research, AESM*

IORDACHI Victoria, *PhD, Associate Professor, National Institute for Economic Research, AESM*

NOVAC Alexandra, *PhD, Associate Professor, National Institute for Economic Research, AESM*

TIMOFEI Olga, *PhD, Associate Professor, National Institute for Economic Research, AESM*

CLICHICI Dorina, *PhD, Associate Professor, Institute for World Economy, Romanian Academy*

AVRAM Alina-Cerasela, *PhD, Senior Researcher, Institute for World Economy, Romanian Academy*

POPESCU Raluca, *PhD, Associate professor, University of Bucharest, Romania*

VOICILA Daniela, *PhD, Institute of Research for Agricultural Economics and Rural Development, Romania*

POPA Viorica, *PhD, National Institute for Economic Research, AESM*

UNGUR Cristina, *PhD, National Institute for Economic Research, AESM*

ȘARGU Lilia, *PhD, National Institute for Economic Research, AESM*

GRIBINCEA Corina, *PhD, National Institute for Economic Research, AESM*

STRATAN Dumitru, *PhD, National Institute for Economic Research, AESM*

GRIGORAȘ Ecaterina, *PhD, National Institute for Economic Research, AESM*

GUTIUM Tatiana, *PhD, Associate Professor, National Institute for Economic Research, AESM*

IAȚIȘIN Tatiana, *PhD, National Institute for Economic Research, AESM*

HEGHEA Ecaterina, *PhD, National Institute for Economic Research, AESM*

CIOBANU Mihail, *PhD student, Scientific Researcher, NIER, AESM*

CEBAN Alexandru, *Scientific Researcher, National Institute for Economic Research, AESM*

POPA Nicolae, *Scientific Researcher, National Institute for Economic Research, AESM*

BORDIAN Elena, *Director of Republican Technical-Scientific Library, NIER, AESM*

GORCEAG Silvia, *Republican Technical-Scientific Library, NIER, AESM*

CATANA Angelina, *bibliographer, Republican Technical-Scientific Library, NIER, AESM*

DALINIȚCHI Nionila, *bibliographer, Republican Technical-Scientific Library, NIER, AESM*

CHIRILOV Olga, *Republican Technical-Scientific Library, NIER, AESM*

MIGUNOVA Elena, *Republican Technical-Scientific Library, NIER, AESM*

MAIER Lidia, *National Institute for Economic Research, AESM*

SANDULESCU Alexandru, *National Institute for Economic Research, AESM*

TABLE OF CONTENTS

ADVANCING SUSTAINABILITY AND MODERNIZATION IN FUTURE AGRICULTURE AND RURAL DEVELOPMENT	11
Tudor BAJURA DEVELOPMENT OF THE INDIGENOUS CATTLE SECTOR THROUGH INVESTMENT SUBSIDIES	13
Camelia GAVRILESCU ROMANIAN MILK AND DAIRY PRODUCTS NEGATIVE TRADE BALANCE – WHERE DOES THE CHAIN FAIL?	17
Ancuța MARIN, Vili DRAGOMIR CALCULATION MODEL FOR CARBON EMISSIONS IN CEREAL AGRICULTURE	21
Elmira GOJAEVA, Fuad GASIMOV PRIORITY DEVELOPMENT OF THE AGRARIAN SECTOR OF AZERBAIJAN IN ENSURING FOOD SECURITY OF THE COUNTRY	25
Krisztina Melinda DOBAY PUBLIC POLICIES FAVORABLE TO THE DEVELOPMENT OF ASSOCIATIVE FORMS IN THE AGRI-FOOD SYSTEM IN ROMANIA	29
Ion CERTAN, Dan-Marius VOICILAS, Camelia GAVRILESCU THE HISTORY AND DYNAMICS OF RICE IN ROMANIA	34
Ana URSU AGRICULTURE AND RURAL SUSTAINABILITY IN ROMANIA AND THE REPUBLIC OF MOLDOVA: A COMPARATIVE ANALYSIS	38
Alexandra Marina MANOLACHE BIBLIOMETRIC STUDY ON THE SITUATION OF PROTEIC CROPS IN ROMANIA AND THE EUROPEAN UNION	42
Aurelia LITVIN, Aliona IONESCU, Larisa CAISIN, Ana RAILEAN, STRENGTHENING FOOD SECURITY BY DEVELOPING ASSOCIATION AND COOPERATION IN AGRICULTURE AND OPTIMIZING THE VALUE CHAIN IN THE REPUBLIC OF MOLDOVA	45
Daniela Nicoleta VOICILA, Steliana RODINO WORK PERFORMANCE ANALYSIS IN BIOECONOMY: ROMANIA VERSUS THE EUROPEAN UNION	49
Olesea COJOCARU COMPARATIVE ANALYSIS OF THE TREND AND PERSPECTIVE OF AGRICULTURE IN THE REPUBLIC OF MOLDOVA IN RECENT YEARS	54

Ruxandra-Eugenia POP	
FACILITATING CIRCULAR TRANSITION IN AGRICULTURE: EU FINANCIAL MECHANISMS FOR SUSTAINABLE DEVELOPMENT	57
Lica ERHAN	
PERFORMANCE AND SUSTAINABILITY OF SMEs FROM AGRICULTURAL AND FOOD INDUSTRY	61
Petruța Antoneta TUREK-RAHOVEANU	
CLIMATE CHANGE AND VEGETABLE FARMING: A SYSTEMATIC LITERATURE - REVIEW	64
Eugenia LUCASENCO	
THE LIVESTOCK SECTOR AS A DRIVER OF ECONOMIC RESILIENCE IN THE REPUBLIC OF MOLDOVA	68
Tatiana IAȚIȘIN	
THEORETICAL FOUNDATIONS OF INVESTMENT STRATEGIES FOR THE MODERNIZATION OF THE WINE SECTOR IN THE REPUBLIC OF MOLDOVA	72
Maria GRUBLEAC, Liliana CIMPOIEȘ	
ANALYSIS OF CROP PRODUCTION SECTOR VULNERABILITY TO CLIMATE CHANGES IN THE REPUBLIC OF MOLDOVA	76
Diana COȘALÎC	
ECOLOGIC AGRICULTURE IN THE REPUBLIC OF MOLDOVA: ACCESS TO THE EU MARKET BETWEEN HARMONIZATION AND BARRIERS	79
Alexandru CEBAN	
CURRENT CHALLENGES AND OPPORTUNITIES FOR ENHANCING THE RESILIENCE OF THE PIG SECTOR IN THE REPUBLIC OF MOLDOVA	83
Viorel TUREȚCHI	
IMPLEMENTATION OF BLOCKCHAIN TECHNOLOGY IN HORTICULTURAL SUPPLY CHAINS IN THE REPUBLIC OF MOLDOVA: OPPORTUNITIES AND CHALLENGES	87

WELL-BEING, INCLUSION AND THE REDUCTION OF SOCIAL INEQUALITIES	90
Plamen Marinov LAKOV, Biser Yordanov KRASTEV REGIONAL DEVELOPMENT POLICY IN THE REPUBLIC OF BULGARIA	91
Cosmin-Constantin SICREA CURRENT TRENDS IN HIV INFECTION IN ROMANIA	94
Alina Ligia DUMITRESCU THE REFORM OF THE EUROPEAN SOCIAL MODEL IN THE CONTEXT OF GLOBALIZATION	99
Tatyana BURLAY, Viktoriia BLYZNIUK, Larysa HUK POST-WAR REPLENISHMENT OF UKRAINE'S HUMAN CAPITAL FOR ITS SOCIAL RESILIENCE	102
Alexandra TIGHINEANU AGE-BASED DISCRIMINATION IN LABOUR LAW: PROTECTING OLDER WORKERS IN THE CONTEXT OF EXTENDING WORKING LIFE	105
Mariana BĂLAN, Carmen UZLĂU REGIONAL DISPARITIES OF THE NEET YOUTH RATE IN ROMANIA	108
Ecaterina HEGHEA INEQUALITY INDICATORS: FROM GINI TO ATKINSON AND PALMA	111
Iulia GARABAJII UNDERSTANDING INCOME DIFFERENTIATION: A SOCIO-ECONOMIC PERSPECTIVE ON MOLDOVA	114
Anatolii ROJCO STATE REGULATION OF PROCESSES AIMED AT REDUCING INCOME INEQUALITY IN THE REPUBLIC OF MOLDOVA	117
Maria KOMPANEETS, Ludmila GOLOVATAYA SUBJECTIVE WELL-BEING IN EU COUNTRIES: EXPLORING ECONOMIC AND SOCIAL DRIVERS	120
Svetlana RUSU IN-WORK POVERTY AMONG YOUTH IN MOLDOVA	123
Carmen CIORNEI, Crina MOISA INVISIBLE SURVIVAL STRATEGIES – THE INTERACT Project: RETHINKING SOCIAL INCLUSION THROUGH THE LIVED EXPERIENCES OF HOMELESS WOMEN IN ROMANIA	126

Dorin VACULOVSCHI, Viorica TOARTĂ MECHANISMS FOR MEASURING THE IMPACT OF THE SOCIAL ECONOMY ON SUSTAINABLE DEVELOPMENT: PERSPECTIVES FOR THE REPUBLIC OF MOLDOVA	130
Angela MICCIO LEGAL RESEARCH AND DISABILITY STUDIES: TOWARDS A TRANSDISCIPLINARY AND UNITARY HUMAN RIGHTS-BASED APPROACH	133
Elena PRUS, Anatolie BABIN, Ion BARABULA DIGITALIZATION OF CULTURAL HERITAGE AS A TOOL FOR SUSTAINABLE DEVELOPMENT AND SOCIAL INCLUSION: THE INNO4CULT PROJECT	136
Vlada COLESNICOVA COMPARATIVE ANALYSIS OF AI-POWERED VIDEO GENERATION PLATFORMS FOR RESOLVING SOCIAL PROBLEMS	139
Oxana BARBĂNEAGRĂ MULTIDIMENSIONAL INDICATORS OF POVERTY AND SOCIAL EXCLUSION: EUROPEAN EXPERIENCES AND PERSPECTIVES FOR THE REPUBLIC OF MOLDOVA	143
Olga SHEPELEVA, Oleksandr BOHDANOV, Serhii PIECHKA, Dmytro LITVINOV PROSPECTS FOR SUSTAINABLE DEVELOPMENT OF RURAL AREAS THROUGH SYNERGY BETWEEN AGRICULTURAL ENTREPRENEURSHIP AND TOURISM	146
Tatiana COLESNICOVA EVALUATION OF THE EUROPEAN UNION COUNTRIES' SYSTEM OF INDICATORS FOR MEASURING INCOME INEQUALITY AND POVERTY LEVEL AMONG THE POPULATION	149
Silvia Elena ISACHI CARBON CAPTURE AND STORAGE TECHNOLOGIES: SUSTAINABILITY AND JOBS	154
Ciprian NIMARĂ, Anca Jarmila GUȚĂ QUALITY OF HABITATION AND PERCEPTION OF URBAN SPACE. CASE STUDY: TÂRGU JIU CITY, ROMANIA	157
Maria Livia STEFANESCU THE QUALITY OF DEMOCRACY PERCEIVED BY THE POPULATION OF ROMANIA IN MARCH 2023	160

Dear Authors and Esteemed Readers!

It is both an honour and a privilege to introduce this new edition of the Proceedings of the International Scientific-Practical Conference “*Economic Growth in the Face of Global Challenges. Strategies for Sustainable Growth, Demographic Resilience, and Social Equity.*” The 2025 edition reaffirmed the conference’s role as a major regional platform for scientific dialogue, bringing together researchers, academics, and practitioners committed to examining the structural transformations shaping today’s economies.

In a global environment marked by uncertainty, geopolitical tensions, technological acceleration, demographic shifts, and widening social disparities, the need for coordinated and interdisciplinary research has become increasingly evident. This year’s conference once again demonstrated that cooperation across countries and academic communities is essential for identifying viable pathways toward sustainable development and resilient societies.

The discussions underscored the urgency of strengthening economic and fiscal resilience, accelerating digitalization and digital literacy—particularly in rural areas—and promoting entrepreneurship, innovation, and sustainable business ecosystems.

The conference proceedings further highlighted the need to reinforce economic competitiveness through the diversification of the productive base and the integration of sustainability, digital, and innovation principles into development policies. The importance of advancing digitalization and expanding digital literacy—especially outside urban centres—was reaffirmed, alongside the recognition of youth and women’s entrepreneurship as a key driver of economic resilience.

Analyses dedicated to green financing demonstrated the growing relevance of ESG criteria in corporate strategies and the necessity of developing a national framework for sustainable finance aligned with European standards. In parallel, discussions on agriculture and rural development underscored the imperative of modernizing the agri-food sector, promoting ecological practices, and improving resource efficiency, alongside the consolidation of value chains, producer associations, and investments in the bioeconomy and rural SMEs.

The conclusions in the social and demographic dimensions brought to the forefront the persistence of economic, educational, and territorial inequalities—phenomena further intensified by demographic and technological transformations. The role of socio-economic research was emphasized as fundamental for informing policies centred on equity, supporting vulnerable populations, and advancing social economy initiatives and community-driven innovation. Moreover, demographic analyses highlighted the need for an integrated approach to ageing, migration, and

declining natality, as well as the importance of developing robust methodological tools, improved databases, and indicators harmonized with European standards to ensure long-term demographic resilience.

We express our deep appreciation to our long-standing partners—the Institute for World Economy of the Romanian Academy, the Institute of Research for Agricultural Economics and Rural Development (Romania), and the Faculty of Sociology and Social Work at the University of Bucharest—whose partnership played a pivotal role in strengthening the academic relevance and analytical depth of the event. We are equally grateful to the members of the Scientific and Organizing Committees for their dedication and professionalism, which ensured the realization of a comprehensive and engaging scientific programme.

Finally, we extend our sincere thanks to all authors and participants whose work is presented in these volumes. Your research, critical reflections, and openness to dialogue contribute meaningfully to our shared effort to better understand the complexities of contemporary economies and to design strategies for a more resilient and equitable future.

We are confident that the studies gathered here will continue to inspire new research directions and inform policy debates at national and international levels.

AESM Rector, Alexandru STRATAN
NIER Director, Angela TIMUȘ

**ADVANCING SUSTAINABILITY AND MODERNIZATION IN
FUTURE AGRICULTURE AND RURAL DEVELOPMENT**

DEVELOPMENT OF THE INDIGENOUS CATTLE SECTOR THROUGH INVESTMENT SUBSIDIES

**Tudor BAJURA, Habilitated Doctor, Professor,
National Institute for Economic Research, AESM,
<https://orcid.org/0000-0003-0126-8386>
bajuraiefs@rambler.ru**

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.01>

UDC: 338.432(478)

JEL Classification: Q 11; Q 13; Q 14

Abstract. *Being at the stage of 25 years since the completion of the agricultural reform in the Republic of Moldova, it is logical to summarize some successes, as well as some shortcomings, of these radical changes in local agriculture. According to the unanimous opinion of scholars (experts), the most obvious success of the aforementioned reform is the essential increase in the labor productivity of local agriculture in the post-privatization years. If at the beginning of this period (2000) each farmer processed on average only 2.86 ha of agricultural land annually, then towards its end this area constituted (also on average) already 11.6 ha or 4.1 times more.*

Keywords: *cattle sector, agrarian reform, labor productivity, growth dynamics, subsidies, investments, etc.*

Introduction. The analysis shows, during the post-reform years, for example, the number of large horned cattle decreased by almost 4.33 times, including the number of dairy cows – by 4.5 times, which caused a decrease in the annual volume of milk production by 2.7 times. Given that it is the branch of large horned cattle that constitutes a real basis of the optimal consumption basket of an individual, contributing 12.6 percent to the formation of this basket in energy values (Kcal) and/or 32.0 percent in the monetary evaluation of this basket, such dramatic decreases in the livestock of large horned cattle practically canceled the export of the respective products from the country and (correspondingly) caused an enormous increase in imports, primarily from Western countries, where the respective prices are traditionally much higher compared to analogous prices in the Republic of Moldova.

The degree of approach to the topic in the scientific literature. The degree of approach to the above-mentioned topic is sufficiently high both within the local institutions (ASEM, UTM, INCE and others), and outside these institutions. It is worth mentioning, first of all, the work of Mr. Sacovici V.A. "Food security of the Republic of Moldova in the context of the world food problem", a.2020, Chişinău, ASEM, 543 pp. [2].

Main research methods. As the main research methods, scientific methods of investigation were used, including: normative method, logical analysis method, statistical, graphic, qualitative and quantitative methods, descriptive, analytical method, etc. The theoretical support of the current work was the theoretical

foundations of strategic planning, increasing the efficiency of management of agricultural enterprises at the current post-privatization stage, etc.

Obtained results and discussions. The first quarter of a century (2000-2025) is approaching its end since the completion of the radical reform of agriculture in the Republic of Moldova, based on the reintroduction of private property over the means of production (including land), the restoration of market relations, the establishment of market prices for agricultural goods based on the free correlation between supply and demand, etc.

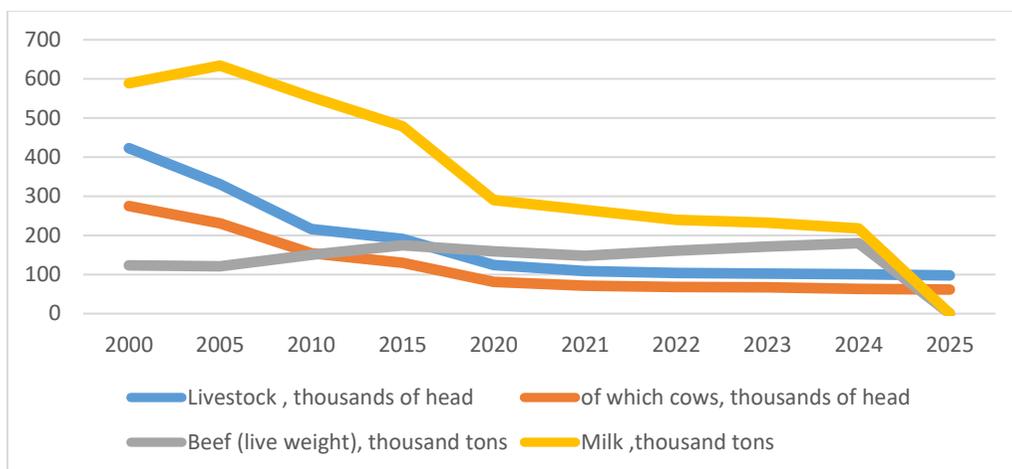
Although, in general, the aforementioned reform was planned and carried out with indisputable success, having been practiced for decades, it allows us to assess in more detail some areas of economic activity in which this success brought relevant increases in the well-being of the country's population and, conversely, the branches (subbranches), resulting in the lack of any of the previously expected progress. The most convincing example in this regard was and continues to be (for 25 years already) the large-horned cattle sector of the agriculture of the Republic of Moldova. Even with the essential support from the state (state budget) the branch in question throughout the post-privatization period shows a tendency to decrease all measurement and/or evaluation indicators. The exception is beef for the simple reason that, from year to year, more and more dairy cows are transported to the slaughterhouse, increasing that indicator by permanently decreasing the total number of large horned cattle.

Table 1. Main indicators of development of the large-horned cattle industry at the initial stage of post-privatization of agriculture in the Republic of Moldova

Name of indicators	Years										2025 in % to 2000
	2000	2005	2010	2015	2020	2021	2022	2023	2024	2025	
Livestock (at the beginning of the year, thousands of head) - cattle - of which cows	423	331	216	191	124	109	104	102	101	97,6	23,1
	275	231	154	130	81	71	68	67	63	61,5	22,4
Beef (live weight), thousand tons	123	121	150	175	159	148	161	171	180	-	146,3
Milk , thousand tons	589	634	554	479	290	265	240	232	218	-	37,0

Source: developed by the authors based on expert assessments

Figure 1. Graphical reflection of the main indicators regarding the functioning of the large-horned cattle industry



Such a dynamic and unequivocal decrease in either the livestock or the volume of bovine milk production has no chance of being justified economically, socially, ecologically or otherwise. The research carried out eloquently shows the high value of all food products obtained in this sector (tab. 2).

Table 2. Standardized composition of the optimal food basket from the large cattle sector (calculated per individual), 2025

Product name	Monthly usage				Annual usage			Market price, MDLei/1000 Calories
	Quantity kg	Quantity of Kcalories in the product used, total	Unit cost, lei/kg	Total cost per month, lei	Quantity, kg	Value of products in Kcalories	Price of products for one year, MD lei	
Butter	0,6	4488	250	150	7,2	53856	1800	33,42
Cheese	0,7	1620	240	168	8,4	19440	2016	103,70
Milk and dairy products	7,5	4200	56	420	90	50400	5040	100,00
Beef	1,5	3270	145	217,5	18	39240	2610	66,51
Total large horned cattle products	x	13578	x	955,5	x	162936	11466	70.37
Total animal products	x	31154	X	1757,6	x	373848	21091,4	56,42
Total phytotechnical products	x	79613	x	1225,5	x	918052	14706,1	16,02
Grand total	x	110767	x	2983,1	x	1291900	35797,6	27,71

Source: developed by the authors based on expert assessments

Taking the data in Table 2 as an analytical basis, we can conclude that by providing the first (and most important) four groups of food products (out of a total of 18 groups) with agricultural raw materials, the cattle sector in the Republic of Moldova would have to provide the country's population with at least 12.6 percent of the annual energy value of a single individual ($162936/1291900 \times 100 = 12.6$) measured in Kcalories. We recall that one Kcalorie is equal to 1000 calories, and the daily consumption of a person, in the calculations in Table 2, is 3539 Kcalories or 1291900 Kcal annually. Taking into account the fact that a caloric unit of products originally from the cattle sector is 2.5 times more expensive than the average price of a caloric unit of the general consumer basket ($70.37/27.71=2.5$) and 4.4 times more expensive than a caloric unit of phytotechnical products ($70.37/16.02=4.4$), we can conclude that the complete destruction of the cattle sector caused enormous quantitative and (especially) qualitative damage to both the factual, average annual consumer basket of the country's citizens and the state budget. Given that an increasing part of the aforementioned food products is consumed as imports, the state continues to spend money on absolutely unfounded subsidization of local milk producers, as stated in the Order of the Ministry of Agriculture and Food Industry of the Republic of Moldova No. 205 of December 27, 2024, according to which milk producers will be subsidized with 3 MDL per kilogram of product [1]. Obviously, apart from "preserving" this disaster situation in the future, which was discussed above, such subsidies will not bring anything good.

Conclusions and offers. Based on all of the above, we can state the fact of the (absolutely unfounded) destruction of a branch of vital importance both for the domestic agricultural sector and for the country's economy in general. Overcoming the deep and long-term crisis situation of such an important area of economic activity of the country's population, especially in rural areas, where the permanent lack of jobs causes a massive exodus of labor (including abroad), cannot be ignored any longer. The development and practical implementation of a State Program for the development of the large-horned cattle sector with both (milk and beef) sub-branches of it is envisaged. The main goal of this Program, as previously mentioned, is the regrouping of the main factors of production (livestock, land, animal service personnel, modern technologies, etc.), in a form (in some forms) optimal from all points of view, capable of organizing the successful and highly efficient functioning of the branch in question.

Acknowledgments / Note: The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.

REFERENCES

- Ordin cu privire la lansarea apelului de depunere a cererilor de solicitare pentru acordarea plăților directe în sectorul zootehnic: nr. 205 din 27.12.2024. (2004). *Monitorul Oficial al Republicii Moldova*, 564-568, art. 1041. https://www.legis.md/cautare/getResults?doc_id=146543&lang=ro
- Сакович, В. А. (2020). *Продовольственная безопасность Республики Молдова в контексте современной мировой продовольственной программы*. Кишинев.

ROMANIAN MILK AND DAIRY PRODUCTS NEGATIVE TRADE BALANCE – WHERE DOES THE CHAIN FAIL?

Camelia GAVRILESCU, *PhD in economics, Institute of Agricultural Economics, Romanian Academy, Bucharest, Romania*

<https://orcid.org/0000-0003-1538-7642>

cami_gavrilescu@yahoo.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.02>

UDC: 338.439.4:637.1(498)

JEL Classification: F14, Q11, Q17

Abstract. Romania's accession to the EU meant the adoption of the common policies also in the milk and dairy sector, as well as free circulation of such products in the Single Market, while observing the quality and food safety regulations. Despite the various support measures for the sector, the raw milk production decreased by 25% in the past years since accession. After quota abolishment, the quantities of processed milk increased constantly. Yet, the growing consumption and the lower prices of milk in other Member States resulted in a steady increase in imports and consequently in a larger negative trade balance for milk and dairy products. The present paper is analyzing the changes in the Romanian international trade with milk and dairy products in the post-accession period, in relation with the upstream stages of the supply chain - production, processing and consumption.

Keywords: trade, milk and dairy, production, consumption, Romania.

Introduction. Milk production has always been an important part of agricultural activity in Romania. In the total agricultural output, it represented 16% in 2000, and subsequently decreased along with the diminishment of the share of animal production. The average share in the pre-accession period (2000-2006) was 11.9% and decreased in the post-accession period to 6.8% (average 2007-2024). Milk production in Romania takes the second largest share in the total animal output (28%, average 2007-2024), after meat production.

The milk production comes mainly from dairy cows and heifers, but also from buffalo cows, ewes and she-goats. While herd numbers of dairy cows and buffalo cows decreased in the post-accession period, an increasing trend could be observed for ewes and she-goats. Production decreased after accession, and stabilized after 2014. With a growing consumption per capita, and a rather low share of milk deliveries to processing, there is a continuous need of imports in order to fulfill the domestic demand, mainly in urban areas, leading to a continuous negative trade balance.

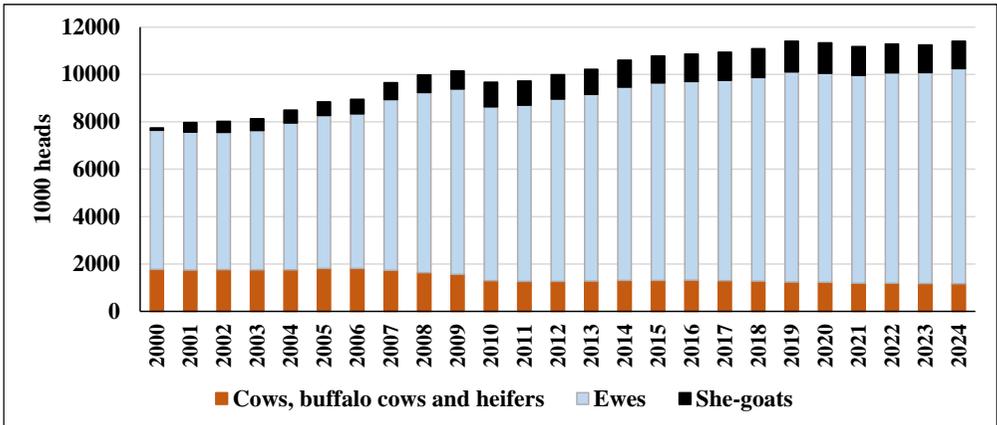
Literature review. There are pros and cons regarding the development of dairy farms in Romania. Among the pros are: latest increases in the number of farms of medium-size, continuous support from CAP funds, increasing demand. Among cons, worth mentioning are: increased frequency of droughts, threatening the feed availability for animals, fractured supply chains (mainly the collection area is severely underdeveloped), lack of middle-sized processing units able to use the local

production, and last but not least, the significant GHG emissions by the dairy farms.

Research methodology. The data on production, consumption and trade used in this paper were extracted from Eurostat, TradeMap, Faostat, and Tempo-online databases. Publications from EU Commission and various academic sources were consulted as well.

Main results. The dairy cows, concentrated mainly in the Northern half of the country, saw their numbers decreasing in the post-accession period from 1.81 million heads down to 1.17 million heads. The buffalo cow heads (concentrated in the Western part of the country) decreased even sharper, by 55% since 2004, down to 11.2 thousand heads in 2024. Sheep husbandry is very ancient and traditional in Romania; the heard increased continuously, up to 10.4 million heads (2024), being second in EU after Spain. A similar trend can be observed for goats: their numbers tripled between 2000 and 2020 (up to 1.61 million heads), to slightly decrease to 1.43 million heads in 2024, of which 1.16 million heads she-goats, ranking third in EU, after Greece and Spain (Figure 1).

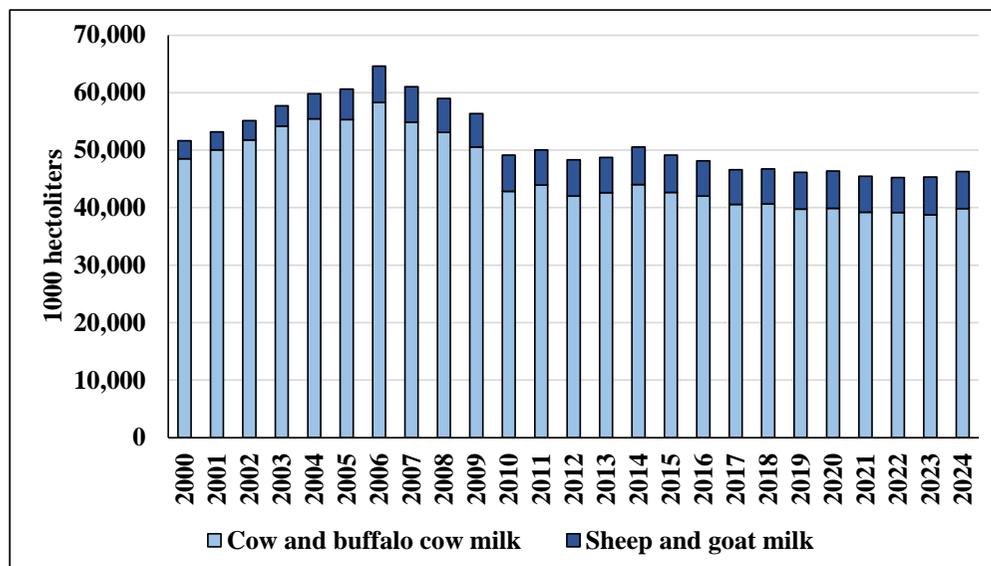
Figure 1. Dairy herd sizes in Romania (2000-2024)



Source: calculations using Tempo online and NIS data.

The total milk production fell from 6.5 million liters (2006) to less than 5 million liters after 2014; in the last 10 years there was a 4.66 million liters average) (Figure 2). Cow and buffalo milk saw a decline in production, while sheep and goat milk increased in quantities and share in total production. If in 2007, the shares were: 88% cow milk, 8% sheep milk and 3% goat milk, in 2024 shares had changed: cow milk 85%, sheep milk 10%, goat milk 5%.

Figure 2. Milk production in Romania (2000-2024)



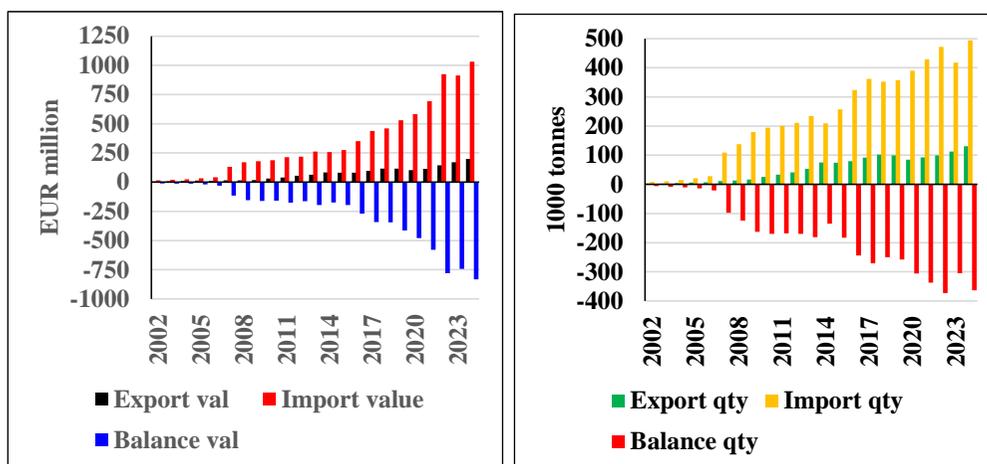
Source: calculations using Tempo online, NIS and Eurostat data.

Farm started developing, mostly through funding projects under Pillar II of CAP. If in 2013, 83.1% of the dairy cows were located in very small size farms (1-2 heads), in 2020 (last Structural Survey in Agriculture), the same share dropped to 71.8%, in favor of medium size farms (3-20 heads).

Consumption of milk and dairy milk products is very high in Romania, and it increased from 198.8 kg/capita/year in 2000, up to 264 kg/capita in 2022, and down to 236 kg/capita in 2023, higher than in developed countries (FAO, 2015). The main reason is that more than half of the milk production is consumed on-farm, since it is the most available and cheapest animal protein in rural areas. As a result, cream and cheese consumption increased in the last decade (40% white salted cheese from cow milk and 20% from sheep milk). The butter consumption in Romania increased from 0.6 kg/capita in 2007, up to 3.3 kg/capita in 2023, but the self-sufficiency rate is 62%, due to low domestic production and high imports. Generally, due to poor collection, only a part of raw milk goes into processing, therefore Romania is importing large amounts of raw milk and cream for industrial processing into drinking milk, fresh fermented dairy products, cheese, butter.

After accession, 99% of milk and dairy products imports came from the EU, mainly from Germany and Poland (cheese and yoghurts) and Hungary (raw milk) (Figure 3).

Figure 3. Romanian trade (value and quantities) in milk and dairy products with EU (2002-2024)



Source: calculations using Eurostat data.

In 2024, Romanian exports of milk and dairy products to the EU totaled 199 million EUR (mostly cheese and buffalo milk), while imports amounted 1.03 billion EUR, resulting a deficit of 832 million EUR. In quantity terms, imports amounted 495 thousand tonnes, while exports 131 thousand tonnes only.

Conclusions. After the abolition of the quota milk system in 2015, the milk and dairy production decreased in Romania. With an increasing domestic consumption, and a fractured supply chain in the area of collection and small and medium size processing units, imports increased significantly in the last 10 years, in both value and quantities, leaving Romania as a net importer. Investments in small and medium sized processing units, able to use the local supply of milk even from small farms are much needed in order to start diminishing the milk and dairy products imports.

REFERENCES

- Eurostat. (n.d.). <https://ec.europa.eu/eurostat/comext/newxtweb/>
- Tempo online. (n.d.). <http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>
- Venig, A., Venig, A. & Mateoc-Sirb, N. (2024). Milk and dairy products in Romania, an overview for the period 2022-2023. *Lucrări Științifice Management Agricol*, 26(2), 181-186. <https://www.lsma.ro/index.php/lsma/article/view/2570>
- Voicilas, D. M. (coord.), Alboiu, C. F., Alexandri, C., Gavrilesu, C. A. & Ionel, I. (2017). *The competitiveness of the agri-food chains in the European Union*. Bucharest: The publishing house of the Romanian Academy. <https://www.researchgate.net/publication/336254071>

CALCULATION MODEL FOR CARBON EMISSIONS IN CEREAL AGRICULTURE

**Ancuța MARIN, PhD in Agronomy, Scientific Researcher II,
Research Institute for Agriculture Economy and Rural Development,
Bucharest, Romania
marin.ancuta@iceadr.ro**

**Vili DRAGOMIR, PhD in agronomy, Acientific Researcher II,
Research Institute for Agriculture Economy and Rural Development,
Bucharest, Romania
dragomir.vili@iceadr.ro**

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.03>

UDC: 631.95

JEL Classification: O01; Q10; Q56

Abstract. *This paper aims to assess the total greenhouse gas emissions associated with the cultivation of wheat, corn and sunflower in Romania, by applying a calculation model based on specific emission factors. The analysis is based on official statistical data provided by the NIS, regarding the cultivated areas and productions obtained for wheat, corn and sunflower in Romania, during the period 2020–2024 and international reference sources for establishing emission factors. For each crop analyzed, greenhouse gas emissions were estimated by applying a simplified calculation model, according to IPCC recommendations. The model is aggregated and does not take into account detailed regional or technological differences (e.g. irrigated vs. non-irrigated, conventional vs. organic farming), but allows for a consistent comparison at the national level between crops and years. The conclusion is that the 3 crops contribute approximately 31% of total agricultural and agri-food emissions in 2024, up from 2023. Corn remains the main source of emissions from the crop sector, representing over 17.5% of the total. The 5% decrease in total emissions reflects the reduction in cultivated areas (especially corn), lower yields, and the slow transition to more sustainable practices.*

Keywords: *circular economy, carbon emissions, environmental impact, wheat, corn and sunflower*

Introduction. Modern agriculture, which is highly mechanized and dependent on fossil fuels, generates high energy consumption and significant greenhouse gas (GHG) emissions. In the context of the transition to a circular economy and climate commitments, low-carbon agriculture based on efficiency, innovative technologies and sustainable practices is needed (Barman & all, 2024). The analysis of emissions from cereal crops is crucial for reducing GHG and

promoting sustainability (Ma & all, 2024; Yin W. & all, 2017; Cui J. & all, 2019). Mavroeidis et al. (2024) estimate emissions per hectare for wheat (1,090 kg CO₂e/ha), maize (2,979 kg CO₂e/ha) and sunflower (1,000–1,500 kg CO₂e/ha).

Material and methods. This paper assesses greenhouse gas (GHG) emissions from wheat, corn and sunflower crops in Romania, based on INS data from 2020–2024. The methodology uses specific emission factors (kg CO₂e/ha), according to the literature (Barman & all, 2024) and IPCC guidelines. By correlating these factors with statistical data, the carbon footprint of the main crops is estimated. The results support the formulation of emission reduction strategies and emphasize the need to adopt sustainable agricultural practices with high energy efficiency.

Results and discussion. During 2020–2024, wheat production in Romania generated an average of over 2.4 billion kg CO₂ equivalent annually, with constant emissions of 1,090 kg CO₂e/ha. Specific emissions varied by yield, with 2021 having the lowest (227.2 kg CO₂e/t) and 2020 having the highest (367.5 kg CO₂e/t).

Table 1. Calculation of total annual emissions for wheat production

Year	Area (ha)	Total emissions (kg CO ₂ e)	Production (t)	Emissions per tonne (kg CO ₂ e/t)
2020	2,155,254	2,349,226,860	6,392,369	367.5
2021	2,175,077	2,370,834,000	10,433,751	227.2
2022	2,168,662	2,363,841,580	8,684,237	272.2
2023	2,317,692	2,526,284,280	9,624,074	262.4
2024	2,271,225	2,475,634,250	9,290,875	266.5
Mean	2,217,582	2,417,164,000	8,885,061	272.0

Source: own calculations

Table 2. Calculation of total annual emissions for corn production (Emissions/ha 2979 kg CO₂e)

Year	Area (ha)	Total emissions (kg CO ₂ e)	Production (t)	Emissions per tonne (kg CO ₂ e/t)
2020	2,537,104	7,559,056,616	10,096,689	748.8
2021	2,549,281	7,590,713,199	14,820,693	512.0
2022	2,431,106	7,243,677,474	8,037,134	901.6
2023	2,195,344	6,539,034,576	8,743,995	747.8
2024	2,110,120	6,284,183,480	5,971,854	1,052.1
Mean	2,364,591	7,043,733,869	9,534,073	739.0

Source: own calculations

Table 3. **Calculation of total annual emissions for sunflower production**
(Emissions/ha 1911 kg CO₂e)

Year	Area (ha)	Total emissions (kg CO ₂ e)	Production (t)	Emissions per tonne (kg CO ₂ e/t)
2020	1,142,841	2,185,964,451	2,122,865	1,029.7
2021	1,123,960	2,147,767,560	2,843,531	755.3
2022	1,093,265	2,090,413,215	2,106,573	992.3
2023	1,077,867	2,060,800,337	2,015,621	1,022.4
2024	1,243,250	2,376,510,750	1,507,995	1,576.1
Mean	1,136,237	2,172,691,663	2,119,317	1,025.0

Source: own calculations

The average was 272 kg CO₂e/t, indicating potential for reduction through productivity and sustainable practices. Maize emitted an average of 7 billion kg CO₂e/year, based on a coefficient of 2,979 kg CO₂e/ha. Total emissions depended on yields, with 2021 having the best efficiency (512 kg CO₂e/t) and 2024 the highest intensity (1,052 kg CO₂e/t) due to low production. The average specific emissions for maize were 739 kg CO₂e/t, reflecting a high carbon footprint. Yield increases and adoption of sustainable practices are needed (Tables 1 and 2). Emission estimates for sunflower (1,200 kg CO₂e/ha) indicate an annual average of 2.17 billion kg CO₂e (2020–2024), with a minimum of specific emissions in 2021 (755 kg CO₂e/t) and a maximum in 2024 (1,576 kg CO₂e/t), depending on yields. In 2023, wheat, maize and sunflower together generated 11.13 million tonnes of CO₂e, representing 28.54% of total agricultural emissions. Maize was responsible for 6.54 million tonnes, wheat – 2.53 million tonnes, and sunflower – 2.06 million tonnes. In 2024, total agricultural emissions are estimated at 36.4 million tonnes CO₂e (–5%), mainly due to the reduction in maize area and energy efficiency measures. However, the three main crops contribute 31% of the total, with maize maintaining its dominant role (Table 3).

Conclusions. In 2024, total agricultural emissions in Romania are estimated at 36.4 million tonnes of CO₂e, marking a 5% decrease compared to the previous year. This reduction is mainly due to the decrease in maize areas, the decrease in yields and the implementation of energy efficiency measures supported by the Common Agricultural Policy. However, wheat, maize and sunflower continue to contribute approximately 31% of total agricultural emissions. Maize remains the main source of emissions in the crop sector, representing over 17.5% of the total. Despite these advances, the pace of adoption of sustainable agricultural practices still remains slow, which limits the significant reduction of the agricultural sector's carbon footprint. Efforts continue to be essential for an effective ecological transition.

REFERENCES

- Barman, A., Pooniya, V., Zhiipao, R. R., Biswakarma, N., Kumar, D., Das, T. K., Shivay, Y. S., Rathore S. S., Das, K., Babu, S., Saikia, N., Meena, M. C., & Bhatia, A. (2024). Integrated crop management for long-term sustainability of maize-wheat rotation focusing on productivity, energy and carbon footprints. *Energy*, *311*, 133304 <https://doi.org/10.1016/j.energy.2024.133304>
- Cui, J., Sui, P., Wright, D. L., Wang, D., Sun, B., Ran, M., Shen, Y., Li, C., & Chen, Y. (2019). Carbon emission of maize-based cropping systems in the North China Plain. *Journal of Cleaner Production*, *213*, 300-308. <https://doi.org/10.1016/j.jclepro.2018.12.174>
- Ma, J., Xu, X., Cui, B., Hao, X., Yang, J., Yang, S., & Liu, L. (2024). Multivariate Regression-Based Dynamic Simulation Modeling of Cumulative Carbon Emissions from Fields. *Sustainability*, *16*(22), 9700. <https://doi.org/10.3390/su16229700>
- Mavroeidis, A., Tsopanoglou, A., Stavropoulos, P., Roussis, I., Vatougiou, D., Kakabouki, I., & Bilalis, D. (2024). Carbon Footprint of Wheat and Maize: A Greek Case Study. *Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Horticulture* *81*(1), 81-84. https://www.researchgate.net/publication/380629418_Carbon_Footprint_of_Wheat_and_Maize_A_Greek_Case_Study
- National Institute of Statistics. *Agricultural area and vegetable production* <http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>
- Yin, W., Chai, Q., Guo, Y., Feng, F., Zhao, C., Yu, A., Liu, C., Fan, Z., Hu, F., & Chen, G. (2017). Reducing carbon emissions and enhancing crop productivity through strip intercropping with improved agricultural practices in an arid area. *Journal of Cleaner Production*, *166*, 197-208. <https://doi.org/10.1016/j.jclepro.2017.07.211>

PRIORITY DEVELOPMENT OF THE AGRARIAN SECTOR OF AZERBAIJAN IN ENSURING FOOD SECURITY OF THE COUNTRY

ELMIRA GOJAEVA, *Doctor of Philosophy in Economics, Associate Professor of the Department of Applied Economics, Azerbaijan State Economic University,*
<https://orcid.org/0000-0001-8413-4812>
elmira_qocayeva@unec.edu.az

FUAD GASIMOV, *Doctor of Philosophy in Economics, Azerbaijan State Economic University,*
<https://orcid.org/0009-0005-7661-6850>
fuad_qasimov@unec.edu.az

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.04>

UDC: 351.862.6+338.439.02](479.24)

JEL Classification: Q1, R1, N5

Abstract. *In the article, the author notes that in recent years, international economic processes occurring throughout the world have acquired a global character and have had a significant impact on the economy of Azerbaijan. In the study, issues based on strengthening the degree of economic security in the world community, protecting domestic agricultural producers, increasing the competitiveness of the agrarian and food market have acquired great relevance. The purpose of the study is to develop theoretical, methodological and practical approaches to increasing the level of socio-economic security through the development of the agrarian and food market, since the agricultural sector, being a strategic sector of the country's economy, reflects a multifaceted system in which its activities occur under the influence of natural and climatic, social and economic laws. The subject of the study is the agrarian and food market of the country, which is the basis of the system of reliability of providing the population at the micro and macro levels of national security. The result of the study is innovation in the agricultural sector, ensuring the competitiveness of the level of national security of the country through the development of the food market through local production based on innovative development.*

Keywords: *food security, import substitution, agricultural sector, innovation, climate change, demography.*

Introduction. In the twenty-first century, food security has become one of the most pressing global challenges, directly influencing economic stability, national well-being, and sustainable development. For Azerbaijan, a country rich in natural resources and favorable agro-climatic conditions, the agricultural sector serves as a strategic pillar of socio-economic security. In recent years, global disruptions —

from climate change and pandemics to geopolitical tensions — have exposed the vulnerability of food systems, emphasizing the need for self-sufficiency and resilient agricultural structures. Against this backdrop, the agrarian sector of Azerbaijan is not merely a traditional branch of the economy but a key determinant of national security and sustainable development.

The aim of this study is to analyze the priority directions of agricultural development in Azerbaijan and to assess how innovation, import substitution, and institutional reforms can strengthen food security at the national level. The article also examines the dynamics of agricultural output, the structure of agricultural exports and imports, and the influence of demographic and climatic factors on food supply.

Research methodology. Agriculture has historically been a backbone of Azerbaijan’s economy, employing a significant share of the rural population and contributing to regional balance. Over the past decade, the share of agriculture in the country’s GDP has remained stable, oscillating between 5.5% and 6.3%, while its contribution to non-oil exports has grown markedly due to state support programs and market diversification initiatives.

Table 1. Share of Agriculture in GDP and Employment in Azerbaijan (2015–2024)

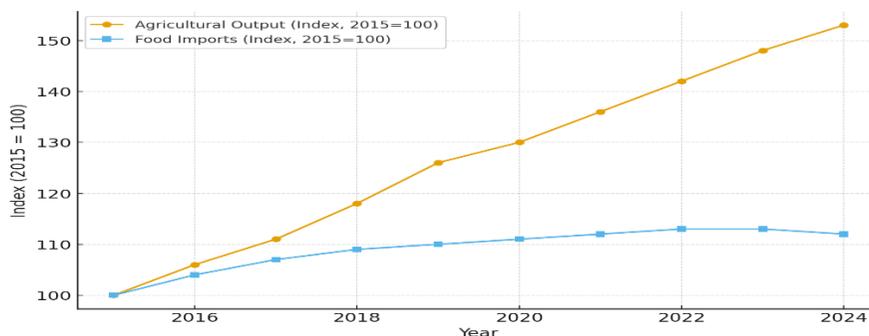
Year	Agriculture in GDP (%)	Employment in Agriculture (%)	Growth of Agricultural Output (real terms, %)	Share of Non-Oil Agricultural Exports in Total Exports (%)
2015	5.7	36.2	2.1	3.8
2017	6	34.9	4.5	5.1
2019	6.2	33.1	6.8	6.3
2021	6.4	31.2	5.4	7.4
2022	6.3	30.7	4.2	8.1
2024*	6	29.4	3.9	8.9

Source: State Statistical Committee of Azerbaijan, author’s calculation

These figures demonstrate a gradual structural shift: while the share of agriculture in employment is declining due to urbanization and technological change, its economic significance is preserved through higher productivity and value-added growth.

Azerbaijan’s food security concept, officially adopted by the government, focuses on the dual objectives of domestic production strengthening and import substitution. According to national statistics, the country produces over 80% of basic food items domestically, yet dependence on imported raw materials, fertilizers, and certain food categories (notably wheat and dairy products) persists.

Figure 1. Dynamics of Agricultural Output and Food Imports (2015–2024)



Source: State Statistical Committee of Azerbaijan, author’s calculation

The policy of import substitution is aimed not only at reducing dependency but also at stimulating local innovation. The establishment of Agroparks and Smart Villages has become a cornerstone of rural transformation, integrating modern irrigation systems, digital monitoring, and precision agriculture. These initiatives have already increased yields of strategic crops such as wheat, cotton, and vegetables, while promoting sustainable practices that mitigate climate risks.

Main results. Innovation in agriculture is central to Azerbaijan’s long-term strategy for food security. The introduction of digital agriculture platforms, drone-based monitoring, and AI-driven soil analysis has allowed for data-based decision-making and efficient use of water and land resources. The Ministry of Agriculture’s digital transformation roadmap (2020–2030) envisions the integration of “smart farming” into at least 60% of agricultural enterprises by 2030.

Table 2. Key Innovation Indicators in the Agrarian Sector (2018–2024)

Indicators	2018	2021	2024
Share of farms using digital tools (%)	5	18	42
Irrigated area under smart control (thousand ha)	25	110	240
Share of renewable energy use in farming (%)	3	7	15

Source: Ministry of Agriculture of the Republic of Azerbaijan, Digital Transformation in the Agrarian Sector 2020–2030 Roadmap; State Statistical Committee of Azerbaijan (2024); author’s compilation.

The shift toward innovation-driven agriculture not only enhances productivity but also ensures sustainability under climate stress. Given that Azerbaijan is located in a semi-arid region, water scarcity poses serious challenges. Hence, the adoption of resource-efficient technologies is vital for maintaining long-term food security.

Climate change remains one of the most serious threats to Azerbaijan’s agricultural stability. Rising temperatures and irregular precipitation patterns reduce yields and increase irrigation demand. At the same time, demographic growth and urban expansion create additional pressure on the food system. The rural population still accounts for nearly 45% of total inhabitants, yet migration to urban areas continues, leading to labor shortages in agricultural production.

To address these challenges, the government has introduced several regional programs for agrarian development (2022–2030), aimed at promoting rural entrepreneurship, supporting young farmers, and modernizing logistics and storage infrastructure. These initiatives also include measures to enhance the resilience of supply chains and stabilize food prices amid global market volatility.

Discussion and conclusions. The priority development of the agrarian sector remains a cornerstone of Azerbaijan’s socio-economic and national security strategy. Strengthening food self-sufficiency, promoting innovation, and diversifying exports are key to achieving sustainable growth in the face of global uncertainty. The country’s approach — combining modernization with preservation of traditional rural values — ensures not only food stability but also regional balance and social cohesion.

In the coming years, the focus should be placed on:

1. Expanding smart farming technologies and green energy in rural areas;
2. Enhancing financial inclusion for small and medium-sized farms;
3. Establishing stronger export infrastructure and certification systems;
4. Promoting education and research in agricultural sciences.

Thus, innovation-based agricultural development serves not merely as an economic goal but as a foundation for Azerbaijan’s broader strategy of sustainable, resilient, and secure growth.

REFERENCES

- Babayeva, S., Adilova, N., Gojaeva, E., & Pashayeva, A. (2024, April). Green Innovation as a Factor of Economic Growth. Development. In: *International Conference on Smart Environment and Green Technologies* (pp. 523-532). Cham: Springer Nature Switzerland.
- Eminov, A., Gojaeva, E., Gutium, T., Badalov, B., & Guliyeva, G. (2024). “Green economy” as a means of ensuring eco-friendly agricultural production. *Reliability: Theory & Applications*. Special Issue, 19(6(81)), 1133-1144. <https://cyberleninka.ru/article/n/green-economy-as-a-means-of-ensuring-eco-friendly-agricultural-production/viewer>
- Gojaeva, E., Veli, I. S., Aysel, P., & Ilham, M. S. (2024, April). Green and Sustainable Financing as a Promising Mechanism for Attracting Foreign Investment. In: *International Conference on Smart Environment and Green Technologies* (pp. 423-430). Cham: Springer Nature Switzerland.

PUBLIC POLICIES FAVORABLE TO THE DEVELOPMENT OF ASSOCIATIVE FORMS IN THE AGRI-FOOD SYSTEM IN ROMANIA

**Krisztina Melinda DOBAY, PhD in economics,
Gheorghe Zane Institute for Economic and Social Research,
Romanian Academy, Iasi Branch**

<https://orcid.org/0000-0002-7635-0061>
dobaykrisztinamelinda@ices.acadiasi.ro
dobaykrisztinamelinda@yahoo.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.05>

UDC: 338.439(498)

JEL Classification: Q13, Q18

Abstract. *The complexity and diversity of the agri-food system, as well as the transformations that the economy and society must make towards a sustainable future in the long term, require collective actions, with an important role being played by producer organizations and agricultural cooperatives, autonomous and voluntary associations formed by several people, which represent a type of enterprise with a dual purpose, economic and social. Current agricultural cooperatives in Romania were established after the advent of Law no. 566, 2004. The pace of annual registrations of agricultural cooperatives at the National Trade Register Office has varied quite a lot, being influenced, first of all, by public policies with an impact on their development. Of these, the most important have proven to be those that regulate the fiscal facilities that agricultural cooperatives and their members can benefit from, such as exemption from various types of taxes (for buildings and land; on profit; on income; on rent, etc.). Currently, agricultural cooperatives play an important role in the agri-food system in Romania, holding almost a third of primary agricultural production and a quarter of the distribution and valorization of agri-food products, and it is imperative to maintain those public policies that are favorable to their future development.*

Keywords: *agricultural cooperatives, producer organizations, public policies, fiscal facilities.*

Introduction. Established under Law no. 566/2004, as subsequently amended and supplemented, the agricultural cooperative is an autonomous association with an unlimited number of members, with variable capital, which carries out an economic, technical and social activity in the private interest of its members. Agricultural cooperatives can be organised for: services; purchases and sales; processing of agricultural products; manufacturing and small industry in agriculture; exploitation and management of agricultural, forestry, fishery land and livestock; the integration, under the terms of the law, of primary agricultural production resulting from the holdings of members with the processing and/or marketing, as well as the joint use of machinery and buildings belonging to agricultural cooperatives; for mutual assistance and agricultural insurance; agricultural cooperative societies.

According to Law no. 265/2020 on amending and supplementing the Law on Agricultural Cooperatives no. 566/2004, for an agricultural cooperative to be considered active it must have had turnover or employees at any time during the reference period, and the National Register of Agricultural Cooperatives (NRCA) is created, updated, administered and published by the Ministry of Agriculture and Rural Development (MARD) on the institution's website, based on data provided by the National Trade Register Office (NTRO).

The producer group is an association of agricultural producers (union) that aims to identify markets, adapt production and capitalize on it according to market needs, aiming to ensure product quality, concentrate supply and rhythmic market supply. Producer groups and producer organizations are established on the basis of Government Ordinance no. 37/2005 on the recognition and operation of producer groups and organizations, for the marketing of agricultural products, with subsequent additions and amendments and Order of the MADR no. 406/2017 for the approval of the Norms on the recognition of producer organizations and other associative forms in the fruit and vegetable sector. Producer groups operate and can be recognized for one or more product groups, which are established by the implementing rules of GO 37/2005.

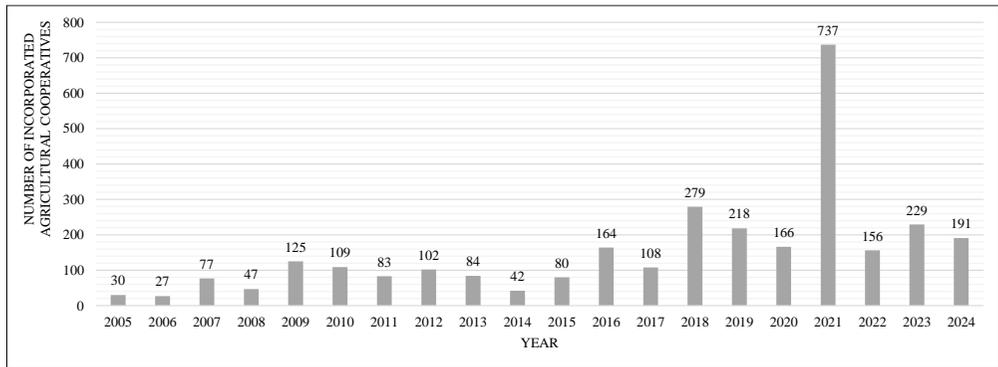
Agricultural cooperatives, producer groups and producer organizations have become increasingly important in the agri-food system in Romania, and their recent dynamics confirm that through appropriate public policies we can also boost their future development.

Status of knowledge. In Romania, the areas in which most of the agricultural cooperatives registered significant turnover and profit are: cultivation of cereals, legumes and oilseed plants; wholesale of cereals, seeds, feed and unprocessed tobacco; wholesale of fruits and vegetables; activities in mixed farms (combined crop cultivation with animal husbandry) (Dobay, 2022). There are currently over 3,000 agricultural cooperatives established in Romania between 2005 and 2024. The dynamics of registrations at ONRC has varied greatly, with a record number of newly established agricultural cooperatives being registered in 2021 (737). In this paper, we will analyze the possible causes of these fluctuations in the registrations of agricultural cooperatives, as well as the dynamics of other forms of association in agriculture.

Research methodology. In order to carry out this work, data on the activity of agricultural cooperatives in Romania were consulted, extracted and processed from the National Register of Agricultural Cooperatives (NRAC), from the website of the Ministry of Agriculture and Rural Development (MARD). For the registrations of agricultural cooperatives, data were extracted from the website of the National Trade Register Office (NTRO). Data on producer organizations and the financial support they benefited from were processed according to the annual reports of the Payments and Intervention Agency for Agriculture (APIA).

Main results. Between 2005 and 2024, 3,054 agricultural cooperatives were registered with NTRO. Of these, 737 were registered in 2021 (*Figure 1*).

Figure 1. Registrations of agricultural cooperatives between 2005 and 2024



Source: Processing based on the National Trade Register Office statistics

The turnover has constantly increased from over 1 billion Ron to over 5 billion Ron between 2018-2023. Regarding the causes of this dynamization of the cooperative system's activity, we believe that we can mention:

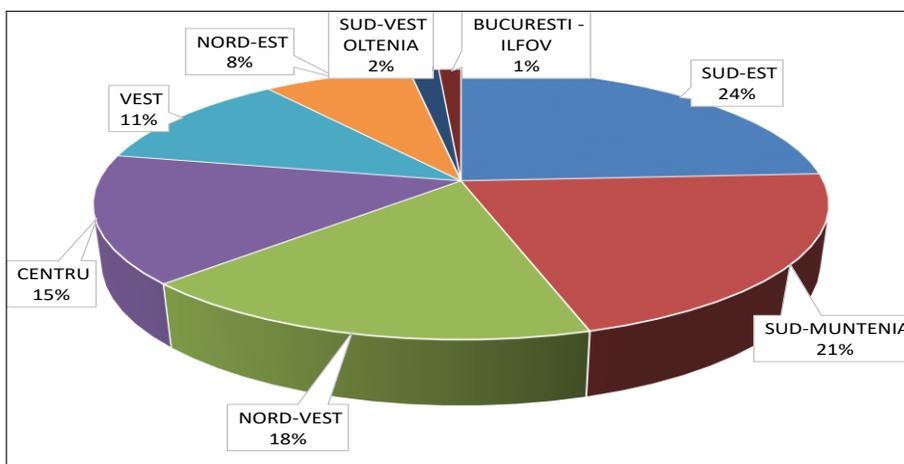
- tax facilities granted since 2016, the most important of which were: in the case of accessing funds from the state budget or European funds, intended for direct payment schemes, transitional national aids and compensatory rural development measures applicable to agricultural land, provided for in the National Rural Development Program 2014-2020, by agricultural cooperatives, the funds can be distributed accordingly to cooperative members, as they are not tax-paying; exemption from paying profit tax for the first 5 years for agricultural cooperatives that process agricultural products; exemption from paying profit tax for 5 years for agricultural cooperatives that have a net annual turnover of up to 2,000,000 euros (respectively 3,000,000 in 2019 and 10,000,000 euros from 2020); exemption of members from paying income tax in the case of legal entities that are micro-enterprises and from paying income tax in the case of individuals, namely natural persons, authorized natural persons, individual enterprises, family enterprises, for production capitalized through/to the agricultural cooperative; in the case of micro-enterprise cooperatives, they pay profit tax and are exempt from paying income tax; exemption from property tax on real estate of cooperative members related to production capitalized through the agricultural cooperative; exemption of cooperative members from paying rent tax in the case of land leased by cooperatives from them; forms of financial support from the state budget or European funds are granted to agricultural cooperatives that have not fragmented their holdings, respectively have not established holdings from fragmentations;

- recognition of agricultural cooperatives as producer groups in order to benefit from all the rights provided for by the legislation in force (carried out by the Ministry of Agriculture and Rural Development);

- harmonization of the application of tax provisions.

At the end of 2024, there were 280 recognized and functional producer groups and producer organizations in the fruit and vegetable sector, most of which in the Sud-Est and Sud-Muntenia Regions (*Figure 2*).

Figure 2. Recognized and functional producer groups and producer organizations in the fruit and vegetable sector in 2024, by regions



Source: Processing based <https://www.madr.ro/grupurile-de-producatori-si-organizatiile-recunoscute-in-romania.html>

Most producer groups have achieved recognition for cereals and oilseeds. According to Government Ordinance no. 37/2005, producer groups may benefit from financial support from the state budget through the MARD budget and may request its release on behalf of their members, with their written consent. At the same time, producer groups may benefit from investment credits granted from the state budget, based on financing programs, according to the legislation in force.

Discussion and conclusions. OECD experts believe that improving access to financing through guaranteed loans for agricultural owners could be ensured by fully registering land titles and completing the national land cadastre (OECD, 2024). Experience so far has shown that it is very difficult to track what is really happening beyond statistics. As we found by following the evolution over time of various formal and informal groups in Iași County within an international collaboration carried out in 2 phases, there is actually much more collaboration than we expected, but it is found in the most different forms. As a rule, collaboration is based on kinship, friendship or neighborhood relationships and is boosted, over time, by existing tax facilities and opportunities, the system being quite elastic from this point of view (Agarwal et al., 2021).

As we have demonstrated in this paper, public policies are very important for ensuring the functionality of the agri-food system, including agricultural cooperatives and producer groups. From this point of view, essential are the policies that ensure the legal framework necessary for the organization and functioning of associative forms, as well as the fiscal facilities that allow achieving their dual purpose, economic and social.

REFERENCES

- Agarwal, B., Dobay, K. M., & Sabates-Wheeler, R. (2021). Revisiting group farming in a post-socialist economy: The case of Romania. *Journal of Rural Studies*, 81, 148-158. <https://www.sciencedirect.com/science/article/pii/S0743016720303478?via%3Dihub>
- Dobay, K. M. (2022). The Resilience of Agricultural Cooperatives in the COVID-19 Pandemic Time. Evidence from Romania. *Agricultural Economics and Rural Development*, 19(1), 13-30. <https://www.researchgate.net/publication/363925132>
- Guvernul României. (2005). Ordonanța Guvernului privind recunoașterea și funcționarea grupurilor de producători, pentru comercializarea produselor agricole și silvice: nr. 37 din 14 iulie 2005. *Monitorul Oficial*, 652. <https://legislatie.just.ro/Public/DetaliiDocumentAfis/63439>
- Ministerul Agriculturii și Dezvoltării Rurale. (2017). Ordin pentru aprobarea Normelor privind recunoașterea organizațiilor de producători și a altor forme asociative din sectorul fructelor și legumelor și modul de accesare a sprijinului financiar de către acestea: nr. 406 din 20 decembrie 2017. *Monitorul Oficial*, 1034. <https://legislatie.just.ro/Public/DetaliiDocument/196245>
- OECD. (2024). *OECD Economic Surveys: Romania 2024*. Paris: OECD Publishing. <https://doi.org/10.1787/106b32c4-en>
- Parlamentul României. (2004). Legea cooperăției agricole: nr. 566 din 9 decembrie 2004. *Monitorul Oficial*, 1236. <https://legislatie.just.ro/Public/DetaliiDocument/58004>
- Parlamentul României. (2016). Legea pentru modificarea și completarea Legii cooperăției agricole nr. 566/2004, precum și pentru stabilirea unor măsuri de aplicare a acesteia: nr. 164 din 22 iulie 2016. *Monitorul Oficial*, 564. <https://legislatie.just.ro/Public/DetaliiDocument/180414>
- Parlamentul României. (2020). Legea pentru modificarea și completarea Legii cooperăției agricole nr. 566/2004: nr. 265 din 20 noiembrie 2020. *Monitorul Oficial*, 1113. <https://legislatie.just.ro/Public/DetaliiDocument/233508>

THE HISTORY AND DYNAMICS OF RICE IN ROMANIA

Ion CERTAN, *PhD in economics, Bucharest University of Agronomic Sciences and Veterinary Medicine, Romania*
<https://orcid.org/0000-0003-0475-2042>
ion.certan@qlab.usamv.ro

Dan-Marius VOICILAȘ, *PhD in economics, Institute of Agricultural Economics, Romanian Academy, Bucharest, Romania*
<https://orcid.org/0000-0003-3411-8958>
dmvoici@yahoo.com

Camelia GAVRILESCU, *PhD in economics, Institute of Agricultural Economics, Romanian Academy, Bucharest, Romania*
<https://orcid.org/0000-0003-1538-7642>
cami_gavrilescu@yahoo.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.06>

UDC: 338.439.4:633.18(498)

JEL Classification: Q15, Q17, Q18, D24

Abstract. *Rice became an important ingredient in the Romanian cuisine under Greek and Turkish influences during the last centuries of the Ottoman Empire presence in the Balkans. Recently, after 1989, rice cultivation and production collapsed, due to several economic factors and inappropriate policies. In this context, the present paper examines the evolutions of rice production, exports and imports in the last 60 years, the current situation, as well as the perspectives for its evolution.*

Keywords: *rice, production, import substitution policy, tradition, trade.*

Introduction. Rice is the second grain produced and consumed in the world, after maize, according to UN Food and Agriculture Organization (FAO). Rice is grown in many parts of the world and is a major source of income for many farmers. Over half the world's population use it, making it vital for food security and economic stability in many regions.

The first rice crop in Romania was established in the mid-18th century in Timiș County, close to the Serbian border. Between 1950-1989, rice cultivation increased in terms of area, production and know-how. After 1990, rice cultivation and production collapsed, due to several economic factors and inappropriate policies. Romania is currently among the eight EU countries that produces rice, but, similarly to the other Member States, is not self-sufficient, hence significant imports, mainly from Asian countries.

Literature review. There are pros and cons regarding the development of rice farms in Romania. Among the pros are: land areas with water resources suitable for rice paddies, improved biodiversity (birds, fish, snails, snakes, insects, butterflies, etc.), groundwater recharge, flood buffer, moderating local air temperature,

preventing soil degradation and secondary salinization process (Mantu, 2012). Among the cons are environmental disadvantages, such as: use of pesticides and herbicides, increased water consumption, possible competition for water with other uses, overlapping of rice fields with Natura 2000 areas, rice-generated emission of methane (Vijulie et al., 2016).

Research methodology. The data on production, consumption and trade used in this paper were extracted from Eurostat, TradeMap, Faostat, and Tempo-online databases. Publications from EU Commission and various academic sources were consulted as well.

Main results. *International context.* Since the 60-s, world total rice production increased continuously, from 215 million tonnes in 1961 to 800 million tonnes in 2023 (3.7 times) (FAO, 2025). While area under rice increased 1.5 times only (from 115 to 168 million hectares in the mentioned period), it was the yield gains that pushed up the total harvest, due to technological advances, such as high-yield variety seeds and modern irrigation methods. Nevertheless, recent challenges such as climate change, water scarcity, and soil degradation resulted in a slowdown of the upward trend.

Top rice producers in the world are China, India, Bangladesh, Indonesia, Vietnam, Thailand, Myanmar, Philippines, Pakistan and Cambodia, with China and India producing 52% of the total world rice output. The total exports amounted 60 million tonnes in 2024 (Trade Map, 2025), of which 74% were by the top five countries: India (30%), Thailand (17%), Pakistan (11%), Cambodia (9%) and Vietnam (7%).

In the EU, rice is not a staple. Although the average rice consumption increased from 7.4 to 9.4 kg/capita/year between 2010 and 2022, it is quite far from the per capita yearly consumption in main rice producing and exporting countries (e.g. 132 kg in China, 194 kg in Philippines, 245 kg in Cambodia).

In the EU, there are eight rice producing countries: Italy, Spain, Greece, Portugal, France, Bulgaria, Romania and Hungary. Their combined production amounts 2.8 million tonnes (average 2000-2023) of paddy rice (~1.7 million tonnes milled rice equivalent); of which Italy produces 53% and Spain 27%. Romania ranks 7-th, with 1.1% of the EU rice production. EU is not-self-sufficient for rice (60% only), its domestic use is about 2.8 million tonnes milled rice equivalent.

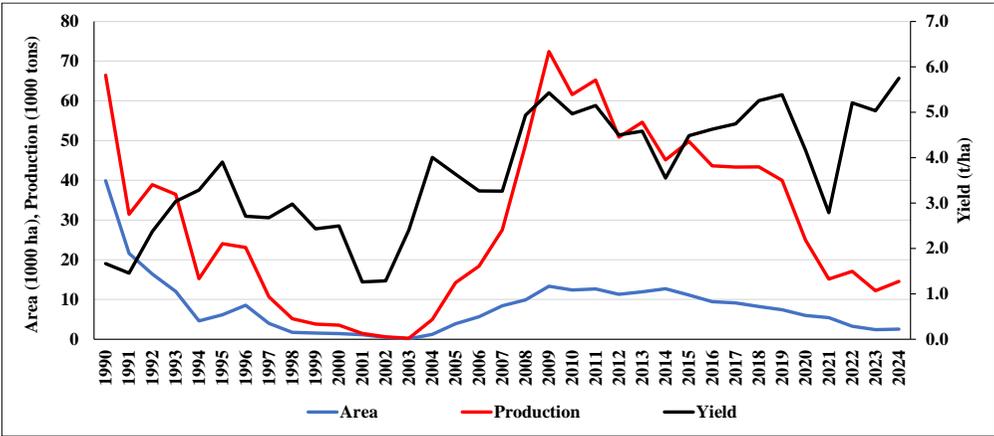
A historical overview of rice cultivation in Romania. The first rice paddy farm established in Romania in Timiș County mid-1700 survived to date due to some brilliant engineering: water comes through gravity from a nearby river, and no pumps are needed. It worked 100 ha in 1934, 200 ha in 1944, and the farm is still there today, with 530 hectares (Mantu, 2012).

In the 70-s, in Romania, rice was among the agri-food products with high imports (after sugar and citrus fruit). In 1972, Romania adopted the import substitution policy concept, quite popular among the developing countries in the 50-s and 60-s, which promoted the idea of a continuous substitution of imports by domestic production. In this vein, taking advantage of its friendship with Asian countries such as China and Vietnam, Romania revived its rice cultivation and production, all along focusing research on creating new rice varieties, suitable and

well adapted to the favorable conditions in the Danube meadow and Delta. As a result, areas under rice increased substantially in the 80-s, and production was able to cover the domestic demand and allowed even some exports.

Recent dynamics. After 1990, rice cultivation and production collapsed, due to several contributing factors such as: import liberalization, land fragmentation and restitution to former owners as result of agricultural cooperatives dismantling, reorientation of crops with high degree of mechanization and international competitiveness (e.g. wheat, maize, sunflower and rapeseeds), land grabbing by foreign companies and joint ventures, and inappropriate policies. Currently, there are left only 23 farms in Romania cultivating rice. Between 1989 and 2003, areas under rice diminished drastically, from 49,300 ha, down to 105 ha. It increased again until 2014, then remained around 13,000 ha for the next five years (*Figure 1*), only to decrease sharply again down to 2,430 ha in 2023, despite various forms of support: Basic Income Support for Sustainability; Complementary Redistributive Income Support for Sustainability; Complementary Income Support for Young Farmers; Coupled Income Support; Environmentally Beneficial Practices Applicable to Arable Land; Practicing Environmentally Friendly Agriculture on Small Farms – Traditional Households (1–10 ha); Transitional National Aid 1 (ANT1); State Aid for Diesel Used in Agriculture (MADR, 2025).

Figure 1. Romanian rice: area, production and yields (1961-2024)



Source: Faostat, <https://www.fao.org/faostat/en/#data/QCL>, Tempo online, <http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>

Yields varied largely as well, from 1.26 t/ha (2001) up to 5.43 t/ha (2009), mostly due to draught intensity. Combined with the instability of areas (89% variation coefficient in 1990-2023), the resulting production has been also strongly unstable, varying between 253 tonnes (2003) and 72,400 tonnes in 2009.

Given that the average demand for human consumption is about 90,000 tonnes per year (eq. milled rice), large imports were needed, resulting a continuous negative trade balance for rice, and a self-sufficiency rate that diminished from 25% (2014) down to 6% (2023). Nevertheless, after 2010, Romania exported quantities of rice between

10,000 and 52,000 tonnes. Imports were far higher, from 45,000 to 126,000 tonnes, depending on the size of domestic production. With a negative trade balance in both quantity and value terms, Romania has been a continuous net importer of rice.

Conclusions. Although currently a net importer, Romania benefits from some favourable resources of land and water, hence may expand its rice area and production. Several limitations challenge market growth, such as climate change impacting rice yield, fluctuating international trade policies, and competitive pricing pressures from alternative grains. Potential research and innovation areas include developing resilient rice varieties that can withstand adverse weather and adopting smart farming techniques to optimize yield and reduce resource consumption. By focusing on sustainability, health benefits, and technological integration, stakeholders can drive growth and resilience in the evolving rice market landscape.

REFERENCES

- European Commission (EC). (2019). *Fact sheet Rice*. https://agriculture.ec.europa.eu/system/files/2019-02/factsheet-eu-rice-market_en_0.pdf
- Food and Agriculture Organization of the United Nation (FAOSTAT). (2025) <https://www.fao.org/faostat/en/#data/QCL>
- Mantu, I. (2012). România ar putea fi unul dintre principalii producători de orez din Uniunea Europeană. *Agro-business*. <https://www.agro-business.ro/romania-ar-putea-fi-unul-dintre-principalii-producatori-de-orez-din-uniunea-europeana/2012/07/30/>
- Ministry of Agriculture and Rural Development. (2025). *Rice. Support policies*. <https://www.madr.ro/en/field-crops/cereals/rice.html>
- Tempo online. (n.d.). <http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>
- Vijulie, I., Manea, G., Tîrlă, L., Matei, E., Preda, M., & Cuculici, R. (2016). Revival of the Rice Crops in the South of Romania: Pros and Cons. *Procedia Environmental Sciences*, 32, 373-385. <https://doi.org/10.1016/j.proenv.2016.03.043>

AGRICULTURE AND RURAL SUSTAINABILITY IN ROMANIA AND THE REPUBLIC OF MOLDOVA: A COMPARATIVE ANALYSIS

Ana URSU, *PhD, researcher. gr. sch. II, ICEADR, Bucharest*

<https://orcid.org/0000-003-1822-9690>

ursu.ana@iceadr.ro

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.07>

UDC: 338.43(498+478)

JEL Classification: Q1, Q15, Q18, R0

Abstract. *The paper comparatively analyzes agricultural sustainability and rural modernization in Romania and the Republic of Moldova, two countries with common historical roots but distinct economic and institutional trajectories. The study uses official statistical data, international reports and specialized literature to assess differences in productivity, access to finance, resource use and implementation of modern agricultural technologies. The results highlight that Romania benefits from European support through the Common Agricultural Policy (CAP) and is rapidly adopting sustainable practices, while the Republic of Moldova faces structural and financial limitations that affect the efficiency and sustainability of the agricultural sector. The study proposes measures to consolidate farms, digitalize processes and streamline natural resources, providing a basis for balanced rural policies.*

Keywords: *sustainable agriculture, rural modernization, Common Agricultural Policy, Romania, Republic of Moldova, rural development*

Introduction. Agriculture is a strategic sector for Romania and the Republic of Moldova, influencing food security, the rural economy and the environment. In the context of climate change, population growth and pressure on natural resources, the sustainability of agriculture becomes a priority objective. Romania and Moldova share common historical roots, but their contemporary trajectories are different: Romania benefits from the CAP and adopts modern technologies, while Moldova faces structural and financial limitations. The aim of this paper is to carry out a comparative analysis and to highlight common and specific challenges, as well as solutions for a balanced and sustainable rural development.

Literature review. Romania and the Republic of Moldova share agricultural traditions dating back to the Principality of Moldavia, where subsistence agriculture, viticulture and animal husbandry were the main economic activities (Giurescu, 1976; Livezeanu, 2000). Major agrarian reforms (Cuza, 1864; interwar, 1921) consolidated family farming and shaped the rural structure, including in Bessarabia (Munteanu, 2014).

Forced collectivization during the communist period led to the loss of individual property, the standardization of production and land fragmentation after 1990 (Verdery, 1996; King & Melvin, 1995). Romania is adopting European policies for agricultural sustainability, while Moldova is faced with fragmented land, limited access to finance and dependence on raw exports (European Commission, 2023; FAO, 2022; World Bank, 2021).

Research methodology. The research methods are based on comparative data analysis for the period 2010-2024. The analyzed indicators were grouped into three dimensions: economic (gross value added in agriculture (% of GDP), government expenditure on agriculture); social (rural population (%), rural distribution by gender); environmental (water efficiency (USD/m³; fertilizers (NPK), pesticides (kg/ha and g/Int\$). The selected indicators were based on the following selection criteria: relevance for productivity, impact on resources, social sustainability, data availability.

Research hypothesis: Although Romania and the Republic of Moldova have a similar agricultural past and common rural traditions, differences in policies, resources, and infrastructure determine distinct trajectories of agricultural sustainability and rural modernization.

Main results

Table 1. Indicators and dimensions of agricultural sustainability

Dimension	Indicator	Unit	Romania (2014-2024)	Moldova (2014-2024)	Comments
Economic	Gross value added by agriculture	% of GDP	4.3 – 4,6 (4.5)	7.2 – 14.1 (11.5)	Moldova is more economically dependent on agriculture
	Agriculture share of Government Expenditure	%	1.5-2.1 (1.8)	2.5-4.8 (2.9)	Moldova receives greater government support
Social	Population employed in agriculture	persoane (mii)	2.441– 0.884 (28.3-11.3%)	0.206-0.185 (23,7-20.9%)	Agriculture employs a larger proportion of the workforce in Moldova
	Rural population	%	46-48	56-61	Moldova is more rural
	Male rural	%	47-50	57-61	There is less imbalance in Romania
	Female rural	%	44-47	55-59	
Mediu	Pesticides	kg/ha	1.1	2.0	Moldova uses more pesticides per hectare
	Pesticides	g/Int\$	0.7	1.6	Moldova is less efficient.
	Nutrients (N, P ₂ O ₅ , K ₂ O) per ha	kg/ha	N: 46.8, P:19.4, K:7.6	N:24.9, P:9.2, K:4.2	Romania uses more inputs

	Nutrients (N, P ₂ O ₅ , K ₂ O) per production value	g/Int\$	N:28.8, P:12.0, K:4.7	N:19.5, P:7.1, K:3.3	Moldova is more efficient per unit of production
	Water Use Efficiency	USD/m ³	0.2–0.4	2.4–4.7	Moldova obtains more profit per volume of water.

Source: Own calculations based on INS data, Tempo online; National Bureau of Statistics of the Republic of Moldova, FAOSTAT, EUROSTAT, IPPC (Integrated Pollution Prevention and Control), FAO

Discussion and conclusions.

There are significant structural and contextual differences in agriculture in Moldova and Romania, which influence productivity, input use and sustainability. Although the indicators analyzed provide valuable information for national agricultural and environmental policies, direct comparisons between the two countries should be approached with caution. The study highlights the need for country-specific strategies focused on efficiency, sustainability and balanced rural development.

General recommendations resulting from the comparative analysis, regarding:

Farm size: reducing land fragmentation, increasing the average farm size to allow for mechanization and more efficient investments;

Increasing productivity: adopting digital technologies and smart farming systems to monitor crops, optimizing irrigation and fertilization;

Making resource allocation more efficient: better management of water, fertilizers and pesticides to increase productivity and ecological sustainability.

Limitations of the study: Structural and dimensional differences between the two countries limit the possibility of making direct comparisons on agricultural efficiency. Although the study provides an overview of trends and challenges in the field of agricultural sustainability, it cannot be concluded that one system is superior to the other.

REFERENCES

Biroul Național de Statistică al Republicii Moldova. (2024). *Indicatori agricoli și rurali*. https://statistica.gov.md/ro/statistic_domains

European Commission. (2023). *Agricultural sustainability and rural development in the EU*. Brussels: European Commission. https://commission.europa.eu/food-farming-fisheries/sustainable-agriculture_en

- European Commission. (2023). *The Common Agricultural Policy at a glance*. Brussels: European Commission. https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cap-glance_en
- Eurostat. (2023). *Agriculture, forestry and fishery statistics*. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agriculture,_forestry_and_fishery_statistics
- Eurostat. (2025). <https://ec.europa.eu/eurostat/data/database>
- Food and Agriculture Organization of the United Nation (FAO). (2022). *Sustainable agriculture and rural development in Eastern Europe*. Rome: Food and Agriculture Organization of the United Nations. <https://www.fao.org>
- Food and Agriculture Organization of the United Nation (FAOSTAT). (2025). *Land Inputs and Sustainability*. <https://www.fao.org/faostat/en/#data>
- Giurescu, C. C. (2000). *Istoria Românilor*. Vol. 3. Ediția a 3-a revizuită. București: Editura All. <https://maia.gov.md/ro/content/rapoarte>, https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SP_M.pdf
- Institutul Național de Statistică al României (INS). (2024). *Tempo online*. <http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>
- IPCC. (2023). *Climate Change 2023: Synthesis Report*. Geneva.
- King, C. (2000). *The Moldovans: Romania, Russia, and the Politics of Culture*. Stanford: Hoover Institution Press.
- Livezeanu, I. (2000). *Cultural Politics in Greater Romania: Regionalism, Nation Building, and Ethnic Struggle, 1918-1930*. Ithaca: Cornell University Press.
- Ministerul Agriculturii și Industriei Alimentare (MAIA). (2024). *Raport anual despre agricultura și dezvoltarea rurală în Republica Moldova*. Chișinău. <https://maia.gov.md/ro/content/rapoarte>
- Ministerul Agriculturii și Industriei Alimentare (MAIA). (2024). *Strategia de dezvoltare agricolă și rurală a Republicii Moldova (SNDAR)*. <https://www.apd-moldova.de/ro/backgroundinfo/sndar-2023-2030/>
- Verdery, K. (1996). *What Was Socialism, and What Comes Next?* Princeton: Princeton University Press.
- World Bank. (2021). *Republic of Moldova Agriculture and Rural Development Report*. Washington, DC: World Bank. <https://www.worldbank.org>
- World Bank. (2021). *Rural development and agricultural sustainability in Eastern Europe*. Washington, DC: World Bank. <https://www.worldbank.org/en/programs/knowledge-for-change/brief/agriculture-and-rural-development>
- World Bank. (2023). *Moldova country economic memorandum achieving the European Union's standard of living within a generation*. Report No: AUS0003407. Washington, DC: World Bank, <https://documents1.worldbank.org/curated/en/099112024082570311/pdf/P179866-9eaed92d-1e4f-46ce-9700-c4b409c2e612.pdf>
- World Bank. (2023). *Romania Economic Update*. Washington, DC: World Bank, <https://www.worldbank.org/en/country/romania/overview>

BIBLIOMETRIC STUDY ON THE SITUATION OF PROTEIC CROPS IN ROMANIA AND THE EUROPEAN UNION

Alexandra Marina MANOLACHE, *PhD, Scientific Researcher,*
Research Institute for Agriculture Economy and Rural Development,
Bucharest, Romania

<https://orcid.org/0000-0002-4417-9407>
bratulescu.alexandra@iceadr.ro

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.08>

UDC: 338.439.4(498+4)

JEL Classification: J21; Q30, P10

Abstract. *The main purpose of this study is to provide a comprehensive perspective, both nationally and internationally, on the importance of the topic of protein plants. The research was structured in two complementary stages; in the first part, the focus was on a quantitative analysis based on the processing and interpretation of statistical data related to protein plants, information extracted from the WoS database. Subsequently, in the second stage, a qualitative analysis was carried out, focusing on the studies and articles identified in the same database.*

Keywords: *Protein plants, quantitative analysis, qualitative analysis*

Introduction. In the current context of the profound changes marking this sector, protein crops are gaining increasing relevance, being considered essential for both agricultural development strategies and the formulation of food security and sustainability promotion policies. The analysis provides the necessary framework for shaping an integrated perspective on scientific advancements in the field and for identifying concrete development opportunities that will underpin both future research and agricultural policies aimed at supporting this sector.

Material and methods. The purpose of this study is to research the main protein plants in Romania using available scientific information sources from the Web of Science (WoS) database, which is internationally recognized for its accuracy and relevance in indexing. The methodology included quantitative analysis, through the evaluation of fundamental bibliometric indicators (number of publications, temporal distribution, structure by document types, authors, institutions, countries of affiliation), and qualitative analysis, through examining research themes and keywords.

Results and discussions. The analysis was conducted based on the works from the WoS database. The search was performed by topic, using two keywords: 'protein plants' and 'Romania'. As a result of querying the two keywords, a total of 95 documents were obtained, which are summarized as follows:

The figure above represents 6 clusters of different colors. The first cluster includes 8 terms (red) namely density, fertilization, fertilizer, productivity, products, wheat, yield, i.; the second cluster includes 7 terms (green) namely crude protein, food, grassland, management, nitrogen, quality, Romania; the third cluster includes 7 terms (blue) namely drought, fat, protein, protein content, temperature, variability, varieties; cluster 4 includes 6 terms (yellow) namely antioxidant activity, chemical composition, germination, oxidative stress, polyphenols, proteins; the fifth cluster includes 6 terms (purple) namely evolution, plants, plum pox virus, pox-virus, prunus domestica, resistance; the last cluster includes 3 terms (light blue) namely maize, organic agriculture, soil.

Conclusions. The bibliometric analysis highlighted that the interest in protein crops in Romania has experienced a steady increase over the last two decades, with a significant intensification after 2015, closely linked to European policies on food security and sustainability. The results of this study suggest that Romania has a significant potential to become an important player in the research and development of protein crops, provided that funding for scientific projects is strengthened, international collaborations are stimulated, and knowledge is transferred to the agricultural sector.

REFERENCES

- Lara, S. W., & Ryan, P. (2025). The current state of peas in the United Kingdom; diversity, heritage and food systems. *Plants, People, Planet*, 7(5), 1235-1244. <https://doi.org/10.1002/ppp3.70001>
- Ma, K. K., Greis, M., Lu, J., Nolden, A. A., McClements, D. J., & Kinchla, A. J. (2022). Functional performance of plant proteins. *Foods*, 11(4), 594.
- Petrescu-Mag, R. M., Pisteu, I. C., Ginsca, C., Cuibus, L. & Petrescu, D. C. (2025). Meat replacers as part of sustainable food systems in Romania: A causal network model. *Journal of Agriculture and Food Research*, 21, 101803. <https://doi.org/10.1016/j.jafr.2025.101803>
- Web of Science. (n.d.). <https://mjl.clarivate.com/home>
- Xiao, X., Zou, P. R., Hu, F., Zhu, W., & Wei, Z. J. (2023). Updates on plant-based protein products as an alternative to animal protein: technology, properties, and their health benefits. *Molecules*, 28(10), 4016. <https://doi.org/10.3390/molecules28104016>

**STRENGTHENING FOOD SECURITY BY DEVELOPING
ASSOCIATION AND COOPERATION IN AGRICULTURE AND
OPTIMIZING THE VALUE CHAIN IN THE REPUBLIC OF
MOLDOVA**

**Aurelia LITVIN, Doctor habilitat,
Technical University of Moldova,**
<https://orcid.org/0000-0003-3756-0856>
aurelia.litvin@em.utm.md

**Larisa CAISIN, Doctor habilitat,
Technical University of Moldova,**
larisa.caisin@mpasa.utm.md

**Ana RAILEAN, master student,
Technical University of Moldova,**
ana.raileanu@mpasa.utm.md

**Aliona IONESCU, Moldovan Pork
Producers Association**
aliona.ionescu@cfc.utm.md

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.09>

UDC: 351.862.6+338.439.02J(478)

JEL Classification: Q1, Q18, R1, R11

***Abstract.** The purpose of this research is to examine the relationship between food security and the current level of association and cooperation in agriculture, as well as how the functionality of the value chain influences the competitiveness and sustainability of the agri-food sector in the Republic of Moldova. The main findings show that the low degree of association and cooperation limits the access of agricultural producers to external markets, modern technologies and sources of financing, which affects the competitiveness and quality of products. At the same time, the lack of consolidated value chains reduces the ability to comply with international food safety standards. In contrast, where there are functional cooperatives and partnerships, there is a better integration of production with quality requirements, an increase in farmers' incomes and a direct contribution to food security.*

***Keywords:** food security, sustainability, agri-food sector.*

Cercetarea a fost realizată în cadrul proiectului științific: 25.80012.5107.20SE Impactul reglementărilor privind siguranța alimentelor asupra competitivității producătorilor locali din Republica Moldova.

Introduction. Modern agriculture in the Republic of Moldova faces major challenges due to limited access to markets and insufficient financing. Farmer associations and cooperation are essential solutions for increasing the

competitiveness and efficiency of the sector. The majority of Moldovan farmers are small producers, which makes it difficult for them to access external markets and European funds. International studies show that the formation of cooperatives improves bargaining power, increases investments in modern technologies and ensures sustainable development.

Literature review. The change in vision of the development of the agricultural sector in the Republic of Moldova, also reflected the fact that farmers, agriculturists, have begun to be asserted as important actors in local/rural development. Special attention to this subject is given by international agencies such as PNUD, the Swiss Agency for Development and Cooperation (SDC) and the United Nations Food and Agriculture (FAO), German Cooperation GIZ-Moldova, Organization for Economic Cooperation and Development (OECD), International Cooperation Alliance (COOP). Among the most recent publications developed by FAO and OECD consultants during their mission to the Republic of Moldova is the Guidance for Responsible Agricultural Supply Chains. It provides a common, globally applicable framework to support agricultural businesses and investors in their contribution to sustainable development by identifying and reducing negative impacts. At the end of 2022, FAO launched the report on agricultural cooperatives, responsible sourcing and risk-based due diligence, to help cooperatives understand what they can do to address sustainability challenges in global agribusiness trade. The Republic of Moldova conducts research and provides periodic studies in the field of agricultural cooperation, implements and supports development programs in the process of food security.

Research methodology.

In the course of the investigation, a set of theoretical and empirical methods were applied and combined, which made it possible to research the state's interest in consolidating the relations of producers and farmers involved in the field of cooperation in agriculture and rural development in the context of the economic development of the Republic of Moldova in a multidimensional framework, always through the direct and indirect involvement of cooperatives of producers in sustainable economic development of the Republic of Moldova by attracting foreign investments and various projects aimed at local and rural development.

Main results. The efficient management of the agro-food value chain is crucial for the ultimate valorization of agricultural production. In Moldova, a large part of the country's art is devoted to rhyming matter, without redress, the value of the name is significantly reduced. A well-structured value chain would increase the profits of farmers, generate income in the rural environment and minimize crop losses. Successful models from countries such as Italy, the Netherlands and Ireland demonstrate that integrating production with processing and distribution brings substantial economic and social benefits. From a scientific point of view, this research contributes to the specialized literature on partnership models and efficient value chains, analyzing international case studies and adapting solutions to the Moldovan context. At the grassroots level, it establishes support mechanisms for farmers, cooperatives and authorities, identifying barriers and opportunities for the development of an efficient agri-food value chain.

Discussion and conclusions. The agri-food value chain represents the totality of interrelated activities that contribute to the production, processing, distribution and marketing of agri-food products, from the farm to the final consumer. The concept is essential for understanding how value is added at each stage of the agri-food chain and how the economic and social efficiency of the agricultural sector can be maximized. It is very important to note that although they are often confused, the value chain and the supply chain are distinct entities, each with specific roles in agri-food management and rural development strategies, namely, the value chain focuses on value creation and efficient integration of actors (from field workers to skilled processing workers), while the supply chain to focus more on the logistics of delivering products from producer to consumer (optimizing the agri-food distribution chain allows for shortening delivery times and reducing losses between producer and consumer). In the agri-food sector, the value chain also integrates social objectives, such as farmer-driven, local development or sustainability. Example: An agricultural cooperative that produces, processes, packages, labels and sells under a brand creates value at many levels. Therefore, the development of the agro-food sector cannot be realized without a clear understanding of the difference between the supply chain and the value chain. Although the rhyme reflects a logistical and operational need, the second is a strategic approach, aimed at the integration of these stories, the creation of added value and the stimulation of development sustainable villages. A competitive and resilient agriculture needs to function harmoniously in all its components. As with all this, in the context of current challenges and European objectives regarding sustainability, building and consolidating value chains becomes a priority – not only for economic efficiency, but also for social well-being and the revitalization of rural communities. For an agri-food value chain to function efficiently, it is absolutely necessary to identify all critical points and bottlenecks that can affect the timely operation of processes. These vulnerable elements are present at all stages – from primary and secondary agricultural production, to processing, distribution or marketing – and generate major imbalances throughout the system. By recognizing and analyzing these bottlenecks, concrete solutions can be developed to create economic reform, reduce losses and support sustainable development in the agri-food sector. Thus, a strategic and careful approach to these blockages becomes an essential tool for strengthening the resilience of the entire chain. These critical points often occur along the entire chain, from primary production to market access, negatively influencing competitiveness, food security and sustainable rural development. The key to identifying problems and critical points in the agri-food value chain is to optimize the entire production and distribution flow, from farm to consumer. By understanding and addressing existing blockages, favorable conditions are created for streamlining economic activities, reducing losses, and ensuring a constant and safe flow of agri-food products. At the same time, a careful analysis of these deficiencies allows to increase the comprehensibility of the lost products, while improving the health, the planting of the crops and the consolidation of the presence of the internal networks and external.

Main critical points in agri-food value chains: 1. Primary production. 2. Storage and disposal. 3. Processing. 4. Distribution. 5. Market access. 6. Regulation and

bureaucracy. 7. Finance. Blockages in agri-food value chains: Fragmentation of producers; Lack of coordination in the value chain; Incoherent fiscal and public policies; Health safety and traceability issues; Cumulative effects on the development of the sector. All these blockages affect economic efficiency, limit market access and reduce investment attractiveness. To build functional and sustainable value chains, a strategic and coordinated intervention of the state, business environment and farmers' organizations is necessary. The main conclusion is that the optimization of value chains are determining factors for increasing the resilience of the agricultural sector and strengthening food security in the Republic of Moldova.

REFERENCES

- Banca Mondială. (2021). *Agricultural Competitiveness in Moldova: A Pathway to Sustainable Growth*. Washington, DC: World Bank Group.
- Food and Agriculture Organization of the United Nations (FAO). (2022). *Development of agricultural cooperatives in Eastern Europe*. <https://www.fao.org/>
- International Fund for Agricultural Development (IFAD). (2021). *Country Strategic Opportunities Programme for Moldova*. <https://www.ifad.org/>
- Litvin, A. (2025). *State of Art of Agriculture in Moldova in the process of EU integration*. Skopje: The Regional Rural Development Standing Working Group in South East Europe (SWG). https://www.researchgate.net/publication/391839208_State_of_Art_of_Agriculture_in_Moldova_in_the_process_of_EU_integration
- Litvin, A., Turcan, R., Stratila, A., & Turcan, I. (2025). *Agricultural trade: Impacts on market stability and integration with developing countries*, Reference Module in Food Science, Elsevier.
- Ministerul Agriculturii și Industriei Alimentare (MAIA). (2023). *Programul Național de Dezvoltare Agricolă 2023-2027*. Chișinău: MAIA.
- Organisation for Economic Co-operation and Development (OECD). (2020). *Agricultural Policy Monitoring and Evaluation 2020: Moldova*. Paris.

WORK PERFORMANCE ANALYSIS IN BIOECONOMY: ROMANIA VERSUS THE EUROPEAN UNION

**Daniela Nicoleta VOICILA, PhD, eng, scientific researcher III,
Research Institute for Agriculture Economy and Rural Development,
Bucharest, Romania**

<https://orcid.org/0000-0003-3648-7618>
badan.daniela@iceadr.ro

**Steliana RODINO, PhD in bioeconomy, scientific researcher I,
Research Institute for Agriculture Economy and Rural Development,
Bucharest, Romania**

<https://orcid.org/0000-0002-5653-9553>
steliana.rodino@yahoo.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.10>

UDC: 338.43(498)

JEL Classification: Q01, Q10, J21, O13, L60

Abstract. *This paper aims to analyze the size and performance of the labor force in the bioeconomy sector, both at the level of the European Union and in Romania, with a focus on the evolution of labor productivity. The bioeconomy, as a strategic field of the green economy, integrates activities such as agriculture, forestry, fisheries, the food industry, and biotechnology, occupying an important position in the ecological transition and efforts toward economic sustainability. At the European level, the bioeconomy sector contributes significantly to the EU's GDP, providing jobs for over 17 million people, with labor productivity showing an upward trend over the past two decades. Romania, on the other hand, faces major challenges: a constant decline in the active workforce employed in the bioeconomy, productivity levels below the EU average, and a dominant agricultural sector with low economic efficiency. The paper highlights these disparities and underlines the importance of structural reforms, investments in technology, education, and vocational training as necessary solutions for increasing the competitiveness of Romania's bioeconomy. The sustainable development of the bioeconomy sector is closely linked to Romania's ability to efficiently harness its available human and natural resources.*

Keywords: *bioeconomy, labor force, productivity, ecological transition, economic sustainability*

Introduction.

The bioeconomic sector, considered strategic for sustainable development, includes areas such as agriculture, forestry, fishing, food industry, and biotechnology. This bioeconomy plays an important role in promoting the transition to a green economy, with significant influences on employment and productivity levels. This work aims to assess labor performance in the bioeconomy through a comparison of key indicators between Romania and the European Union during the

period 2010–2022. Using official data provided by Eurostat and rigorous statistical methods, the study aims to identify trends, disparities, and factors that influence the performance of the bioeconomic sector.

Literature review

Bioeconomy is considered a key instrument for sustainable development in the EU, with significant socio-economic potential, estimating the creation of approximately one million jobs by 2030, especially in rural and coastal areas (Nowak et al., 2022). Existing research studies focus on the concept of bioeconomy and its related policy framework, while research concerning the impact of specific sectors on the labor market is rarer (Firoiu et al., 2023). Assessing the role of the workforce in the development of the bioeconomy is important, as the structure and productivity of labor influence the efficiency of the bioeconomy sector (Dolge et al., 2023).

Bioeconomy is an important sector for the labor market in the EU, with millions of employees, with significant differences between states regarding labor productivity. The adaptation of European economies to the new conditions requires the development and social acceptance of bioeconomy. (Nowak Anna, Jarosz-Angowska Aneta, 2024)

Research methodology

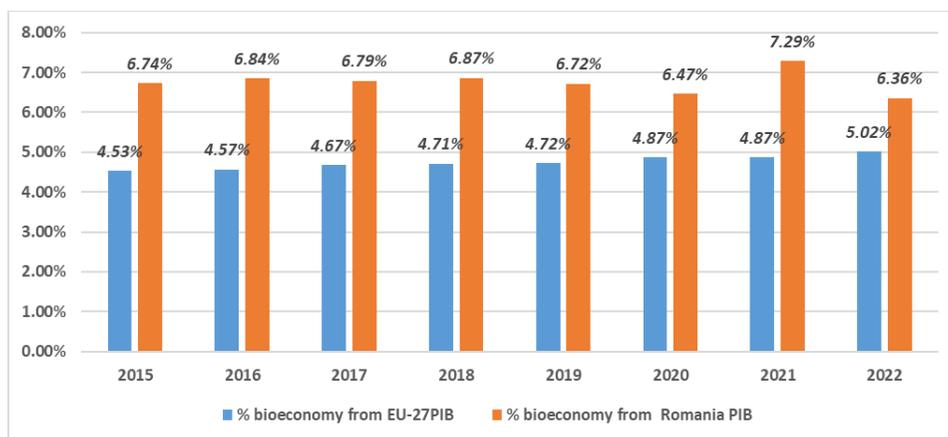
This paper analyzes the performance of work in the bioeconomic sector in Romania compared to the European Union during the period 2010–2022, using Eurostat data. Within this framework, indicators such as contribution to GDP, employment, productivity, and research and development expenditures were evaluated, using descriptive methods and correlational analyses.

Main results.

The bioeconomic sector is playing an increasingly important role in the economy of the European Union, significantly contributing to sustainable growth, job creation, and the transition to a circular economy.

Analyzing the statistical data regarding the contribution of the bioeconomy sector to the gross domestic product (GDP), it indicates an increase in both the absolute value and the share of this sector in the economy of the European Union and, respectively, Romania, during the period from 2015 to 2022. At the EU-27 level, the total GDP grew from 12.3 trillion euros in 2015 to over 16.1 trillion euros in 2022. The bioeconomy sector in Romania represents a larger proportion of GDP compared to the European average, indicating an economic structure where traditional sectors (agriculture and forestry) hold a significant share.

Figure 1. The contribution of the bioeconomic sector to the GDP of the European Union and Romania



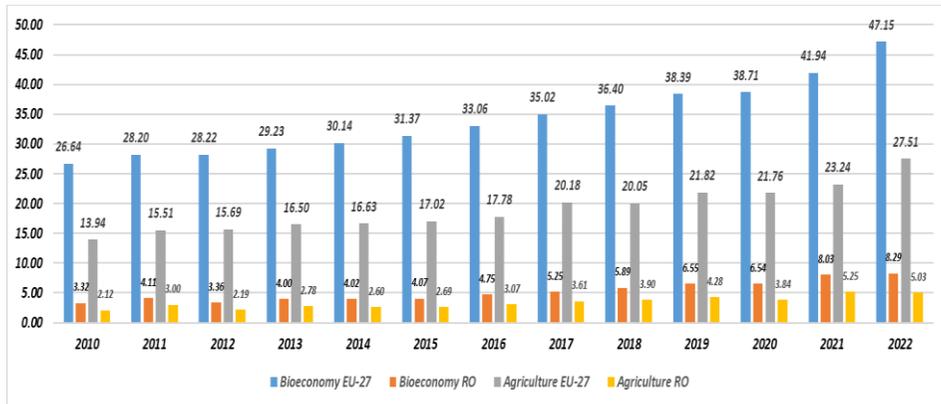
Source: processed data from Eurostat

Romania's GDP during the period 2015-2022 increased from 160 billion euros to over 281 billion euros, while the GVA from the bioeconomy from 10.8 billion euros to 18 billion euros, thus the contribution of the bioeconomy in Romania varied between 6.36% and 7.29%, with a maximum value in 2021, followed by a decrease in 2022. In the case of the bioeconomic sector at the EU-27 level, there was a decrease in the share of employment in the bioeconomic sector, mainly in agriculture within the EU-27 bioeconomy, from 56.8% in 2010 to 49.5% in 2022. The observed trend indicates a diversification and modernization of the European bioeconomy, with a greater focus on high value-added activities and advanced technologies.

Agriculture represented over 86% of the total workforce in the bioeconomy in 2020, and this share decreased to about 80% by 2022. The number of employees in Romania's bioeconomy sector at the EU level recorded a decline from 16.80% in 2010 to 12.54% in 2022, indicating an overall reduction in employment in the bioeconomy compared to the rest of the EU states. The dominant sector remains agriculture, which saw a significant decrease in its share from 25.39% in 2010 to 20.34% in 2022, highlighting labor migration and the reduction of the active rural population.

Between 2010 and 2022, labor productivity in the bioeconomic sector in Romania registered a positive evolution. Thus, in 2010, its value was 3.32 thousand euros per occupied person, and by 2022, it had increased to 8.29 thousand euros, representing an increase of about 150%, an evolution that indicates an improvement in labor efficiency and possible progress regarding the adoption of technologies, investments in infrastructure, and modernization of production processes.

Figure 3. Comparison of labor productivity in the bioeconomic sector in Romania with the EU average

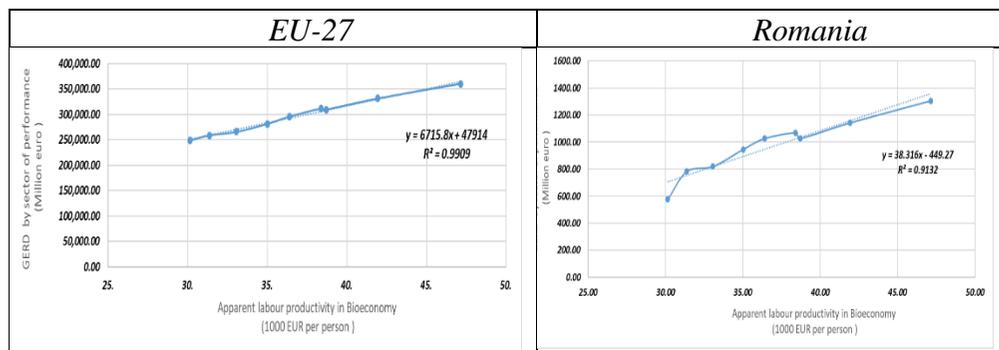


Source: data processed by Eurostat

The average productivity of labor in the bioeconomic sector at the EU-27 level increased from 26.64 thousand euros to 47.15 thousand euros per occupied person, equivalent to an increase of about 77%. In 2010, labor productivity in Romania represented 12.5% of the EU average, and by 2022 it reached 17.6%, indicating a slight reduction in the gap. From 2020 to 2022, Romania recorded the highest annual increases in productivity in the bioeconomic sector, which can be attributed to investments stimulated by European funds, accelerated digitalization, and economic policies adapted to the post-pandemic context.

Investments in technology are essential for increasing productivity in the bioeconomic sector, through digitalization, biotechnology, and efficient resource use. Thus, a correlational analysis was conducted for the European Union and Romania highlighting the crucial role of investments in increasing labor productivity in the bioeconomic sector.

Figure 4. The impact of technology investments on productivity in the bioeconomic sector at the EU level and Romania



Source: Eurostat processed data

Regarding the European Union (EU-27), a close correlation ($R^2 = 0.9909$) was observed between labor productivity and research and development expenditures (GERD), reflecting the high efficiency of human resource utilization and the importance of well-directed investments in enhancing sector performance. At the level of Romania, data indicates a strong correlation ($R^2 = 0.9132$) between research and development expenditures (GERD) and labor productivity in the bioeconomy. The result underscores the significant contribution of research and innovation activities to the sector's development. Both at the EU level and in Romania, investments – especially in innovation and human capital – play a crucial role in transforming the bioeconomy into a pillar of sustainable economic growth and the transition to a circular economy.

Discussion and conclusions.

Both in the EU and in Romania, the bioeconomy sector has recorded a constant expansion between 2015 and 2022, significantly contributing to GDP and supporting the transition to a green and circular economy. In the EU, the workforce in agriculture declined from 56.8% in 2010 to 49.5% in 2022, while bio-based industrial sectors grew. Romania saw a slow decrease in the share of the workforce in agriculture, from 86% in 2010 to 80% in 2022, indicating a gradual diversification of the bioeconomy. Romania has recorded a significant increase in labor productivity in the bioeconomy sector, from 3.32 thousand euros/person in 2010 to 8.29 thousand euros/person in 2022.

A correlational analysis showed a strong link between research and development spending and labor productivity in Romania, highlighting the necessity of continuing investments in innovation and technology to enhance the competitiveness of the bioeconomic sector.

REFERENCES

- Dolge, K., Balode, L., Laktuka, K., Kirsanovs, V., Barisa, A., & Kubule, A. (2023). A comparative analysis of bioeconomy development in European Union countries. *Environ Manage*, 71(2), 215-233. <https://doi.org/10.1007/s00267-022-01751-3>
- European Commission. (n.d.). *JRC - Bioeconomics*. <https://datam.jrc.ec.europa.eu/datam/public/pages/dataList.xhtml>
- Eurostat. (2025). *Gross domestic product and main components per capita*. <https://ec.europa.eu/eurostat/en/web/main/search/-/search/dataset?text=Gross%20domestic%20product%20and%20main%20components>
- Eurostat. (2025). *Gross value added and income by main industry*. <https://ec.europa.eu/eurostat/en/web/main/search/-/search/dataset?text=Gross%20value%20added%20and%20income%20by%20main%20industry>
- Firoiu, D., Ionescu, G. H., Cojocaru, T. M., Niculescu, M., Cimpoeru, M. N., & Călin, O. A. (2023). Progress of EU Member States Regarding the Bioeconomy and Biomass Producing and Converting Sectors. *Sustainability*, 15(19), 14128. <https://doi.org/10.3390/su151914128>
- Nowak, A., & Jarosz-Angowska, A. (2024). Employment And Labour Productivity in The Bioeconomy - An Overview of The Member States of the European Union. *Scientific Papers of Silesian University of Technology. Organization And Management Series*, 199, 457- 469. <http://dx.doi.org/10.29119/1641-3466.2024.199.34>
- Nowak, A., Jarosz-Angowska, A., & Krukowski, A. (2022). The potential of Polish bioeconomy compared to the European Union countries. *Przegląd Prawno-Ekonomiczny*, 4, 97-116. <https://doi.org/10.31743/ppe.13792>

COMPARATIVE ANALYSIS OF THE TREND AND PERSPECTIVE OF AGRICULTURE IN THE REPUBLIC OF MOLDOVA IN RECENT YEARS

Olesea COJOCARU, *PhD in geonomics,*
Principal Consultant,
Ministry of Environment, Republic of Moldova
<https://orcid.org/0000-0001-5546-269X>
olesea.cojocaru@mediu.gov.md

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.11>

UDC: 338.43(478)

JEL Classification: Q10, Q15, Q18, O13, R11

Abstract. *The article examines the evolution of key agricultural crops in the Republic of Moldova from 2015 to 2024, focusing on trends in productivity and cultivated areas. Using a combination of statistical data analysis, regression modeling and regional comparison, the research reveals contrasting trajectories for crops like wheat, maize, sunflower and sugar beet, influenced by climatic conditions and institutional shortcomings. The findings underline the vulnerability of the sector, the need for modernization of infrastructure and support systems, and call for strategic reforms to enhance resilience and sustainability.*

Keywords: *sustainable agriculture, climate change, agricultural policies, productivity, rural modernization, Republic of Moldova, resilience.*

Introduction. Agriculture is a key pillar of the Moldovan economy, generating 10% of GDP and providing over 25% of jobs (World Bank, 2023). Despite modernization in large farms, most smallholders face structural constraints, including fragmented land, weak infrastructure, and limited support systems (OECD, 2022; FAO, 2022). Climate risks, especially recurrent droughts in 2020 and 2022, have exacerbated these vulnerabilities (UNDP, 2023). National strategies such as the 2023-2030 NSARD aim to address these gaps, but implementation remains uneven. This paper analyzes crop trends over 2015-2024 to identify vulnerabilities and policy directions.

Literature review. Studies (Lerman, 2008; Swinnen & Van Herck, 2015) reveal Moldova's agricultural challenges: weak diversification, climate sensitivity, and low access to irrigation. FAO (2022) and GIZ (2023) emphasize the need for smart tools and institutional reform. Local voices (Boincean, 2020; Capcelea, 2024) advocate for ecological transition, but practical uptake is low without strong knowledge transfer. The literature calls for integrated and inclusive climate-resilient strategies to bridge the development gap with neighboring countries. Moldova remains at an early stage of digitalization in agriculture, with initial efforts launched by the Agricultural and Rural Advisory Center (Cojocaru, 2025). In contrast, Romania has integrated digital tools into both education and advisory systems, while Ukraine explores European partnerships for agri-digital platforms.

Research methodology. This study uses a quantitative and comparative approach to evaluate the performance of Moldova’s agricultural sector during the period 2015-2024. The analysis focuses on two key indicators: (i) cultivated area (thousand hectares) and (ii) average yield (tons per hectare), assessed for main crops: wheat, maize, sunflower, barley, and sugar beet. Data were sourced from the National Bureau of Statistics and analyzed through linear and polynomial regressions. The coefficient of determination (R^2) was used to assess the strength of temporal trends in cultivated areas. Additionally, crop resilience was evaluated based on yield variability, identifying years of minimum and maximum productivity. Climate variables, especially precipitation, were correlated with yields to assess sensitivity. Comparative indicators with Romania and Ukraine were also included to contextualize Moldova’s position in terms of irrigation access, digital adoption, and organic farming integration.

Main results. The analysis of agricultural dynamics in Moldova during 2015-2024 reveals significant differences between crops in terms of area trends and climate resilience. Wheat shows a clear upward trend in cultivated area ($R^2 = 0.836$), with moderate productivity fluctuations influenced by drought and limited irrigation. Maize presents highly unstable patterns ($R^2 = 0.149$), with yields severely reduced during dry years, although partially compensated by improved hybrids and geographic dispersion. Sunflower cultivation expanded until 2020 ($R^2 = 0.697$), followed by a recent decline due to market volatility and soil fatigue. Sugar beet recorded a sharp structural collapse, from 428 to 2.6 thousand tons, mainly caused by the loss of processing infrastructure and institutional support. Barley maintained moderate resilience, with relatively stable yields between 2.04 and 3.11 t/ha, especially in central and northern zones. These trends highlight the uneven adaptation capacity across crops and the urgent need for targeted support measures. Table 1 summarizes the cultivated area trends and corresponding R^2 values, reflecting the strategic positioning and resilience of each crop.

Table 1. Cultivated area trends and R^2 (2015–2024)

Crop	Area trend	R^2	Resilience
Wheat	Increasing	0.836	Moderate
Sunflower	Increase	0.697	High
Maize	Unstable	0.149	Low
Barley	Fluctuating	0.346	Medium
Sugar beet	Continuous decline	0.536	Very low

Source: author’s calculation based on NBS data

Discussion and conclusions. The comparative analysis of agricultural crop dynamics in Moldova over the last decade reveals persistent structural imbalances, low adaptive capacity, and high climate vulnerability. The disparity in R^2 values across crops confirms that agricultural decision-making remains largely reactive, influenced by short-term climate and market conditions rather than long-term planning. Low levels of irrigation, limited public investment, and unequal access to

modern technologies continue to hinder sustainable development. Strategic investments in irrigation, diversification incentives, and support for small farmers are essential. Moreover, integrating research and innovation - particularly in sustainable and organic agriculture, can increase resilience and competitiveness. In conclusion, the Moldovan agricultural sector requires coordinated reforms that combine infrastructure development, institutional efficiency, and climate adaptation strategies. Without such measures, the sector risks further stagnation and deepening disparities compared to neighboring countries with similar agronomic potential.

REFERENCES

- Boincean, B. (2020). *Conservation Farming: a handbook for agricultural producers and their trainers*.
- Capcelea, A. (2024). *The ecological crisis in agriculture and strategic directions for recovery*.
- Cojocaru, O. (2025). *Interim Director of the Agricultural and Rural Advisory Center - the mandate to build an institution from scratch*.
- Food and Agriculture Organization of the United Nations (FAO). (2022). *Moldova: Agricultural sector review*. <https://www.fao.org>
- GIZ. (2023). *Evaluation report on agricultural infrastructure and policy gaps*. <https://www.giz.de/en/worldwide/28358.html>
- Lerman, Z. (2008). *Agricultural development in Central and Eastern Europe: Lessons from the transition experience*. Brussels: Centre for European Policy Studies (CEPS).
- Ministerul Agriculturii și Industriei Alimentare (MAIA). (2023). *National Strategy for Agricultural and Rural Development 2023-2030*. <https://www.maia.gov.md>
- National Bureau of Statistics (NBS). (n.d.). *Databank*. https://statistica.gov.md/ro/statistic_domains
- OECD. (2022). *Agricultural policy monitoring and evaluation: Republic of Moldova*. <https://www.oecd.org>
- United Nations Development Programme Moldova (UNDP). (2023). *Climate Risk Country Profile: Moldova*. <https://www.undp.org/moldova>
- World Bank. (2023 April). *Moldova Economic Update*. <https://www.worldbank.org>

FACILITATING CIRCULAR TRANSITION IN AGRICULTURE: EU FINANCIAL MECHANISMS FOR SUSTAINABLE DEVELOPMENT

**Ruxandra-Eugenia POP, PhD in economics,
Research Institute for Agriculture Economy and Rural Development, Romania**

<https://orcid.org/0000-0001-5938-6946>

pop.ruxandra@iceadr.ro

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.12>

UDC: 338.43(4)

JEL Classification: Q01, Q18, H81

Abstract. *The integration of circular economy (CE) principles into the agricultural sector and related industries is strengthening, yet financial aspects that could enable broader adoption remain insufficiently explored. This study synthesizes the main outcomes of a systematic analysis, revealing both opportunities and barriers, particularly the limited access to funds for farmers and small enterprises. To address this constraint, we propose a concise overview of the main European funding opportunities. Adopting CE strategies in agriculture can improve farmer wellbeing and enhance local community welfare by diversifying markets and creating value-added products, while also contributing to natural resource conservation. Striking a balance between farm revenues and environmental protection aligns with key EU policy objectives, including the Green Deal, the Circular Economy Action Plan, and the Zero Pollution Action Plan. Accordingly, this paper emphasises suitable European funding opportunities to support the transition from conventional agricultural models towards circular, sustainable systems.*

Keywords: *circular economy, sustainable agriculture, funding opportunities, farmers wellbeing*

Introduction. In general terms, the circular economy concept is defined as “a production-consumption model that emphasizes sharing, leasing, reusing, repairing, refurbishing, and recycling materials and products for as long as possible. This approach aims to extend product life cycles, reduce waste, and make more efficient use of resources” (*European Parliament, 2023*). Agriculture is an energy-intensive sector that generates substantial waste and wastewater, and is a major source of carbon emissions. Adopting a circular approach, based on the principles of *Reduce, Reuse, and Recycle (3R)*, offers a promising pathway to minimize these impacts and support the achievement of the Sustainable Development Goals (Peng et al., 2025). Although awareness campaigns and technological advances support the transition towards a circular economy and the achievement of European objectives, insufficient funding and limited access to non-reimbursable funds remain key barriers, particularly for local farmers. This statement is supported by the fact that achieving a transition to a circular economy requires substantial investment in innovation, the development of circular supply chains, and targeted support for small and medium-sized enterprises (*Ma Q. et al., 2025*).

Literature review. Financial constraints remain a major barrier to adopting circular economy strategies in agriculture. A 2021 CEPS report highlights that high costs and limited access to financial support challenge agri-food enterprises. Recent studies, including the Institute for European Environmental Policy (2025), emphasize the need for dedicated funds to assist farmers, as current financing is insufficient and access to non-reimbursable funds remains limited. The WBCSD report "Closing the Gap" identifies funding shortages as a key obstacle to regenerative agriculture. Initial investments range between 2,000 and 5,000 euro/hectare, with incentives reducing payback from 9 to 5 years; however, a funding gap of 1,400–4,100 euro/hectare persists, especially for small and medium farms lacking economies of scale.

Research methodology. This study combines literature review, data analysis, structural system analysis, and logical reasoning to examine financial barriers and opportunities for circular economy adoption in agriculture.

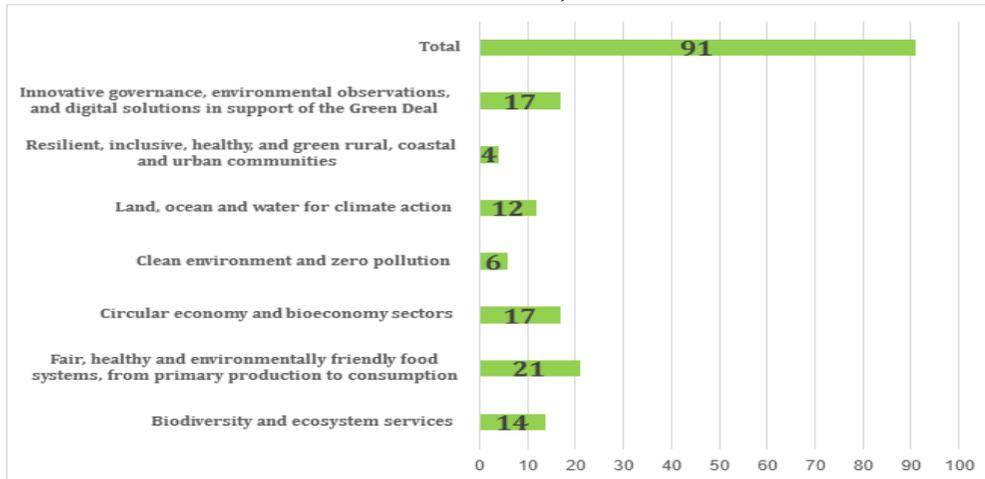
Main results. Across Europe, including Romania, various funding opportunities support the adoption of circular economy strategies in agriculture. Table 1 presents the most relevant funding mechanisms, reflecting the European Commission’s commitment to sustainable and circular agriculture. To access these funds, farmers and agri-food enterprises must meet eligibility criteria and submit projects aligned with environmental and rural development goals.

Table 1. Financial Instruments Promoting Circular Economy in the Agricultural Sector

Funding programme/	Time period	Total amount of funding (billion euro)
European Agricultural Fund for Rural Development (EAFRD)	2021-2027	95.5
EU funding for climate action – Modernisation Fund	2021-2030	57
InvestEU	2021-2027	375
Just Transition Fund	2021-2027	19.32
EU Horizon Europe – Cluster 6 Food, bioeconomy, natural resources, agriculture and environment;	2021-2027	8.952

Source: author's processing according to the indicated sources

Figure 1. The number of project financed through Horizon EU Cluster 6 by call;



Source: author's processing from REA (2025)

One of the most important funding opportunities for applying the principles of circular economy in practice is represented by the European program Horizon Cluster 6 Food, bioeconomy, natural resources, agriculture and environment. According to a recent statement of the European Research Executive Agency (2025), 91 new EU-funded projects have been launched to advance innovative research in sustainable food systems, bioeconomy, natural resources, agriculture, and environmental protection. Figure 1 presents the number of projects funded through this funding mechanism depending on the call they were addressed to. Regarding the amount allocated for funding based on the call accessed by the beneficiaries, the largest share of the total amount of 500 mil. euro was allocated to Innovative governance, environmental observations, and digital solutions in support of the Green Deal (26%), followed by Fair, healthy and environmentally friendly food systems, from primary production to consumption (19%) and Biodiversity and ecosystem services (15,27%).

Discussion and conclusions. Limited access to funding remains a major barrier to the adoption of circular economy principles in agriculture, particularly for small and medium-sized farms that lack the financial resources for substantial initial investments. Multiple European funding opportunities are available, such as EAFRD, Horizon Europe, and InvestEU, but effectively accessing these requires meeting specific eligibility criteria and aligning project proposals with EU environmental and rural development goals. Awareness campaigns targeting economic actors in agriculture and related sectors are essential to improve understanding of the available funding opportunities at the EU and national levels. In addition, providing specialized consultancy services can significantly facilitate the funding application process and the preparation of required documentation is a recommendation supported by the findings of this research.

REFERENCES

- Baldock, D., Muro, M., Fraas, E., & Hojte, S. (2025). *Bridging the gap: Why the EU needs a just transition funding mechanism for agriculture*. Institute for European Environmental Policy. <https://ieep.eu/publications/>
- European Commission. (2023). *European Agricultural Fund for Rural Development*. <https://circular-cities-and-regions.ec.europa.eu>
- European Commission. (2025). *91 new EU-funded projects to deliver innovative research on sustainable food, bioeconomy, natural resources, agriculture, and environment*. <https://rea.ec.europa.eu/news/>
- European Commission. (n.d.). *InvestEU - European Union Programme*. https://investeu.europa.eu/index_en
- European Commission. (n.d.). *Modernisation Fund*. https://climate.ec.europa.eu/eu-action/eu-funding-climate-action/modernisation-fund_en
- European Parliament. (2023). *Circular economy: definition, importance and benefits*. <https://www.europarl.europa.eu/topics/en/article/20151201STO05603/circular-economy-definition-importance-and-benefits>
- Ma, Q., Xu, B., & Bititci, U. (2025). Unpacking financial aspects of circular economy: A systematic literature review. *Journal of Environmental Management*, 384, 125507. <https://doi.org/10.1016/>
- Peng, J., Baležentis, T., Streimikiene, D., Dabkiene, V., & Agnusdei, G. P. (2025). Circular economy in agriculture: A systematic literature review. *Sustainable Development*. <https://doi.org/10.1002/sd.70017>
- Rizos, V., Bryhn, J., Alessi, M., Righetti, E., Fujiwara, N., & Stroia, C. (2021). *Barriers and enablers for implementing circular economy business models. Evidence from the electrical and electronic equipment and agri-food value chains*. Centre for European Policy Studies (CEPS). <https://cdn.ceps.eu/wp-content/uploads/2021f>
- World Business Council for Sustainable Development. (2025). *Closing the Gap: An analysis of the costs and incentives for regenerative agriculture in Europe*. <https://www.wbcsd.org/resources/>

PERFORMANCE AND SUSTAINABILITY OF SMEs FROM AGRICULTURAL AND FOOD INDUSTRY

Lica ERHAN, *PhD in economics,*
Academy of Economic Studies of Moldova

<https://orcid.org/0000-0001-5204-6367>

lica.erhan@ase.md

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.13>

UDC: 334.72:[631+664]

JEL Classification: G00; G30.

Abstract. *Over the last decades, SMEs have become one of the most important sectors of economy in many countries. Similar to other countries, SMEs represent the majority of businesses in the Republic of Moldova. The agricultural sector remains a key and fundamental sector for Moldova as well. Still, the overlapping crises from the last years have affected SMEs operating in agriculture and food industry, limiting their performance and growth. In order to overpass the challenges it is necessary to take steps that will promote SMEs growth, which is essential for their sustainability and continuity of their economic activities.*

Starting from this reality, the primary aim of this research paper is to evaluate the economic performance and sustainability of SMEs from agricultural and food industry. In order to meet the aims and objectives of this paper, an analysis of secondary data resources will be carried out. The research will include an analysis of SMEs from Republic of Moldova, based on official data from national and international bodies and will be completed by the most recent data and references in this field of research and own reflections of the author.

Keywords: *small and medium-sized enterprises, agricultural and food sector, crisis, sustainable development.*

Introduction. Small business survival is critical for economic sustainability due to the multifaceted role of the economy (Ganlin Pu. et. al 2022). Considering the importance of the food and agriculture sector, this research has focused on the challenges that SMEs from this sector has experienced in the past years. Starting with the health crisis from 2020, SMEs found themselves in a vulnerable situation, due to limited financial resources, lack of internal governance tools, low level of technology, limited digital means, and insufficient diversification both at the level of suppliers and customers. The main challenge faced by the agriculture sector was related to the draught that affected Moldova in that period, mixed with the poor irrigation infrastructure system. These two negative factors, pandemic restrictions and insufficient rainfall have pushed small farmers and agricultural producers into economic vulnerability. Still, this was just the beginning, followed by the Russian full-scale military aggression against Ukraine. Consequently, Moldovan economy faced an unprecedented influx of refugees, trade disruptions, major energetic and security crisis. These overlapping crisis heavily affected SMEs from agricultural sector, decreasing their financial performance. After a largely unfavorable market

environment in 2023, in 2024 farmers still needed to manage lower price pressures, coupled with lower yields compared to last year (SCR, 2024). Even if farmers benefited from a reduction in the costs of pesticides and fertilizers and of financing costs during the last year, due to the continuous drop in prices the situation remained complicated in the first half of the year. Despite all significant efforts undertaken by the authorities, access to finance remains one of the major challenges for SMEs from Moldova. Moreover, it is very important to acknowledge that this sector faces the dual pressures of increasing global food demand and the need to assure its sustainable development. Furthermore, sustainable development often includes initiatives to support small scale and family farmers, who are crucial for global food security. Sustainable technologies, markets, and financial resources, initiatives help smallholders improve their productivity. (Agan&Bayrak, 2025).

Research methodology. The research methodology chosen for this study is documentary analysis. This approach involves collecting and analyzing information from scientific articles, study reports and government documents.

Main results. Anxious to facilitate access to financing for SMEs, the government has set up the fund for entrepreneurship and economic growth. This fund offers loans at advantageous rates to SMEs, thus giving them a crucial boost to develop and create jobs. More than 4 billion MDL was allocated to budgetary programs to support SMEs and agriculture alone in the period 2022–2023. In addition, the funding from the government was supplemented with financial resources allocated by different external partners, especially the EU, the United States Agency for International Development, and on a bilateral basis (SCR, 2024).

Despite all these significant efforts, access to finance remains one of the major challenges for SMEs from Moldova. There are still many financial barriers for local SMEs to starting up and scaling up, such as insufficient availability of non-bank finance (lack of access to venture capital funds, business angel capital and knowledge). Applying the “principle of rarity” in granting agricultural subsidies and prioritizing projects with a high economic impact could contribute to a more efficient and impactful use of budgetary resources for farmers (SCR, 2024).

However, at the same time, Moldova was officially granted candidate status by the European Union and set a target date of 2028 for EU membership. The materialization of these opportunities can create an enormous synergy effect for attracting funds for SMEs development and sustainability.

Sustainable development in agriculture is promoting fair trade, supporting smallholder farmers, and ensuring that agricultural practices contribute to the well-being of local communities (Alvi et. al 2020).

Furthermore, it is important to recognize the current practices in food and agriculture often lead to significant environmental degradation, including soil erosion, deforestation, and greenhouse gas emissions. Sustainable development within this sector requires a transformative approach that emphasizes resource efficiency, climate resilience, and equitable growth (Agan & Bayrak, 2025).

Discussion and conclusions. In the light of the above-mentioned, governments and policymakers should implement policies that support sustainable practices. Funding and technical support should be provided to help farmers implement these practices

effectively. It is therefore recommended to diversify sources of financing and explore alternative sources of financing, to compensate for the insufficiency and financing difficulties of SMEs. Additionally, sustainable development is essential for food and agricultural security as it ensures that agricultural practices and food systems are resilient, equitable, and capable of meeting current and future challenges.

Acknowledgments: *The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.*

REFERENCES

- Agan, B., & Bayrak, R. (2025). The Future of the Food and Agriculture Sector in Terms of Green Economics and Sustainable Development. In: Ozturk, L., Bayrak, R., & Erhan, L. (eds.) *SMEs in Agriculture and Food Industry During the Health Crises. Studies in Systems, Decision and Control*, (Vol. 576, pp. 119-146). Springer, Cham. https://doi.org/10.1007/978-3-031-77286-3_8
- Alvi, S., Jamil, F., Roson, R., & Sartori, M. (2020). Do farmers adapt to climate change? A macro perspective. *Agriculture* 10(6), 212. <https://doi.org/10.3390/agriculture10060212>
- Expert Group. (2024). State of Country Report 2024. <https://www.expert-grup.org/>
<https://www.expert-grup.org/en/biblioteca/item/2879-raportul-de-stare-a-%C8%9B%C4%83rii-2024>
- Pu, G., Qamruzzaman, M., Mehta, A. M., Naqvi, F. N., & Karim, S. (2021). Innovative Finance, Technological Adaptation and SMEs Sustainability: The Mediating Role of Government Support during COVID-19 Pandemic. *Sustainability*, 13(16), 9218. <https://doi.org/10.3390/su13169218>

CLIMATE CHANGE AND VEGETABLE FARMING: A SYSTEMATIC LITERATURE - REVIEW

Petruța Antoneta TUREK-RAHOVEANU,
*PhD in agronomy- scientific researcher grade III,
Research Institute for Agriculture Economy and Rural, Romania*

<https://orcid.org/0009-0007-8674-0913>
turek.petruta@iceadr.ro

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.14>

UDC: 631.95

JEL Classification: Q11, Q13, Q17

Abstract. *Agriculture is an important pillar for the population with a fundamental role in ensuring the food source for growing entities. Climate change is a confrontation with many challenges that manifest themselves through extreme phenomena manifested by high temperatures, heavy rainfall, hail and strong storms. The purpose of this paper is to highlight the structure of the specialized literature as a necessity in the scientific approach and to synthesize current research on the impact of extreme phenomena on the vegetable sector. The study is based on researching data from Web of Science sources where those that studied the impact of climate change on the vegetable sector were selected. The effects resulting from extreme phenomena are found on the yield and quality of products, affecting food safety.*

Keywords: *Climate change, vegetable farming, literature analysis, environmental factors*

Introduction. In the last decade, climate change has had a negative impact on both agriculture and human life. Agriculture is an essential sector in the state's economy. The vegetable sector is a main pillar in agriculture and can be affected by climate factors. Changes in temperatures and precipitation have (Potter et al,2019) led to lower yields of production in the long term.

Literature review. The existence of recent studies and research shows that climate change has a significant impact on vegetable production. Its effect on vegetable microbiology was highlighted by Jung, Jang and Mattheus (2014) where the report of pathogens existing in water, soil, crop was given, resulting in risks to the population. Jasper, Wagstaff and Bell (2020) studied the report on the effect of post-harvest hydrolysis on production being affected by high temperatures, 400, as well as plant survival at low temperatures (Bisbis, Gruda and Blanke, 2019), which indicates the impact of climatic factors on vegetable crops. Reidsma et al. (2015) specify the importance of integrated analyses and assessments of agricultural technological systems, which include adaptation at different levels, as a basis for understanding the effects of climatic factors on vegetable crops. However, crop models suggest that by 2050, climate change would no longer have negative effects on the yields of major crops (Malhotra, 2017)..., meaningful and participatory assessments that investigate the effects of extreme phenomena also confirm the

existence of climate risks (Georgopoulou, E.,... & Zavras, V., 2017). The existence of measures to adapt to the negative impact on crops helps farmers to modify crop technologies in order to modify inputs and outputs (Ramlall, 2014).

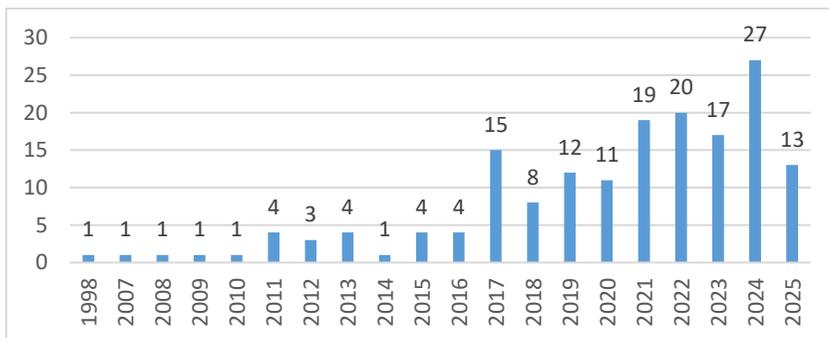
Research methodology.

In order to carry out this work, a systematic review of the Web of Science database was carried out on the impact of climate change on agriculture, especially the vegetable sector. The review of this study provides an overall picture of the evolution of research in the agricultural field. The methodology includes bibliometric analysis, which is a quantitative research method that allows the concentration of publications according to several principles (year of publication, keywords, authors, country of affiliation, title, etc.). The establishment of the database was achieved by selecting the "subject" field in WoS by querying the words: climate change, vegetable farming, environmental factors.

Main results.

Following the query of the keywords climate change, vegetable farming, environmental factors, publications belonging to the Agricultural Economy Policy, scientific articles from Sustainability, Scientific Papers Series Management Economic engineering in Agriculture and Rural Development, British Food Journal, Agriculture Basel and Foods were identified. The research fields in which the publications were classified were: agriculture, economy, ecology and biodiversity.

Figure 1. Number of empirical research publications on climate change in the vegetable sector by year



Source: data processing from WoS (2025)

Figure 1 shows an increase in publications over the period 1998-2024 with some variations in the topics analyzed. This trend of increasing publications shows a better concentration of climate change research on the vegetable sector, reaching a maximum in 2024.

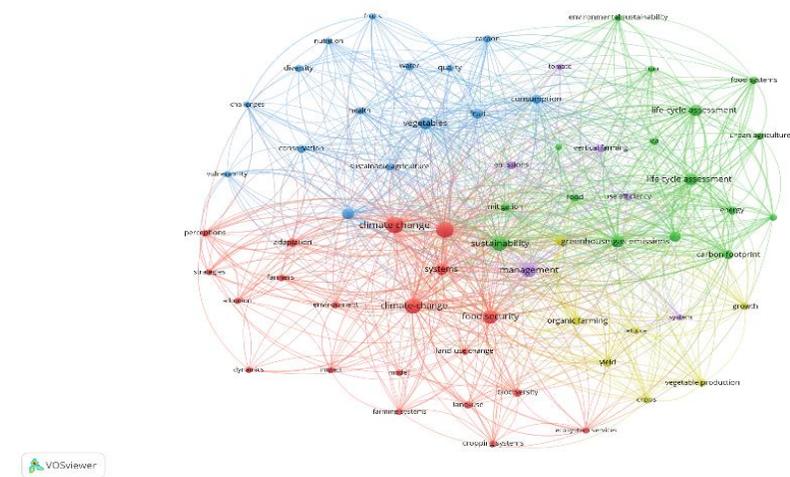
Using WosViewer 1.6.19 software, a bibliometric map was generated with keywords that were used in the specialized literature and grouped into 5 clusters. The terms relevant to the analyzed subject, based on semantic similarity, are grouped into clusters where the frequency of occurrence of keywords, the thickness and length of the links between the nodes indicate the level of intensity (degree) of association between them. (Jung, Y., Jang, H., & Matthews, K. R. (2014).

This study involves research that contributes to the image of the vegetable sector at its current stage, by identifying clusters.(Figure 2)

Cluster 1 (red) called adaptation uses 20 terms such as: adaptation, environment, climate change, farming systems, sustainability, food security, land-use-change, cropping systems, agriculture, farmers, land-use, biodiversity, etc. The cluster focused on impact assessment tools and sustainable agricultural practices.

Cluster 2 (green) consisting of 16 terms: crop, carbon photoprint, food-production, life cycle assessment, tomato production, environmental sustainability, greenhouse-gas emissions, focuses on the assessment of gas emissions and the sustainability of vegetable production in urban areas, where the link between local production and cost reduction is highlighted

Figure 2. The link between impact, climate change and vegetable crops, agriculture.



Source: own processing based on VoS results (VOSviewer)

Cluster 3 (blue) uses 15 terms such as: vegetables, vulnerability, quality, consumption, etc., which reflects the link between climate change and agriculture that emphasizes environmental sustainability. It can be said that agricultural practices represent a possible cause and/or solution in mitigating the effects of extreme climatic factors.

Cluster 4 (yellow) consisting of 7 terms (crops, growth, irrigation organic farming, vegetable production, yield, lettuce), suggests that research in the specialized literature emphasizes vegetable production, crop yield influenced by climatic factors, the essential role of irrigation management, adaptation to limited water resources.(Turek &.Turek,2023)

Cluster 5 (purple) involves 6 terms (emissions, management, system, tomato, use efficiency, vertical, farming) and the managerial dimension of sustainable agriculture can be highlighted as two directions: optimizing irrigation and reducing gas emissions; implementing innovations in vegetable growing technologies.

Discussion and conclusions. In this study, a clear trend towards integrating sustainable agricultural practices, climate impact assessment and technological innovations into specialized studies can be highlighted. The results provide a solid basis for sustainable agricultural and horticultural strategies, highlighting the important factor as managing the impact of climate change on the agricultural and horticultural sector.

REFERENCES

- Bisbis, M. B., Gruda, N. S., & Blanke, M. M. (2019). Securing horticulture in a changing climate - A mini review. *Horticulturae*, 5(3), 56. <https://doi.org/10.3390/horticulturae5030056>
- Georgopoulou, E., Mirasgedis, S., Sarafidis, Y., Vitaliotou, M., Lalas, D. P., Theloudis, I., Giannoulaki, K. D., Dimopoulos, D., & Zavras, V. (2017). Climate change impacts and adaptation options for the Greek agriculture in 2021-2050: A monetary assessment. *Climate Risk Management*, 16, 164-182. <https://doi.org/10.1016/j.crm.2017.02.002>
- Jasper, J., Wagstaff, C., & Bell, L. (2020). Growth temperature influences postharvest glucosinolate concentrations and hydrolysis product formation in first and second cuts of rocket salad. *Postharvest Biology and Technology*, 163, 111157. <https://doi.org/10.1016/j.postharvbio.2020.111157>
- Jung, Y., Jang, H., & Matthews, K. R. (2014). Effect of the food production chain from farm practices to vegetable processing on outbreak incidence. *Microbial Biotechnology*, 7(6), 517-527. <https://doi.org/10.1111/1751-7915.12178>
- Malhotra, S. K. (2017). Horticultural crops and climate change: A review. *The Indian Journal of Agricultural Sciences*, 87(1), 12-22. <https://doi.org/10.56093/ijas.v87i1.67138>
- Porter, J. R., Challinor, A. J., Henriksen, C. B., Howden, S. M., Martre, P., & Smith, P. (2019). Invited review: Intergovernmental Panel on Climate Change, agriculture, and food - A case of shifting cultivation and history. *Global Change Biology*, 25(8), 2518-2529. <https://doi.org/10.1111/gcb.14700>
- Ramlall, I. (2014). Gauging the impact of climate change on food crops production in Mauritius: an econometric approach. *International Journal of Climate Change Strategies and Management*, 6(3), 332-355. <https://doi.org/10.1108/IJCCSM-12-2012-0079>
- Reidsma, P., Wolf, J., Kanellopoulos, A., Schaap, B. F., Mandryk, M., Verhagen, J., & van Ittersum, M. K., (2015). Climate change impact and adaptation research requires farming systems analysis and integrated assessment: a case study in the Netherlands. *Procedia Environmental Sciences*, 29, 286-287. <https://doi.org/10.1016/j.proenv.2015.07.216>
- Turek Rahoveanu P., & Turek Rahoveanu, M. (2023). Assessment of climate changes on the wine sector. In: *Annals of the University of Craiova - Agriculture, Montanology, Cadastre* (Vol. 53, No. 1, pp. 319-323). <https://doi.org/10.52846/aamc.v53i1.1486>

THE LIVESTOCK SECTOR AS A DRIVER OF ECONOMIC RESILIENCE IN THE REPUBLIC OF MOLDOVA

Eugenia LUCASENCO, Dr.,
National Institute for Economic Research,
Academy of Economic Studies of Moldova
<https://orcid.org/0000-0002-5032-7963>
eugenia_lucasenco@yahoo.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.15>

UDC: 338.43(478)

JEL Classification: Q12, Q13

Abstract. *The livestock sector in the Republic of Moldova, based on the strong tradition and current developments, plays an important role in the livelihood of population from rural areas, ensures food security and builds the economic resilience. The paper analyzes how livestock production contributes to enhancing the economic resilience by providing added value in the agricultural sector, how it responds to climate issues and its evolution as a result of introduction of direct payments, as a distinctive measure of public support. By applying a mixed-methods approach using statistical review and qualitative synthesis, the paper reflects the main mechanisms through which the livestock sector enhances economic resilience, namely diversification of household income, provision of value-chain linkages, high potential in increasing the added value of production. Major constraints in the sector concerning the declining in the number of animals in some years, fragmentation of farm structure, limited access to finance and veterinary services, as well as vulnerability to climate changes are also discussed. The findings are concluded with policy recommendations to strengthen the livestock–resilience through targeted social protection for livestock-dependent households, direct payments, improvement of veterinary services, and extension services and development of climate-smart practices.*

Keywords: livestock sector, Republic of Moldova, climate changes, public support

Introduction. The economic sector of the Republic of Moldova strongly relies on the agri-food sector, due to its share in GDP, contribution to employment and food security. At the same time, it has also an important impact of other sectors like foreign trade, transportation, internal trade, etc. Within the agricultural sector, livestock is essential for providing rural household with income and employment, thus making it as a core element of economic resilience.

The most recent adverse climate events and market fluctuations have uncovered the existing vulnerabilities in feed supply, animal sanitary and veterinary services and value-chain infrastructure, as the Moldovan authorities had to undertake urgent measures to prevent the sector's destruction and the downward trend. Thus, this paper analyzes the mechanisms through which the livestock sector supports the economic resilience at household level in particular and at the national economic

level, in general, identifies constraints that reduce its development and adaptation capacity and proposes priority directions for strengthening the relationship between livestock sector and economic resilience. The analysis is based on recent national and international reports and analytical studies, current sectoral statistics and evidence from the public support program.

Literature review. The available international literature on the livestock sector and economic resilience highlights the multiple roles played by the livestock. Sectoral approach was made by Benoit et al (2020) when analyzing the economic resilience of sheep-meat farms in France and Ireland; Wilczyński & Kołoszycz (2021) emphasized the economic resilience of EU dairy farms; and Giglio et al (2025) – pig farms. With respect to the livestock sector as a whole, the works of Vigani & Berry (2018), Bahta (2024), Cradock-Henry (2021) and Bonilla-Cedrez et al (2023) reflect that the livestock sector has a double relationship with climate changes, both in terms of being a contributor through emissions, as well as an impacted sector due to adverse weather conditions.

In the Republic of Moldova, although numerous studies on the livestock sector's development are available, such as: Stratan et al (2024), Stratan et al (2022), and Ignat & Lucasenco (2019), the connection with the resilient economic development was approach by Ceban (2024) with respect to the cattle sector.

Research methodology. The carried-out analysis is based on a combination of different methodologies, like document and statistical review, quantitative data analysis and qualitative synthesis.

Main results. During the period 1990-2023, the number of livestock decreased for most of each animal category, except for goats and rabbits. This demonstrates the precarious situation in the livestock sector, even its degradation, as a result of the low level of investment, poor infrastructure, high production costs, etc. As a result, the number of cattle decreased from 1112 thousand heads to 102.4 thousand, of which the number of cows from 402 thousand to 67.1 thousand. The number of pigs decreased from 2045 thousand to 340 thousand, the number of sheep – from 1306 thousand to 419.3 thousand, horses – from 46 thousand to 17.7 thousand, and the number of bee colonies – from 388 thousand to 203.3 thousand. However, for the beekeeping sector, compared to 2000, a trend of increasing the number of bee colonies is observed (76 thousand in 2000). Of the entire livestock sector, only the number of goats, during the analyzed period, increased from 32 thousand in 1990 to 139.4 thousand in 2023 and of rabbits - from 249 thousand in 1990 to 303.1 thousand in 2023.

The situation of the livestock sector continues to be dominated by a high presence of households, which comprise the majority of the number of registered animals. The sheep, goat, horse, donkey, rabbit and bee sectors are practically over 95% of households in 2023. Compared to 1990, in 2023, agricultural enterprises and peasant households account for only 25.5% of the total cattle (83.7% in 1990), 16.8% of the total cows (76.9% in 1990), 63.6% of the total pigs (84.0% in 1990). Major changes were also recorded for the horse, bee and sheep sectors.

The carried-out analysis points that the livestock sector serves as an important buffer for rural households. Livestock is considered not only as a production factor,

but also as an important asset that can be used during periods of crisis. Moreover, in case of shortages of fodder, households may sell the livestock, sometimes even at cheaper prices, fact that contributes to the decrease of the medium and long-term productivity in the farm / family farm.

Intervention public support programs in the shape of subsidies for livestock infrastructure development and direct payments represent a proof of the positive role of support. However, the high degree of farm fragmentation, insufficient modernized infrastructure, the weak cold-chain infrastructure, and limited access to finance prevent the sector from transferring its household-level resilience into a sustained contribution to the development and enhancing resilience of the national economy.

At the same time, climate change has revealed the sector's vulnerabilities, mainly by constraining the availability of feed and emergence of diseases. In this context, the development of climate-smart livestock systems and better settled fodder management practices are among the most critical priorities in the nearest future. Only by addressing these important constraints the livestock sector can boost its role as a driver of economic resilience at the household and macroeconomic levels.

Discussion and conclusions. The livestock sector represents a significant asset for enhancing the resilience of Moldova's economy, being at the same time, constrained by fragmentation of production, feed security, weak processing infrastructure, and emerge of diseases due to insufficient veterinary services. Therefore, priority actions in order to strengthen the livestock-resilience are needed, mainly: investments in fodder system, targeted social protection mechanisms for smallholders, scale-up of veterinary services and extension services, increased access to finance as well as investments in monitoring systems for herds. The future research in this direction should be focused on household-level studies, cost-benefit analysis and efficiency assessment of the public support program.

Acknowledgements. The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.

REFERENCES

- Bahta, S. T. (2024). *Report on the Livestock Dynamics and Economic Resilience: A Comprehensive Modelling Framework Symposium at the 32nd International Conference of Agricultural Economists (ICAE)*. Nairobi, Kenya: International Livestock Research Institute. <https://cgspace.cgiar.org/server/api/core/bitstreams/514a0fbc-188e-4a7e-95d8-a3407308d451/content>
- Benoit, M., Joly, F., Blanc, F., Dumont, B., Sabatier, R., & Mosnier, C. (2020). Assessment of the buffering and adaptive mechanisms underlying the economic resilience of sheep-meat farms. *Agronomy for Sustainable Development*, 40(34). <https://doi.org/10.1007/s13593-020-00638-z>

- Bonilla-Cedrez, C., Steward, P., Rosenstock, T. S., Thornton, P., Arango, J., Kropff, M., & Ramirez-Villegas, J. (2023). Priority areas for investment in more sustainable and climate-resilient livestock systems. *Nature Sustainability*, 6, 1279-1286 <https://doi.org/10.1038/s41893-023-01161-1>
- Ceban, A. (2024, October 10-11). Sporirea rezilienței sectorului de bovine în Republica Moldova. In: *Economic growth in the face of global challenges. Consolidation of national economies and reduction of social inequalities: Conference proceedings: International Scientific-Practical Conference (XVIIIth Edition, Vol. 1, pp. 312-324)*. Chisinau: INCE, ASEM. <https://doi.org/10.36004/nier.cecg.I.2024.18.31>
- Cradock-Henry, N. A. (2021). Linking the social, economic, and agroecological: a resilience framework for dairy farming. *Ecology and Society* 26(1), 3. <https://doi.org/10.5751/ES-12122-260103>
- Giglio, L., Rousing, T., Łodyga, D., Reyes-Palomo, C., Sanz-Fernández, S., Soffiantini, C. S., & Ferrari, P. (2025). Economic Resilience in Intensive and Extensive Pig Farming Systems. *Sustainability*, 17(15), 7026. <https://doi.org/10.3390/su17157026>
- Ignat, A., & Lucasenco, E. (2019). Evolution of the dairy sector of the Republic of Moldova: latest trends and developments. In: *Scientific papers. Series Management, Economic Engineering in Agriculture and Rural Development* (Vol. 19, Issue 2, pp. 203-208). https://managementjournal.usamv.ro/pdf/vol.19_2/Art25.pdf
- Stratan, A., Ceban, A., & Lucasenco, E. (2022). Evolution of the livestock sector of the Republic of Moldova. In: *Scientific papers. Series "Management, Economic Engineering in Agriculture and Rural Development"* (Vol. 22, Issue 2, pp. 671-678). https://managementjournal.usamv.ro/pdf/vol.22_2/Art79.pdf
- Stratan, A., Lopotenco, V., & Staver, L. (2024). *Resilience of Agri-Food Security in the Republic of Moldova*. IntechOpen. <https://doi.org/10.5772/intechopen.1008164>
- Vigani, M., & Berry, R. (2018, July 28-August 2). Farm economic resilience, land diversity and environmental uncertainty. In: *30th International Conference of Agricultural Economists*, (pp. 1-31), Vancouver, British Columbia, <https://doi.org/10.22004/ag.econ.276979>
- Wilczyński, A., & Kołoszycz, E. (2021). Economic Resilience of EU Dairy Farms: An Evaluation of Economic Viability. *Agriculture*, 11(6), 510. <https://doi.org/10.3390/agriculture11060510>

THEORETICAL FOUNDATIONS OF INVESTMENT STRATEGIES FOR THE MODERNIZATION OF THE WINE SECTOR IN THE REPUBLIC OF MOLDOVA

Tatiana IAȚIȘIN, PhD,
*National Institute for Economic Research,
Academy of Economic Studies of Moldova;*
<https://orcid.org/0000-0002-8339-795X>
tatianaiatisin@yahoo.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.16>

UDC: 330.322.2:634.8(478)

JEL Classification: Q1, Q14, Q19

Abstract. *The wine sector represents a strategic pillar of Moldova's national economy and a defining element of its international image, contributing significantly to rural incomes. However, it faces structural challenges related to climate change, market volatility, geopolitical instability, and insufficient sustainable investment. Modernization is therefore a strategic imperative, requiring coherent policies, efficient investments, and stronger public–private cooperation. Increasing productivity, meeting contemporary standards of quality and sustainability, and diversifying external markets demand investments in production reorganization, intensive and digitalized practices, and sustainable infrastructure. Based on a solid theoretical framework, this study analyzes investment strategies in the Moldovan wine sector and proposes a classification of modernization investments according to sustainability and economic efficiency, emphasizing those essential for long-term, intelligent development.*

Keywords: *wine sector, investment strategies, investments, modernization, sustainable investments.*

Acknowledgments / Note: *The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.*

Introduction: Investments are a strategic driver for enhancing the competitiveness and sustainability of the wine sector, impacting all stages of the value chain from vineyard cultivation and grape processing to wine marketing. Through targeted investments, key objectives can be achieved, including increased production via vineyard expansion and varietal improvement, enhanced wine quality through modernization of winemaking equipment and processing technologies, cost reduction and loss minimization via mechanization and automation, and access to international markets through compliance with quality standards and certifications such as ISO, IFS, or DOC/DOCG. A well-structured investment strategy combining technological modernization, process innovation, workforce development, and product promotion—can position the wine sector as a competitive and sustainable pillar of both the national and international economy.

Literature review. The research was based on a series of official and up-to-date information sources, such as legislative acts, public policy documents, but also reports from the National Office of Vine and Wine and other institutions. The works of economists from Romania and the Republic of Moldova were also studied, such as: M. Bilaus, F. Buhociu, V. Dumitraşcu, M. Stoian, Fl. Staicu, G. Prelipcean, I. Popa, Gh. Negoescu, L. Cistelean, D. Zaiţ, and A. Diaconu, C. Munteanu, A. Stratan, R. Hîncu, T. Bajura, S. Albu, E. Timofti, and A. Timuş. All this specialized literature in the field of agricultural economics, investment, and strategic management provided a solid theoretical and practical framework for the development of the research topic.

Methodology and data: To achieve the objectives set in this paper, the following was used: documentary analysis (desk research), based on the study of specialized literature (monographs, scientific articles, economic reports) to define the key concepts and develop a new classification of sustainable investments.

Results and discussions. In the specialized literature, the concept of investments is approached from multiple perspectives, reflecting a broad and diversified theoretical evolution. Significant contributions come from classics of political economy, such as A. Smith, D. Ricardo, and J. Mill, representatives of classical theory, as well as from E. Heckscher, O. Nurkse, and I. Fisher. Keynesian theory, through J. M. Keynes, and neo-Keynesian theory, represented by F. Machlup, R. Harrod, and E. Domar, emphasize the role of investments in stimulating demand and economic growth, while Marxist theory, through K. Marx, analyzes them from a structural perspective within the context of capital accumulation. Romanian and Moldovan economists have made valuable contributions to the development of the investment concept, providing theoretical and practical insights. Among them are M. Bilaus, F. Buhociu, M. Stoian, G. Prelipcean, Gh. Negoescu, L. Cistelean, D. Zaiţ, as well as A. Diaconu, A. Stratan, R. Hîncu, T. Bajura, S. Albu, E. Timofti and A. Timuş. Prelipcean (2000) defines investment as "expenditure of money for the purpose of obtaining goods and/or services," characterized by durability, risk, and efficiency. In a broad sense, investments include capital placements in various fields, aimed at acquiring equipment, construction, staff training, or technological development; in a narrow sense, they represent expenses for the acquisition of fixed and circulating capital, productive or non-productive (Buhociu & Negoescu, 1998; Cistelean, 1983). In the Republic of Moldova, S. Albu (2010) defines investment as "the placement of monetary resources in a project or operation to obtain income," and national legislation (Law no. 81/2004) regulates investment as the totality of goods allocated to entrepreneurial activity to generate income. Analyzing these perspectives, an integrative definition of investment would be: "a rationally managed effort over a specified period that generates added value for investors, contributing to modernization, development, and proper risk management. Investments in the wine sector are essential for promoting innovation and technological progress, responding to economic challenges, leveraging profitable opportunities, and facilitating the implementation of modern low-risk technologies (Cimpoieş & Simiciuc, 2017; Bradu, 2006). Classifying investments by sustainability criteria (Figure 1) allows for a more detailed understanding of their nature, highlighting the

differences between simple expenditures and innovative investment processes aimed at modernization and the application of the most effective technical and managerial solutions.

Figure 1. Classification of investments in the modernization of the wine sector according to sustainability criteria

Investments in physical capita	Investments in research and development (R&D)	Investments in human capital	Investments in marketing and promotion
<ul style="list-style-type: none"> • Acquisition and modernization of machinery; • Construction or renovation of cellars; • Digitization of technologies, processes and activities; • Implementation of irrigation and drainage systems. 	<ul style="list-style-type: none"> • Creating disease-resistant grape varieties; • Developing innovative vinification technologies, • Ensuring technology transfer and continuous learning. 	<ul style="list-style-type: none"> • Vocational training of viticultural and oenologic; • Transfer of know-how and best practices between local producers and international partners; • Strengthening professional capacities in the sector. 	<ul style="list-style-type: none"> • Branding and promoting wines; • Positioning the republic as a wine-producing country among producers of quality wines; • Participation in international wine events; • Developing wine tourism and tasting experiences.

Source: Prepared by the author [12; 2; 8].

In conclusion, investments dedicated to the modernization of the wine sector constitute a fundamental pillar of the sustainable development of this field, ensuring both economic competitiveness and alignment with global standards of quality and sustainability.

REFERENCES

- Albu, S. (2010). Teoria investițională: Aplicare în evaluare și gestiune. *Studia Universitatis. Seria Științe Exacte și Economice*, 2(32), pp. 158-164. https://ibn.idsi.md/vizualizare_articol/19447
- Bradu, M. (2006). *Analiza statistico-economică a procesului investițional și a riscului investițional* [Teză de doctorat]. Chișinău.
- Burja C. (n.d.). *Eficiența investițiilor alocate dezvoltării durabile*. <http://www.oeconomica.uab.ro/upload/lucrari/820062/10.pdf>
- Cistelecan, L. (1983). *Investiții*. București: Editura Academiei. <https://ru.scribd.com/document/28310304/Investitii-Lazar-Cistelecan>
- Diaconu, A., & Ursache, A. (2015). Aspecte specifice în definirea conceptului de investiții. *Revista Română de Statistică - Supliment*, 10, 43-49.
- Hîncu, R., Bunu, M., & Dascaluic, D. (2010). *Bazele activității investiționale (sinteze și aplicații)*. Chișinău: ASEM. https://lib.ase.md/wp-content/uploads/publicatii/Publicatii%20Asem_2010/Hancu_Activitati%20informatiionale.pdf

- Hotărâre cu privire la aprobarea Strategiei naționale de dezvoltare agricolă și rurală pentru anii 2023-2030: nr. HG56/2023 din 17.02.2023. (2023). *Monitorul Oficial al Republicii Moldova*, nr. 117-118, art. 244. <https://faolex.fao.org/docs/pdf/mol223412.pdf>
- Hotărâre cu privire la Strategia națională de dezvoltare a societății informaționale “Moldova Digitală 2020”: nr. 857 din 31.10.2013. (2013). *Monitorul Oficial al Republicii Moldova*, nr. 252-257, art. 963. https://old.mei.gov.md/sites/default/files/strategia_moldova_digitala_2020_857.pdfhttps://www.revistadestatistica.ro/supliment/wp-content/uploads/2015/10/RRSS_10_2015_A04RO.pdf
- Lege cu privire la investițiile în activitatea de întreprinzător: nr. 81 din 18.03.2004. (2008). *Monitorul Oficial al Republicii Moldova*, nr. 64-66, art. 334. https://www.legis.md/cautare/getResults?doc_id=27421&lang=ro
- Prelipcean, G. (2000). *Fundamente economice ale investițiilor*. Suceava: Editura Universității.
- Simiciuc, E., & Cimpoeș, D. (2017). Rolul Managementului Inovațional în Activitatea Antreprenorială a Agenților Economici din Republica Moldova. *CSEI Working Papers Series*, nr. 7, pp. 29-34. https://irek.ase.md/xmlui/bitstream/handle/123456789.1/98/Simiciuc_Cimpoes_WP_Issue_7_2017.pdf?sequence=1&isAllowed=y
- Stratan, A., & Bajura, T. (2017). *Metodologia elaborării și evaluării proiectelor investiționale pentru sectorul agroalimentar: ghid metodologic*. Chișinău: INCE.
- Timuș, A., & Timuș, A. (2022, May 26th-27th). Aspectele sociale ale investițiilor durabile: realizări și perspective. In: *Experience. Knowledge. Contemporary Challenges. Opportunities for changing the Economic-Social Realities of the World: International Symposium*. Artifex University of Bucharest. <https://rses.ince.md/server/api/core/bitstreams/27919b6d-8266-4dac-94f4-8f07cb83fbfc/content>
- Лажметкина, Н. И. (2015). *Инвестиционный менеджмент*. М.: КНОРУС.
- Мустафаева, Р. Р. (2021). Современные тенденции инвестиций в сельское хозяйство. В: *Экономика, предпринимательство и право*, 11(6), сс. 1457-1468. <https://doi.org/10.18334/epp.11.6.112254>

ANALYSIS OF CROP PRODUCTION SECTOR VULNERABILITY TO CLIMATE CHANGES IN THE REPUBLIC OF MOLDOVA

Maria GRUBLEAC
PhD., candidate ASEM

<https://orcid.org/0009-0000-2530-4922>
maria.grubleac@ase.md

Liliana CIMPOIEȘ

PhD., associate professor ASEM,

<https://orcid.org/0000-0003-3709-9406>
lcimpoies@ase.md

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.17>

UDC: 631.95

JEL Classification: Q10, Q18, Q54

***Abstract.** This study examines the effects of climate change on the Republic of Moldova's output of main crops as wheat, maize, and sunflower from 2007 to 2024. The research focuses on temperature and rainfall variations, highlighting these important crops' vulnerability and adaptability. The research is based on data from the National Bureau of Statistics and combines descriptive statistical methods with multiple regression modeling to assess the relationship between weather patterns and crop performance. The results show that sunflower is the most resilient crop, with low yield variability and a moderate correlation with precipitation. Wheat is sensitive to rainfall distribution, while corn is the most unstable crop, showing a weak correlation with the analyzed climatic factors. Precipitation significantly influences crop yields, while temperature has either negative or limited effects.*

The findings highlight the urgent need for adaptation through drought-resistant varieties, soil conservation technologies, and the expansion of irrigation infrastructure.

Keywords: agriculture, crop production, climate change, vulnerabilities.

Introduction. The agricultural sector of the Republic of Moldova, especially crop production, is increasingly facing significant pressures generated by climate change. Increasing variations in the average annual temperature, the increased frequency of droughts and the uneven distribution of rainfall directly affect the productivity and stability of agricultural crops. The aim of this research is to evaluate how climate factors have influenced Moldova's three most important crops—wheat, maize, and sunflower—over the period 2007 to 2024, offering a data-driven foundation for future adaptive strategies in agriculture.

The degree of approach to the topic in the scientific literature. In the scientific literature, the impact of climate change on agriculture is intensively studied, highlighting the direct relationship between climatic factors and crop yields (Popescu, Yuan). Studies confirm that rainfall has the strongest influence on productivity, while the effects of temperature vary by species and region (Cimpoies).

At the regional level, research highlights the vulnerability of crops in Eastern Europe, including Moldova, and the need for adaptation through resilient agricultural technologies and integrated climate management.

Research methodology. The analysis is based on statistical data from 2007–2024 on wheat, maize and sunflower, correlated with average annual temperature and rainfall. Descriptive statistics, Pearson correlations and multiple regression models were used to assess the climate impact on production. The trends were analyzed through polynomial regressions, allowing the comparison of vulnerability between crops.

Research results. The analysis of climate evolution and agricultural production in the period 2007–2024 reveals a gradual increase in the average annual temperature in the Republic of Moldova, accompanied by a pronounced instability of the rainfall regime. This trend had differentiated effects on the crops analyzed. Wheat, a crop with a vegetation period that depends on the humidity in the autumn and spring months, proved to be particularly sensitive to variations in rainfall. The multiple regression model applied for this crop indicates a coefficient of determination R squared of 0.66, which reflects a significant correlation between production and climatic factors. In particular, rainfall has a positive influence on yields, while high temperatures have a negative effect. The coefficient of variation of wheat productivity (30.16%) suggests a moderate instability from one year to another, which becomes accentuated in years with spring drought or winters without protective snow cover.

Maize recorded the highest instability among the three crops analyzed, confirming its vulnerability to climate stress, especially extreme temperatures and droughts in the summer period. The coefficient of variation for production was 79.68%, and for productivity – 54.36%, which reflects high volatility. The regression analysis demonstrated a marked negative influence of temperatures on production, while the annual amount of rainfall had a positive effect, but insufficient to compensate for losses in dry years. With an R squared of 0.73, the statistical model shows a solid relationship between climatic factors and variations in maize production, especially in the southern areas of the country, where drought is more frequent and heat intensity higher. This crop is strongly affected in the pollination and berry formation phase, critical moments when lack of water and excessive temperatures lead to drastic reductions in yields.

In contrast to the other two crops, sunflower was distinguished by a high degree of resilience to variable climatic conditions. With a coefficient of variation in productivity of only 27.92%, this crop has demonstrated a relatively constant ability to provide stable yields, even in years marked by drought or high temperatures. The multiple regression model indicates an R squared of 0.56, suggesting a moderate correlation between climatic factors and productive performance. The tolerance of sunflowers to drought is supported by its morpho-physiological characteristics – deep root system, leaf waxing and high efficiency in water use – factors that give it an advantage over heat and water stress. This stability makes it a strategic option for farmers in drought-prone regions, especially as climate change becomes increasingly pronounced.

Overall, the results of the research confirm that rainfall is the main determining factor for agricultural performance in Moldova, directly influencing the production of the three analyzed crops. Temperature, although with variable effects, becomes a critical factor in years with significant deviations from the climate average. The classification of crops according to resilience places sunflowers at the top, as the most adaptable, followed by wheat, with a medium sensitivity, and corn, the most vulnerable crop to climate change. These conclusions underline the importance of adjusting agricultural strategies according to the specifics of each crop, by selecting varieties tolerant to climate stress, expanding irrigation and optimizing the agricultural calendar, so that national agricultural production becomes more resilient in the face of increasingly frequent climate risks.

Conclusions. Rainfall unpredictability is emerging as a major driver of climate change, which is clearly and increasingly affecting agricultural production in the Republic of Moldova. Of the main crops, sunflower exhibits the highest degree of resilience to changing climatic conditions, wheat exhibits intermediate sensitivity, and maize is the most vulnerable. Adaptive measures including enhanced irrigation infrastructure, soil-conserving farming methods, and crop types resistant to drought are crucial for ensuring the agricultural sector's viability.

Acknowledgements

This research was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.

REFERENCES

- Cimpoieș, L., & Grubleac, M. (2025). Assessing the impact of climate change on Moldova's agricultural sector: Quantifying drought and temperature effects on selected crops yield. *Scientific Papers. Series Management, Economic Engineering in Agriculture and Rural Development*, 25(1), 185-192. https://managementjournal.usamv.ro/pdf/vol.25_1/Art19.pdf
- Popescu, A., Dinu, T. A., Stoian, E., & Serban, V. (2023). Climate change and its impact on wheat, maize and sunflower yield in Romania in the period 2017-2021. *Scientific Papers. Series Management, Economic Engineering in Agriculture and Rural Development*, 23(1), 587-602. https://managementjournal.usamv.ro/pdf/vol.23_1/Art63.pdf
- Yuan, X., Li, S., Chen, J., Yu, H., Yang, T., Wang, C., Huang, S., Chen, H., & Ao, X. (2024). Impacts of global climate change on agricultural production: A comprehensive review. *Agronomy*, 14(7), 1360. <https://doi.org/10.3390/agronomy14071360>

ECOLOGIC AGRICULTURE IN THE REPUBLIC OF MOLDOVA: ACCESS TO THE EU MARKET BETWEEN HARMONIZATION AND BARRIERS

Diana COȘALÎC, *PhD student,*
Academy of Economic Studies of Moldova
<https://orcid.org/0000-0002-3303-2119>
cosalic.diana@ase.md; diana.cosalic@aipa.gov.md

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.18>

UDC: 338.439.52(478)

JEL Classification: Q18, Q28, Q57

Abstract. *This paper examines the opportunities and challenges faced by the Republic of Moldova in integrating its organic agri-food products into the European Union market. Against the backdrop of growing EU consumer demand for clean, sustainable, and certified organic products, Moldova seeks to harness this potential through the alignment of its national legislation with EU regulations—particularly with the adoption of Law No. 237/2023 on organic production and product labeling. The study highlights progress, including the recognition of certification bodies and participation in international trade fairs, while also addressing significant barriers such as bureaucratic procedures, phytosanitary requirements, logistical constraints, and limited financial resources. Based on an analysis of the regulatory framework, statistical data, and relevant literature, the article emphasizes the need for stronger institutional support and a coherent strategy to promote organic agriculture as a driver of sustainable development and closer EU trade integration.*

Keywords: *agriculture, organic farming, farms, operators, exports.*

Introduction.

The export of organic agricultural products to the European Union (EU) represents a development opportunity for countries outside the European bloc, including the Republic of Moldova, but it also comes with well-defined regulations for entering the market as an exporter.

Analyzing the growing interest of EU consolidators in organic agricultural products, it can be stated that the EU is one of the largest importers of organic products in the world. This statement is supported by the existence of EU policies promoting the consumption of organic agricultural products, as well as the implementation of the “Farm to Fork” Strategy, which aims to increase organically cultivated areas and the consumption of organic products. Additionally, citizens of EU member states have shown a constant demand for clean products, free from pesticides, grown in environmentally friendly conditions, and certified as organic agricultural products.

Literature review. EU member states have set quantitative targets aimed at fostering the development of organic agriculture, including the expansion of areas under organic farming practices [3, 5, 8].

The impact of organic farming practices on biodiversity and food security is well-documented in the academic literature [5].

Research methodology. This research is based on the analysis of the regulatory framework governing the development of organic agriculture in the Republic of Moldova, as well as its alignment with EU requirements. With the harmonization of legislation, Moldovan farmers will meet the necessary conditions to export agri-food products to EU member states.

Main results. Among the development trends in sustainable agriculture, the field of organic agriculture holds a priority role, as the EU places strong emphasis on the advancement of organic farming. Consequently, EU member states have adopted the target of increasing organically farmed agricultural areas to 25% of the total cultivated land by the end of 2030.

This opportunity should be actively explored by Moldovan farmers engaged in organic agricultural production, given the existence of a large consumer base (500,000), which serves as an incentive to facilitate the export of products to the EU market.

The current situation is characterized by bureaucratic challenges. Moldovan exporters of organic products sometimes face bureaucratic difficulties and additional inspections by importers from EU member countries, as Moldova was previously classified as a risk group due to cases of exporting "contaminated" goods under the pretext of being organic. This results in double checks during export.

To be marketed as organic within the EU, Moldovan products must hold certificates issued by internationally recognized certification bodies (such as those complying with the European Organic Regulation standards). These certificates confirm that the products meet the EU organic production standards. To facilitate exports, international certification bodies accredited in the EU are not required to undergo re-accreditation in the Republic of Moldova [11].

In 2014, the Republic of Moldova signed an Association Agreement with the EU, which came into effect in July 2016. The Deep and Comprehensive Free Trade Area (DCFTA) agreement further facilitates trade by gradually aligning Moldovan legislation, norms, and procedures, including standards, with those of the EU. Additionally, this agreement reduces tariffs faced by European economic operators when exporting to Moldova, as well as those encountered by Moldovan economic operators exporting to the EU, and streamlines customs procedures [10].

The agreement reduces tariffs on various products, including agricultural goods, and mandates the harmonization and implementation of EU regulations regarding:

- standards for agri-food product safety;
- specific regulations concerning animal feed;
- regulations on genetically modified organisms;
- regulations on veterinary medicinal products.

In fact, the EU is the Republic of Moldova's most important trading partner, absorbing a large share of its agricultural exports. Over 65% of Moldovan exports reach the EU. The main agricultural export products include cereals (wheat, corn,

sunflower), fruits (especially dried plums, table grapes, apples, cherries), sunflower oil, and processed food industry products.

The EU has granted Moldova trade liberalization for seven categories of agricultural products: table grapes, tomatoes, garlic, apples, cherries, plums, and grape juice, allowing exports without tariffs and quantitative restrictions. This measure was recently extended until July 2025.

The trade liberalization for these seven agricultural product categories has had a positive impact, although quotas were not always fully utilized for all products (e.g., tomatoes and garlic in the past). The extension of liberalization until July 2025 continues to support exports. A significant portion of agricultural exports to the EU consists of primary agricultural products (approximately 62.1% of total Moldovan exports to the EU, valued at €637.9 million as of the end of January 2025). However, there is a growing trend in exports of processed food products.

The export procedure for organic products from the Republic of Moldova to the European Union involves several essential steps to ensure compliance with EU regulations and to facilitate market access. Below, I will illustrate graphically the process for accessing the EU market with organic agri-food products originating from the Republic of Moldova.

Table 1. Stages undertaken by an economic entity exporting organic agri-food products to EU member countries

Stage	Description
Stage I	Registration of the economic entity as an organic operator
Stage II	Inspection of the economic entity by the control body
Stage III	Labeling of the organic product to ensure export to EU member countries
Stage IV	Prior Submission of the export customs declaration to the customs authorities in the Republic of Moldova
Stage V	notification of transport using the TRACES NT platform
Stage VI	Verification of documentation by the authorities in the EU

Source: elaborated by the author, <https://trade.ec.europa.eu/access-to-markets/ro/content/zona-de-liber-schimb-aprofundata-si-cuprinzatoare-ue-moldova>

Discussion and conclusions.

The Republic of Moldova holds strong potential to expand its organic agriculture sector, particularly through exports to the European Union, which remains its largest and most important trading partner.

The government's commitment to converting 25% of arable land to organic farming by 2030 demonstrates a clear strategic vision aligned with global sustainability trends and EU market demands.

The national brand "Organic Agriculture – Republic of Moldova" plays a vital role in promoting certified organic products and safeguarding consumer trust both domestically and abroad.

Trade liberalization measures granted by the EU, including tariff-free access for key agricultural products, have positively impacted Moldovan exports, although ongoing efforts are needed to fully utilize quotas and increase processed food product exports.

The trend toward increasing exports of processed organic food products alongside primary agricultural goods signals diversification and added value in Moldova's agricultural export portfolio, which may strengthen its competitiveness on the EU market.

REFERENCES

Arndt C., & Lozan A. (2021). *Opportunities for Investment into Organic Horticulture: Facilitating Moldova's Strategy to Enhance Organic Farming*", Chisinau. https://issuu.com/afc-agriculture_finance/docs/organic_horticulture_investment_opportunities

Atlasul Agriculturii Ecologice în Republica Moldova. 2020-2023; <https://ecovisio.org/ro/ce-facem/proiecte-ro/atlasul-agriculturii-ecologice-din-republica-moldova>

Bernet, T., & Weidmann, G. (2019). *Moldova Agricultura ecologică: Principii de bază și bune practici*. FiBL și LED. <https://agrobiznes.md/wp-content/uploads/2020/02/Agricultura-ecologica-in-Moldova.pdf>

Comisia Europeană. (n.d.). <https://trade.ec.europa.eu/access-to-markets/ro/content/zona-de-liber-schimb-aprofundata-si-cuprinzatoare-ue-moldova>
European Commission (EU). (n.d.).

https://agriculture.ec.europa.eu/farming/organic-farming/future-organics_en?utm
IFOAM. (n.d.). <https://www.ifoam.bio/why-organic/%20organiclandmarks/definition-organic>

Lege privind producția ecologică și etichetarea produselor ecologice: nr. 237 din 31.07.2023. *Monitorul Oficial al Republicii Moldova*, 338-340. art. 596. https://www.legis.md/cautare/getResults?doc_id=143874&lang=ro

Mayen, C. D., Balagtas, J. V., & Alexander, C. E. (2010): Technology adoption and technical efficiency: Organic and conventional dairy farms in the United States. *American Journal of Agricultural Economics* 92(1), 181-195. <http://dx.doi.org/10.1093/ajae/aap018>

Moldova's Organic Agriculture Sector: Seizing the Opportunities for Growth, Southern Africa Farmer to Farmer Program. AID-7200AA18LE00005. (2021). USAID, CNFA.

Rusu T., Albert I., & Bodis A. (2005). *Metode și tehnici de producție în agricultura ecologică (ecotehnica)*. Cluj-Napoca: Editura Risoprint.

Vietnam promotes organic agriculture in line with new EU regulations. (2024). <https://en.vietnamplus.vn/vietnam-promotes-organic-agriculture-in-line-with-new-eu-regulations-post307193.vnp?utm>

Voloșciuc L. (2009). *Probleme ecologice în agricultură*. Chișinău: Editura „Bons Offices” SRL.

CURRENT CHALLENGES AND OPPORTUNITIES FOR ENHANCING THE RESILIENCE OF THE PIG SECTOR IN THE REPUBLIC OF MOLDOVA

Alexandru CEBAN, *Scientific researcher,*
National Institute for Economic Research,
Academy of Economic Studies of Moldova
<https://orcid.org/0000-0002-3300-4054>
ceban_alexander@yahoo.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.19>

UDC: 338.43(478)

JEL Classification: Q13, Q18, O13

Abstract. *The pig sector in the Republic of Moldova is facing some serious challenges, related to economic, sanitary and public health aspects, as well as technological ones. All these challenges limit its potential of increasing competitiveness and hinder its resilient development. High volatility for pork prices and feed, reliance on imports, insufficient innovative and modern infrastructure and a great vulnerability to diseases make this sector susceptible to negative events and phenomena. At the same time, there are a series of opportunities for enhancing its sustainable evolution, mainly related to increasing of the local demand and consumption, public support in the shape of subsidies for creation of infrastructure, adoption of new innovative technologies and diversification of processed products. Thus, the paper analyzes the existing challenges and opportunities in the pig sector, reflecting the overview of the current directions for its resilient development.*

Keywords: pig sector, challenges, opportunities, resilience, Republic of Moldova

Introduction. The pig sector plays a significant role in the agricultural sector of the Republic of Moldova, as it provides for important quantities of meat for internal consumption, as well as for the processing sector. By this, it contributes to increasing the personal income of rural households, ensures food security, especially in rural population and supports with raw material the processing meat sector in the country.

However, the pork production is oscillating, being affected by a series of endogenous and exogenous factors like African swine fever epidemics, lack of modern and innovative technologies, high prices for feed and inputs, lack of local breeding material, high costs of production, etc. The existing current challenges pose some threats in achieving the sector's resilience to adverse events and enhancing its sustainability and require the need for targeted, strategic interventions. At the same time, the potential opportunities may contribute to pig sector's transformation into a driver of the development of the agri-food sector in general, if such opportunities are correctly and properly exploited.

Literature review. The importance of the pig sector for national economy, with its subsequent impact on food security, rural development and environmental performance is presented in various studies and analytical reports carried out, especially by international organization (FAO, 2018; FAO, 2010; OECD/FAO, 2025; OECD, 2003). The role of the livestock sector (including pig sector) in economic development and its social implications on poverty reduction was approached by Upton (2004), while Giglio et al (2025) analyzed the economic resilience of the pig sector in various types of farming systems and Wei et al (2016) have approached the environmental, economic and social implications of the peri-urban pig production.

At the same time, in the Republic of Moldova, the analysis of the pig sector in terms of strategic development was performed by Baltag and Baranov (2013), as an integral part of the livestock sector – by Stratan et al (2022) and through standard development projects – by Baltag and Osoianu (2023). Nevertheless, the issues on challenges and opportunities have been hardly approached, while the given paper provides for a partial SWOT analysis of the pig sector in the Republic of Moldova.

Research methodology. The paper considers a combination of quantitative data and qualitative analysis for identification of the challenges and opportunities for the resilient development of the pig sector. Data on output, consumption, self-sufficiency levels, foreign trade, etc. have been analyzed, involving the use of methods such as description and comparison. The partial SWOT analysis method was also used to structure the obtained results and emphasize the strategic directions for the sector's development.

Main results. Several structural challenges have been noticed while carrying out the analysis of the pig sector in the Republic of Moldova.

One of the main challenges is related to oscillating values of production. These occur mainly due to high input and feed costs, which subsequently lead to high production costs. Occasional decrease in volumes of production favorize imports of pork meat from EU countries. Dependence on international markets supposes the existing of some vulnerability to the fluctuations of the international price and potential trade restrictions may also affect the provision with pork.

From a sanitary point of view, the African swine fever is one of the most important threats and challenges the sector faces. Occurrence of swine fever has caused considerable losses for economic agents from several rayons of the country (Ungheni, Straseni, Drochia and Anenii Noi), leading to the slaughter of herds, quarantine and control measures and severe trade restrictions. The slow response on this type of hazard accompanied by the reduced capacity to manage it puts a pressure on the pork industry and requires a modern biosecurity infrastructure capable to strengthen preventive measures.

Another challenge is represented by the high production costs and price volatility. Increase in prices for forage (cereals) puts a pressure for farms by reducing the profit margins. Also, in some cases, potential investments in the sector are also discouraged. Thus, the local pig farmers encounter some difficulties in preserving their competitive place on the market, which imposes some limits in the capacity of farms to expand their area and modernize infrastructure.

The insufficiently developed infrastructure in the pig sector, starting with farm technologies and ending with processing sub-sector represents another challenge the sector has to face. Throughout the country, the number of modern equipped slaughterhouses and processing units is low, which determines farmers to sell the pigs when they are alive, or raw meat, which does not bring an added value to the sector. All of these reduce the potential income of farmers and affect their competitive position on the market.

At the same time, the excessive fragmentation of farms and their inclusion in the small categories or rural households hinders the implementation of modern farming technologies. The fragmentation is creating difficulties, first of all, in applying safety standards in terms of quality of products. Taking into account that the integration of farmers in strong associations of producers is low, the bargaining power in the market is also reduced.

On the other hand, the analysis identified a series of opportunities for revitalizing the pig sector.

The constantly increasing demand on the local market represents an important advantage, as pork is one of the most consumed sources of animal protein in the Republic of Moldova. Increasing awareness of consumers in opting for local production may represent an incentive for farmers in the field in order to increase their production capacities. Moreover, there are favorable prospects related to the integration of the pig sector into regional value chains. The proximity of the EU markets offers opportunities for exports, in the case if sanitary-veterinary and quality standards are followed and investments are made for their enhancement.

At the same time, the orientation in the direction of value-added products represents one of the strategic directions for the sector's sustainable development. The production of meat and traditional preparations of pork, production of new types of products, even from the luxury and premium segment, development of organic production and promotion of local producers may increase the attractiveness of the sector. It is very important to capitalize on the national cuisine heritage and adapt it to new consumer preferences which will generate added value and provide for jobs in rural areas.

The SWOT analysis based on these findings present that the sector's development benefits from several strengths – the tradition of farming, stable demand and available agricultural resources. The existing weaknesses are linked to fragmentation of farms, lack of modern infrastructure and high production costs. On the other hand, opportunities related to regional integration, public support and product diversification can contribute to the modern transformation of the sector. At the same time, the threats like African swine fever and market volatility for feed and cereals need urgent actions and investments to ensure the viability of the sector in the long-term.

Discussion and conclusions. The pig sector in the Republic of Moldova requires an integrated approach in order to increase its resilience. Farm consolidation, association in producers' organizations, modernization of processing infrastructure, enforcing biosecurity with strict sanitary standards represent essential elements to increase its competitiveness. At the same time, public policies and

increased access to finance may facilitate the conversion to a more innovative and sustainable sector.

Acknowledgements. The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.

REFERENCES

- Baltag, G., & Baranov, E. (2013). Characteristics and strategic development of pork sector in Moldova and the European Union. *Scientific Papers. Series Management, Economic Engineering in Agriculture and rural development*, 13(4), 45-48. https://managementjournal.usamv.ro/pdf/vol3_4/Art7.pdf
- Baltag, G., & Osoianu, A. (2023, October 12-13). Methodological and scientific contribution to the development of the pigmeat sector based on standard development projects. In: *Economic growth in the conditions of globalization: conference proceedings: International Scientific-Practical Conference*, (XVIIth edition, Vol. I, pp. 269-279). Chisinau: SEP ASEM. <https://doi.org/10.36004/nier.cecg.II.2023.17.15>
- Food and Agriculture Organization of the United Nations (FAO). (2018). *Environmental performance of pig supply chains: Guidelines for assessment (Version 1)*. Livestock Environmental Assessment and Performance Partnership. Rome, FAO. <https://openknowledge.fao.org/handle/20.500.14283/i8686en>
- Food and Agriculture Organization of the United Nations, World Organisation for Animal Health/World Bank (FAO, OIE). (2010). *Good practices for biosecurity in the pig sector - Issues and options in developing and transition countries*. FAO Animal Production and Health Paper No. 169. Rome, FAO. <https://www.fao.org/4/i1435e/i1435e00.pdf>
- Giglio, L., Rousing, T., Łodyga, D., Reyes-Palomo, C., Sanz-Fernández, S., Soffiantini, C. S., & Ferrari, P. (2025). Economic Resilience in Intensive and Extensive Pig Farming Systems. *Sustainability*, 17(15), 7026. <https://doi.org/10.3390/su17157026>
- OECD-FAO Agricultural Outlook 2025-2034. (2025). <https://doi.org/10.1787/601276cd-en>
- Organisation for Economic Co-operation and Development (OECD). (2003). *Agriculture, Trade and the Environment. The Pig Sector*. https://www.oecd.org/content/dam/oecd/en/publications/reports/2003/10/the-pig-sector_g1gh38ad/9789264104174-en.pdf
- Stratan, A., Ceban, A., & Lucasenco, E. (2022). Evolution of the livestock sector of the Republic of Moldova. *Scientific Papers. Series Management, Economic Engineering in Agriculture and rural development*, 22(2), 671-678. https://managementjournal.usamv.ro/pdf/vol.22_2/Art79.pdf
- Upton, M. (2004). The Role of Livestock in Economic Development and Poverty Reduction. *PPLPI Working Papers*, 10. <https://doi.org/10.22004/ag.econ.23783>
- Wei, S., Bai, Z. H., Qin, W., Xia, L. J., Oenema, O., Jiang, R. F., & Ma, L. (2016). Environmental, economic and social analysis of peri-urban pig production. *Journal of Cleaner Production*, 129, 96-607. <https://doi.org/10.1016/j.jclepro.2016.03.133>

IMPLEMENTATION OF BLOCKCHAIN TECHNOLOGY IN HORTICULTURAL SUPPLY CHAINS IN THE REPUBLIC OF MOLDOVA: OPPORTUNITIES AND CHALLENGES

Viorel TUREȚCHI, *Scientific researcher,*
National Institute for Economic Research,
Academy of Economic Studies of Moldova
<https://orcid.org/0009-0001-3201-5085>
turetchi.viorel@ase.md

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.20>

UDC: 338.439.5(478)

JEL Classification: Q1, R1, H254 Q13, O33, Q17

Abstract. *The increasing integration of the Republic of Moldova into the European market entails compliance with strict standards concerning food safety, product traceability, and transparency across agri-food value chains. This paper explores the role of blockchain technology as a transformative tool for addressing these challenges, ensuring traceability, enhancing consumer trust, and aligning Moldovan horticulture with EU requirements. The research applies a literature review, comparative analysis, and case study method, drawing on international practices (Walmart–IBM Food Trust, Carrefour, TE-FOOD Vietnam) and national regulatory frameworks (Food Safety Law No. 306/2018, ANSA). Results highlight four main opportunities for blockchain adoption: improved market access, brand development, logistics efficiency, and consumer confidence. However, challenges remain, such as input data quality, technological fragmentation, high costs for small producers, and governance requirements. The paper concludes that a phased implementation starting with pilot projects in apples, plums, and table grapes would create conditions for broader national-scale adoption. Blockchain is not a panacea but a catalyst for digital transformation of the horticultural supply chain, reinforcing Moldova’s competitiveness in international markets.*

Keywords: *blockchain, horticulture, food safety, traceability, competitiveness, Moldova, digital transformation, supply chain*

Acknowledgments / Note: *The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.*

Introduction. The integration of the Republic of Moldova into the European market requires compliance with strict standards concerning food safety, product traceability, and transparency along agri-food value chains (Regulation (EC) No. 178/2002, 2002). In this context, horticultural producers face growing pressure to deliver certified and traceable products of consistently high quality. Blockchain technology, initially associated with cryptocurrencies, now offers innovative

solutions to ensure transparency, prevent fraud, and enhance trust in the agri-food sector (Kamilaris et al., 2019).

Literature review. In academic literature, blockchain is defined as a distributed digital ledger composed of encrypted blocks linked through cryptographic algorithms (Kamilaris et al., 2019). Its immutability guarantees data integrity and accountability. Applications in agri-food supply chains include traceability, certification, food safety, and cost reduction. International practices demonstrate its efficiency: Walmart and IBM Food Trust reduced the time needed to identify the origin of mangoes from several days to 2.2 seconds (IBM Food Trust, 2019), while Carrefour's blockchain system for poultry, tomatoes, and dairy strengthened brand trust through consumer access to QR code-based data.

Research methodology. The study combines: Comparative analysis of EU food safety legislation and Moldovan regulatory frameworks; Case study review of international blockchain applications in agri-food systems; Qualitative analysis of Moldovan horticultural sector data, including exports, infrastructure, and institutional support (ANSA, USAID HVAA, IFAD).

Main results. Moldova's horticultural exports—apples, plums, and table grapes—are central to the trade balance but increasingly face stricter market demands. Law No. 306/2018 on Food Safety, updated in 2024, and ANSA regulations established mandatory traceability standards. However, digitalization remains limited, with fragmented infrastructure and absence of integrated supply-chain platforms. The adoption of blockchain presents several opportunities: market access, brand development, logistics efficiency, and consumer trust. At the same time, challenges persist: ensuring input data accuracy, avoiding technological fragmentation, overcoming financial constraints for smallholders, and establishing governance and data protection mechanisms.

Discussion and conclusions. Blockchain technology offers significant opportunities for enhancing the competitiveness of Moldovan horticulture, particularly in the context of the country's progressive integration into European and global agri-food markets. Its capacity to ensure end-to-end product traceability, streamline compliance with international safety standards, and provide transparent data management across the supply chain makes it an indispensable tool for future modernization. A phased strategy for adoption is therefore recommended.

The initial stage should focus on pilot projects involving strategic crops with the highest export potential—apples, plums, and table grapes—where compliance and reputation are already critical factors. These pilot initiatives could connect selected farms, packing houses, and exporters into a digital ledger system verified by the National Agency for Food Safety (ANSA). In this phase, emphasis should be placed on building trust among stakeholders, training human resources, and standardizing input data collection (labelling, QR codes, sensor integration).

The second stage should gradually extend the system's coverage by incorporating logistics operators, cold storage facilities, and export intermediaries. Here, blockchain would not only serve as a traceability tool but also enable smart contracts for streamlining payments, managing certifications, and reducing transaction costs. Integration with IoT devices - temperature and humidity sensors,

GPS trackers - would further strengthen quality control and reduce post-harvest losses.

Finally, a sector-wide adoption phase should institutionalize blockchain as a national compliance instrument, officially recognized by ANSA and harmonized with EU digital standards such as GS1. At this level, blockchain could serve as a unifying digital backbone, connecting farmers, associations, exporters, and regulators in a transparent ecosystem that promotes fair competition and sustainable practices.

While challenges exist—such as the financial burden for smallholders, the need for reliable data entry, and the risk of technological fragmentation—the long-term benefits clearly outweigh the costs. Improved market access, stronger brand identity for Moldovan fruit, higher logistics efficiency, and increased consumer trust would generate durable competitive advantages. In this sense, blockchain should not be seen merely as a technical solution but as a catalyst for Moldova’s digital agricultural transformation, harmonizing practices with EU requirements, stimulating investment, and ensuring a resilient position for Moldovan horticulture in global agri-food markets.

REFERENCES

- Agenția Națională pentru Siguranța Alimentelor (ANSA). (2024). *Regulations and Orders*. <https://www.ansa.gov.md/>
- GS1. (2020). *Standards and Regulations*. https://gs1md.org/regulamentul_gs1_moldova
- IBM Food Trust. (2019). *Walmart and IBM transform food supply chain with blockchain*. <https://www.ctc-n.org/sites/default/files/IBM%20Food%20Trust%20Overview%20Presentation%20for%20UN-CTCN%20-%20final.pdf>
- IFAD. (2023). *Rural Resilience Project - Annual Report*. Rome. <https://www.ifad.org/en/w/corporate-documents/projects-programmes/republic-of-moldova-2000001156-rrp-supervision-report-january-2023>
- Kamilaris, A., Fonts, A., & Prenafeta-Boldú, F. X. (2019). The rise of blockchain technology in agriculture and food supply chains. *Trends in Food Science & Technology*, 91, 640-652. <https://arxiv.org/pdf/1908.07391>
- Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety*. <https://eur-lex.europa.eu/legal-content/RO/TXT/?uri=celex:32002R0178>
- USAID Moldova. (2022). *High Value Agriculture Activity (HVAA) - Final Report*. Chișinău. https://gov.md/sites/default/files/media/documents/2025-03/chapter_11_agriculture_and_rural_development.pdf

**WELL-BEING, INCLUSION AND THE REDUCTION OF
SOCIAL INEQUALITIES**

REGIONAL DEVELOPMENT POLICY IN THE REPUBLIC OF BULGARIA

Plamen Marinov LAKOV, Professor, PhD,
*Head of Department "Regional Development,
Agribusiness and Tourism",
University of Agribusiness and Rural Development,
Plovdiv, Republic of Bulgaria,*
plakov@uard.bg

Biser Yordanov KRASTEV, Professor, PhD,
*Head of Department "Economics and Management",
University of Agribusiness and Rural Development,
Plovdiv, Republic of Bulgaria,*
<https://orcid.org/0000-0002-5321-1659>
bkrastev@uard.bg

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.21>

UDC: 332.1(497.2)

JEL Classification: F15, H77, O18, R11, R58

***Abstract.** The need for a regional development policy in Bulgaria is determined by the fact that the principle of territorial solidarity requires the creation of relatively equal living conditions in the different parts of the country's territory. An important argument is also the process of accession and subsequent membership in the European Union, in which the policy of economic and social cohesion occupies a central place. The European Union, in addition to providing significant resources from the community, sets specific requirements for the member states, including in the regional policy it implements. In this scientific work, the authors aim to characterize the priorities of the regional policy of the Republic of Bulgaria for different periods. The emergence, development, legislative framework and instruments of regional development policy are examined. Relevant conclusions and generalizations are made.*

***Keywords:** regional policy, regional development, regional economy, regions, strategic planning*

Introduction. The need for a regional development policy in Bulgaria is determined by the fact that the principle of territorial solidarity requires the creation of relatively equal living conditions in the different parts of the country's territory, that the regional differences existing in each country give rise to social and political problems, that regional and national economies are closely linked, that market forces alone cannot ensure balanced regional development. An important argument is also the accession process and subsequent membership in the European Union, in which the policy of economic and social cohesion occupies a central place. The European

Union, in addition to providing significant resources from the community, sets specific requirements for the member states, including in the regional policy it implements. In this paper, the authors aim to characterize the priorities of the regional policy of the Republic of Bulgaria for different periods. To achieve the stated goal, the following tasks have been solved: characteristics of the periods of development of regional policy, development of the legislative framework of regional policy, determination of the instruments of regional development policy.

Material and methods. The main research methods are: comparative and retrospective analysis, cartographic method. Official data from various departments and the National Statistical Institute were used for the analysis.

Results and discussion. The development of regional development policy can be divided into the following periods: Socialist - until the changes of 1989; Transitional period - from 1989 to 1999; Period of negotiations for accession to the European Union (Pre-accession period) - 1999-2006; Period of membership in the European Union - from 2007. Each period is characterized by its own specific features, positive and negative characteristics.

Period of negotiations for accession to the European Union (Pre-accession period). In view of the requirements of the European Union for the presence of a regional development policy in the candidate countries, a number of reforms are being initiated in Bulgaria to meet this requirement. The beginning was made with the adoption of a law on regional development and institutionalization of the policy implemented in the regions. There are 6 planning regions (at NUTS 2 level) and 28 districts (at NUTS 3 level) in the country. The six planning regions are as follows: North-West with Vidin as the center, North-Central with Ruse as the center, North-East with Varna as the center, South-East with Burgas as the center, South-Central with Plovdiv as the center and South-West with Sofia as the center. It was agreed to divide the country into 2 territorial statistical units at NUTS 1 level - Northern and Southern Bulgaria (Яков, 2019). Regional plans and municipal strategies for regional development of almost all administrative-territorial units in Bulgaria were developed and updated. Development plans for the six planning regions were developed. A National Operational Programme for Regional Development (NOPRD) was also developed and updated. An information database for the projects included in the National Regional Development Plan was created (ИИМЦ, 1999).

Some conclusions from the implementation of the Regional Development Act until 2004:

1) The Regional Development Act does not regulate the coordination and agreement between regional and sectoral developments, it does not address the issue of at what level and at what stage regional and sectoral strategies and plans converge. In practice, a strong dominance of the sectoral approach in planning is observed; 2) Regional planning is not tied to territorial planning. This leads to delays or incomplete absorption of the funds provided due to the unpreparedness of the relevant territory to use them - lack of preliminary studies, delays in expropriation procedures or the construction of the accompanying infrastructure; 3) A serious problem at all levels involved in the regional development planning process in Bulgaria is their insufficient administrative capacity. Much can be desired and must

be done regarding their further construction, training, equipment and material incentives; 4) There is a discrepancy between the responsibilities assigned to the subjects of regional planning and their capabilities for financing the plans; planning documents are also developed at levels where there is no budget and no funding is foreseen; 5) Targeted Impact Areas (TIAs) have not become an effective instrument of regional policy - on the one hand, they do not cover the entire territory of the country, and on the other, they overlap with each other. 6) Targeted Impact Areas were not adopted by the EC and did not find application in documents such as the National Regional Development Plan, etc.; 7) Planning areas were used to a limited extent; 8) When developing municipal development strategies, they included a large number of projects - at the "conceptual design" stage and not financially secured, which turned the strategy into an unrealistic document. At the same time, the law was not in line with European legislation and the provisions of Regulation 1260/1999 of the European Union, which regulates the procedure and general conditions for receiving funds from the Structural Funds, which are basic requirements for the successful conduct of negotiations for our country's membership in the EU under Chapter 21 "Regional Policy and Coordination of Structural Instruments". Regional development is defined as "... a process of forming and implementing a policy to achieve balanced and sustainable development of the administrative-territorial units on the territory of the Republic of Bulgaria." (Закон за регионалното развитие, 2004). The structure of those involved in regional policy and the system of mutual linking of plans and programs is clearly defined.

Period of membership in the European Union. Period 2007-2013. The main goal is to achieve sustainable and balanced development of the planning regions in Bulgaria. For the programming period 2014-2020, through 10 national programs, Bulgaria relies on funding in the amount of 9,753,843,073 provided by European funds (Europa, 2025). National co-financing under the individual programs is 1,813,094,033 euros (Јаков, 2023).

Strategic planning and programming of regional development. Strategic planning of regional development integrates regional and spatial development and covers the development and updating of a system of documents to reduce the imbalance in the development of the national territory, taking into account the territorial potential, including ensuring the development of cross-border, transnational and interregional cooperation. The system of documents covers: National concept of regional and spatial development; Integrated territorial strategies for the development of level 2 planning regions; Integrated development plan of a municipality. The specified documents are in hierarchical subordination and have a corresponding time horizon.

Conclusion. In conclusion, we would like to note that due to non-compliance with the requirements of the European Union, a new territorial division of the country is imminent and the formation of new regions in which regional development policy will be implemented. A number of options (over five) have been proposed, and here we will present the option adopted by the Bulgarian government in March 2025, which has been sent for approval by the European Commission. It is proposed to establish four level 2 planning regions, as follows:

1. Northern, including the districts of Vidin, Montana, Vratsa, Lovech, Plevna, Gabrovo, Veliko Tarnovo, Targovishte, Ruse, Razgrad and Silistra;
2. Eastern, including the districts of Dobrich, Varna, Shumen, Burgas, Sliven and Yambol;
3. Southern, including the districts of Sofia, Pernik, Kyustendil, Blagoevgrad, Pazardzhik, Smolyan, Plovdiv, Stara Zagora, Haskovo and Kardzhali;
4. Capital, including the district of Sofia (capital city).

This is necessary because the current North-West and North-Central regions do not meet the Eurostat requirements for a minimum number of 800,000 people of the population in the regions for statistical purposes. The new zoning aims to support the processes of implementing regional development policy and reducing interregional disparities by bringing the NUTS Classification into line with European requirements (NSI, 2025).

REFERENCES

- European Comision. (n.d.). https://ec.europa.eu/regional_policy/bg/atlas/bulgaria/
 Гълъбова, Ю. (n.d.). *Политика на регионално развитие в България*. Център по публична администрация НБУ. https://eprints.nbu.bg/id/eprint/125/1/Article_RPolicy_JG.pdf
- Докова, С., & Петров, К. (2012). *Регионално развитие и регионална политика*. София: Авангард Прима.
- Закон за регионално развитие. (1999). *Държавен вестник*, брой 26 от 23 март 1999 г.
- Закон за регионално развитие. Чл. 4. (2004). *Държавен вестник*, брой 14 от 20 февруари 2004 г.
- Закон за регионалното развитие. (2015). *Държавен вестник*, брой 9 от 3 февруари 2015 г.
- Каракашев, Х., Докова, С., & Петров, К. (2002). *Проблеми на регионалното развитие*. Курс лекции. ЕКС-ПРЕС.
- Конституция на Република България*. (2023). Народно събрание на Република България. <https://www.parliament.bg/bg/const>
- Лаков, П. (2015). *Регионална икономика*. Плевен: СЕД „Чиста природа“.
- Лаков, П. (2019). *Регионална икономика*. Пловдив: Академично издателство „Талант“. <http://isao.vuarr.com/>
- Лаков, П. (2021). *Регионална икономика*. Висше училище по агробизнес и развитие на регионите Пловдив: Академично издателство „Талант“. <https://uni.e-uard.bg/course/index.php?categoryid=77>
- Лаков, П. (2021). *Регионална политика*. Висше училище по агробизнес и развитие на регионите. Пловдив: Академично издателство „Талант“. <https://uni.e-uard.bg/course/index.php?categoryid=77>
- Лаков, П. (2021). *Регионално развитие и макроикономическа политика*. Висше училище по агробизнес и развитие на регионите. Пловдив: Академично издателство „Талант“. <https://uni.e-uard.bg/course/index.php?categoryid=77>

- Лаков, П. (2021). *Регионално устойчиво развитие*. Висше училище по агробизнес и развитие на регионите. Пловдив: Академично издателство „Талант”. <https://uni.e-uard.bg/course/index.php?categoryid=77>
- Лаков, П. (2023). *Регионална политика и устойчиво регионално развитие*. <https://isaoplus.vuarr.com/>
- Министерският съвет на Република България. (1999). Постановление № 105 на Министерския съвет от 2 юни 1999 година за определяне на районите за целенасочено въздействие. *Държавен вестник*, брой 52 от 11 юни 1999 г.
- Министерският съвет на Република България. (1999). Решение № 374 на Министерския съвет от 2 юни 1999 година за определяне на конкретен териториален обхват на районите за целенасочено въздействие. *Държавен вестник*, брой 52 от 11 юни 1999 г.
- Министерство на регионалното развитие и благоустройството Региони. (n.d.). *Региони в България*. <https://www.mrrb.bg/bg/regionalno-razvitie/regioni-v-bulgariya/>
- Национален статистически институт (НСИ). (2025). *Министерският съвет определи нов обхват на регионите за планиране*. <https://www.nsi.bg/news/ministerskiyat-savet-opredeli-nov-obhvat-na-regionite-za-planirane-8338>
- Националната стратегия за регионално развитие (НСРР) за периода 2012-2022 г.* (n.d.). <http://www.strategy.bg/publicconsultations/View.aspx?lang=bg-BG&Id=598>
- Петров, К. (2012). *Устойчиво развитие на регионите*. София: Авангард Прима.
- Петров, К. (2015). *Регионална политика на Европейския съюз и Република България*. София: Издателски комплект на УНСС.
- Стоянов, Я. (2004). *Регионалната политика на България в контекста на Регионалната политика на ЕС*. Трявна. <https://www.slideserve.com/ananda/3873344>

CURRENT TRENDS IN HIV INFECTION IN ROMANIA

Cosmin-Constantin SICREA, *PhD, Assistant Lecturer,*
University of Petroșani, Romania,

<https://orcid.org/0009-0000-9414-8804>
cosmin_sicrea2005@yahoo.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.22>

UDC: 614(498)

JEL Classification: I18, I14, I12, I190

Abstract. *Background: HIV infection continues to be a significant public health issue in Romania, with ongoing challenges in prevention, treatment access, and social stigma. On December 1st 2024, Romania had reported a total of 28,793 cases of HIV/AIDS since 1985. Of these, 18,768 individuals were living with HIV/AIDS. Challenges: Many times hospitals in Romania have reported shortages of essential HIV medications, leading to limited access to ART for some patients. Social stigma continues to affect individuals living with HIV, impacting their willingness to seek testing and treatment. Socio-professional integration remains one of the most important challenges. Methodology: Analysis of documents within the Department for Monitoring HIV Infection in Romania (National Institute of Infectious Diseases dr. "Matei Bals" Bucharest) on the evolution of HIV-AIDS at the level of our country, respectively the data presented by patient associations. Conclusion: HIV infection continues to be a public health problem in Romania also, that requires sustained efforts both in terms of management of cases already diagnosed and in terms of prevention among the population.*

Keywords: *HIV, social, stigma, trends, medical services, challenges*

Introduction. The HIV epidemic in Romania began and evolved as a pediatric one (Pleșca, 1998:12). Thus, inadequate medical practice, the absence of disposable syringes, and political ignorance caused HIV to spread rapidly among children, leading to an unprecedented epidemic. By 2000, 60% of pediatric HIV-AIDS cases in Europe were registered in Romania (Dente, 2006).

In response to this major AIDS epidemic, the focus was on treating patients, by implementing a free program, starting in 1998, that guaranteed universal access to triple active antiretroviral therapy (Andrioni, 2011: 22-23). This approach was very successful and considerably increased the survival rate of infected children. However, these children are now adolescents or young adults, representing a large cohort of “long-term survivors” - a unique population that represents a great challenge for the public health system and for their integration into civil society.

Not infrequently, the existence of an HIV-AIDS diagnosis implies the existence of negative pressure from cultural policies that often become oppressive. (Singer, 1994).

Literature review. Romania has a special configuration in that it has a high number of people infected with HIV and who are called long-term survivors, adults

over 20 years of age. It should be noted that since the beginning of the HIV-AIDS pandemic, the importance of a multidisciplinary approach has been highlighted. Thus, not only the medical community is faced with challenges given by HIV infection, but also social assistance services, educational services or the labour market must adapt to the new requirements of these beneficiaries in a special socio-medical situation, often reaching a situation of social exclusion.

Research methodology. In order to highlight the contemporary challenges of HIV infection in Romania, we used the method of analysing documents from the Department for Monitoring HIV Infection in Romania, i.e. the main data existing within patient organizations fighting for the rights of HIV-positive people.

Main results. According to the existing data within the National Institute of Infectious Diseases "Prof. Dr. Matei Balș" of Bucharest, more precisely the Department for Monitoring and Evaluation of HIV/AIDS Infection in Romania, on December 31, 2024, 18,768 people were living with HIV-AIDS out of a total of 28,793 (*cumulative 1985-2024*) (Department for Monitoring and Evaluation of HIV/AIDS Infection in Romania <https://cnlas.ro/index.php/date-statistica>). *In a study conducted by the "Baylor Black Sea" Foundation,* HIV-positive people experienced discrimination both within medical services and within the community or at work (Budin, 2022). Uninterrupted access to antiretroviral medication sometimes becomes difficult due to the impossibility of purchasing antiretroviral treatment by the authorities (Dojan, 2021). The causes of this shortage are not always clear, but may include supply problems, bureaucracy and an insufficient national strategy for managing the HIV/AIDS epidemic. Also, integration on the labour market remains a delicate subject for people affected by this disease, so the director of UNOPA (National Union of Organizations of People Affected by HIV/AIDS), Iulian Petre, stressed the importance of aligning medical criteria with new standards that allow HIV-positive people to work legally without violating their right to confidentiality and employment (Mitran, 2025). According to hivnet, the unfounded request for an HIV test at employment represents a flagrant violation of the privacy of PLHIV (people living with HIV) (<https://www.hivnet.ro/dezbateri/munca-si-educatie/>). In a study conducted by Larion & Dinu (2021), the relationship between stigmatization and decreased adherence of PLHIV to antiretroviral therapy was highlighted. Thus, social relationships with the people around a person can influence the somatic evolution of the disease.

Discussion and conclusions. Although efforts are being made that involve significant costs, it is very difficult to monitor in real time the evolution of HIV infection both at regional and global levels. Thus, people possibly infected with HIV or who have been exposed to the infection resort to counselling and testing services late, sometimes only when the disease gives signals to the body, after a longer period of time, sometimes even years. Social dialogue and HIV-AIDS policies should be able to improve relations between employers, employees and government through legislative transparency, non-discriminatory promotion of the right to work and proactive measures for the socio-professional integration of PLHIV. It is also recommended that at the community level, the general population be able to adopt pro-social behaviour.

REFERENCES

- Andrioni, F. (Coord.) (2011). *Information, counselling and professional guidance of people affected by the human immunodeficiency virus. Good practice guide*. Corvin Publishing House, Deva. [In Romanian].
- Budin. (2022). *Study on the stigma and discrimination of HIV patients. Medical Life*. [In Romanian].
- Dente, K., & Hess, J. (2006). Pediatric AIDS in Romania - a country faces its epidemic and serves as a model of success. *MedGenMed. Medscape General Medicine*, 8(2), 11. PMID 16926750; PMCID PMC 1785216. <https://pmc.ncbi.nlm.nih.gov/articles/PMC1785216/>
- Dojan, S. (2021). *HIV positive in Romania. Hospitals run out of medicine, trauma patients. "They told me they had no money"* [In Romanian]. <https://romania.europalibera.org/a/romania-hiv-lipsa-medicamente/31444527.html>
- Larion, M., & Dinu, E. (2021). The stigma of HIV/AIDS patients. *Brasov Medical Journal*, 2, 42-48. <https://doi.org/10.31926/jmb.2021.2.7>
- Mitran, A. (2025, 20 January). How accessible jobs are for people with HIV-AIDS. "There was a time when we looked at things more normally". *Adevărul Newspaper*. [In Romanian]. <https://adevarul.ro/stiri-interne/societate/cat-de-accesibile-sunt-locurile-de-munca-pentru-2415845.html>
- HIV-AIDS Legal Network. (n.d.). *Work and Education* [In Romanian]. <https://www.hivnet.ro/dezbateri/munca-si-educatie/>
- Pleşca, D. (1998). *HIV infection in children*. Bucharest: Amaltea Medical Publishing House. [In Romanian].
- Singer, M. (1994). The politics of AIDS. *Social Science & Medicine*, 38(10), 1321-1324. [https://doi.org/10.1016/0277-9536\(94\)90270-4](https://doi.org/10.1016/0277-9536(94)90270-4)

THE REFORM OF THE EUROPEAN SOCIAL MODEL IN THE CONTEXT OF GLOBALIZATION

**Alina Ligia DUMITRESCU, PhD, Senior Researcher,
Institute for World Economy, Bucharest, Romania,
<https://orcid.org/0009-0000-3983-2582>
alinaligia@gmail.com**

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.23>

UDC: 316.4(4)

JEL Classification: I31, I32, B55

Abstract. *The European Social Model is based on three principles that have guided Europe for centuries: freedom, equality, and fraternity. However, these principles are increasingly criticized, as a result of the changes that have occurred in industrialized societies in recent decades, through the restructuring of national economies, the increase in unemployment in the European Union, globalization and increased competition, the acceleration of technological innovation, political and economic changes in the countries of Central and Eastern Europe. These have led to the introduction of neoliberal ideas, which have had a hard impact on shaping the European Social Model in recent years. The presentation will focus on the analysis of the reform of the European Welfare Model and its rapid adaptation to changes necessary to respond to current economic and social problems. The research methodology is a multidisciplinary analysis of EU social and economic policies as well as Eurostat labour market indicators. Restructuring the European Social Model is essential for strengthening the European Union's position in the World economy and responding to the challenges of globalization.*

Keywords: *European Social Model, cohesion, solidarity, welfare, reform, globalization*

Introduction. The European Social Model is fundamentally defined by its commitment to integrating economic competitiveness with robust social protection and cohesion. Rather than viewing economic growth and social welfare as incompatible, this model asserts that the two can and must advance together. The *Lisbon Strategy*, adopted in 23-24 March 2000, encapsulates this principle by challenging the European Union to become the world's most competitive and dynamic knowledge-based economy while achieving full employment and enhanced social cohesion. This approach positions the EU as a paradigm for balancing prosperity with inclusiveness.

Perhaps one of the most complex definitions of the European Social Model can be found in the conclusions of the *Nice European Council* (7-9 December 2000), in Annex 1: "The European Social Model is characterised by a system of high social protection and is based on social dialogue and services of general interest, covering social cohesion activities".

Literature review. Although the European Social Model is often mentioned in the speeches of European politicians, there is no clear definition of it.

In Aiginger & Guger's (2005) view, the European Social Model can be defined as a way of assuming societal responsibility of society for the well-being of individuals. Aiginger & Guger (2005) have shown that the European Social Model is based on the *regulation of the labour market*, as well as on the *redistribution of wealth through the tax system*. Furthermore, they consider that the European Social Model has *two pillars: labour productivity and competitiveness and the education and knowledge process*. According to Alber (2006), there are four elements that characterise the European Social Model: a high level of social protection, social dialogue, social cohesion, and a set of common social values (solidarity and social inclusion).

Research methodology. The research is based on a multidisciplinary approach, which involves a systematic analysis of economic processes, of an empirical nature, as well as a qualitative research of European Commission documents. Both types of analysis are based on consulting specialized literature, studies and articles published by renowned authors from abroad and in the country, and on the analysis of official documents of the European Union institutions.

Main results. The European Union has opted for *four principles* as the basis for the European Social Model: (1) *social cohesion* - according to which all economic and social actions are directed towards a unitary benefit of all Member States; (2) *social inclusion* - implies the elimination of discrimination of any kind between Member States; (3) *social correlation* - requires the establishment of a link of interdependence between economic and social policy; (4) *social solidarity* - ensures support for less developed countries and regions of the European Union.

The European Social Model is based on the premise that the European Community accepts the public sector as a part of society that belongs to all residents by right, under the conditions that the public sector does not act for profit, but for the "*public good*". In this sense, the state serves as the guarantor of two community concepts: social cohesion and social inclusion. Social cohesion is a "purely European" concept, which implies the mutual assumption of responsibility for common well-being.

On the other hand, *social inclusion emerged as a response to the fight against poverty and social exclusion* and implies support for socially disadvantaged groups. In this way, the European Model of Social Welfare aims to respond to five universal problems: (1) controlling the massive growth of social spending, especially social assistance; (2) creating a system of incentives to find a job for every person able to work; (3) developing a mixed public/private system in social insurance; (4) decentralizing social services and increasing responsibilities at the local level; (5) increasing the degree of involvement of the private sector in the development of social programs and services.

Conclusions. In the near future, in the globalization context, we can speak of a "single European model of social welfare", which is advanced as a "third way". This involves a synthesis of the dimensions of the "welfare state" and a continuous adaptation to the economic and social changes of contemporary European society.

The transformation of the “welfare state” at the community level considers the *plurality of values, interests, structural differences between the Member States* of the European Union. To achieve this, the European Union aims to create social programs and activities that strengthen and stimulate the contribution of each Member State to the development of a “*common social policy*.”

REFERENCES

- Alber, J. (2006). The European Social Model and the United States. *European Union Politics*, 7(3), 393-419. <https://doi.org/10.1177/1465116506066272>
- Aiginger, K., & Guger, A. (2005). *The European Socio-Economic Model. Differences to the USA and Changes over Time*. WIFO Working Papers, 266. Austrian Institute of Economic Research. Vienn
- European Union (2025). *EUR-Lex*. <https://eur-lex.europa.eu/collection/eu-law/treaties/treaties-overview.html>

POST-WAR REPLENISHMENT OF UKRAINE'S HUMAN CAPITAL FOR ITS SOCIAL RESILIENCE

**Tatyana BURLAY, Dr. hab. (Economics), Leading Researcher,
Institute for Economics and Forecasting,
National Academy of Sciences of Ukraine, Kyiv, Ukraine**

btv2008@ukr.net

<https://orcid.org/0000-0003-4530-9151>

**Viktoriia BLYZNIUK, Dr. hab. (Economics), Corresponding Member of the
NAS of Ukraine, Institute for Economics and Forecasting,
National Academy of Sciences of Ukraine, Kyiv, Ukraine**

<https://orcid.org/0000-0003-2265-4614>

vikosa72@gmail.com

**Larysa HUK, PhD (Economics), Senior Researcher,
Institute for Economics and Forecasting,
National Academy of Sciences of Ukraine, Kyiv, Ukraine**

<https://orcid.org/0000-0002-0143-077X>

l_guk@ukr.net

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.24>

UDC: [331.101.262+316.4](477)

JEL Classification: A13, I31, J24, O15

Abstract. For over thirty years, Ukraine's global ranking on the Human Development Index (HDI) has been in a clear downward trend. The large-scale war with Russia has greatly exacerbated this negative trend due to significant human losses, many millions of internally displaced persons and refugees abroad, and socio-economic destruction. High losses of human capital are a strategic threat to Ukraine's post-war recovery and its social resilience. Therefore, the ways to replenish these losses were in the focus of the High-Level Ukraine Recovery Conference (July 2025, Rome). Given the above, the article purpose is to substantiate strategic directions and approaches for overcoming Ukraine's post-war deficit of human capital in order to strengthen its social resilience. The research is methodologically based on an interdisciplinary approach. Key findings relate to the socio-economic consequences of Ukraine's loss of human capital in the education and employment sectors; the identification of Triple Nexus and Social Quality approaches as optimal strategies for Ukraine's post-war social progress. Among the main conclusions of the scientific research is the urgent need for institutional changes to strengthen the interaction between the education sector and the labour market of Ukraine, aimed at overcoming the loss of Ukrainian human capital after the wartime.

Keywords: *sustainable development, societal threats, well-being, inclusion, social inequality, Ukrainian recovery, post-war challenges*

Introduction. The harsh military realities and tasks of post-war recovery of Ukraine objectively require strengthening its social and economic resilience. One of the effective ways to do this is to minimize and replenish the losses of national human capital caused by the full-scale war. Ukraine's position in the global ranking according to the integral HDI has a clear downward trend: from 47th place in 1991 to 78th in 2021 and to 100th place in 2024. High losses of human capital are a strategic threat to the post-war recovery of Ukraine and its long-term resilience. Therefore, ways to replenish these losses were discussed at the "Human Dimension" section of the Ukraine Recovery Conference on July 10–11, 2025 in Rome. The urgent task remains to substantiate strategic approaches for overcoming the post-war deficit of human capital in Ukraine.

Brief literature review. Basic research on human capital was conducted by Mincer (1958) and Becker (1964). The impact of education and science on human capital creation was substantiated by Blackburn et al. (2000). Shumska (2022) econometrically modelled long-term trends in Ukraine's human capital. Social and employment policy instruments for post-war replenishment of Ukrainian human capital losses were suggested by Koval & Vlasenko (2023).

Research methodology. The methodological basis of the study is an interdisciplinary approach, with an emphasis on the political economy and institutional methodology. The data from the Ukrainian State Statistics Service we used do not cover the temporarily occupied territories of Ukraine and its territories where hostilities were or are being conducted.

Main results. The severe consequences of the ongoing full-scale war, which has caused significant losses of Ukraine's human capital, are correlated with human casualties, destruction and damage to healthcare, education, science, population incomes, social services, labour migration and employment. Due to war shocks, following UNHCR, in 2025 12.7 million people living in the territories controlled by the Ukraine's Government will need humanitarian aid and social protection, and more than 5.6 million Ukrainians remain refugees abroad. The war also caused high labour losses in Ukraine. In line with estimates by the Institute for Economics and Forecasting of the NAS of Ukraine, the Ukraine's labour force in 2025 will decrease by 18.4% compared to the pre-war 2021 level. And this will further deepen the shortage of workers in the national labour market, which will hinder post-war reconstruction. In our opinion, the post-war recovery of Ukraine should be based on the principles of sustainable inclusive development, and also economic and social resilience. For this, it is advisable to use such approaches as the Humanitarian Aid–Development–Peace Nexus (Triple Nexus) and the Social Quality as optimal strategies for Ukrainian post-war progress (Burlai & Kostyrytsia, 2025). In order to overcome the deficit of national human capital, including labour resources, it is very important for Ukraine to implement policies aimed at: (i) reconstructive recovery of the housing sector, educational, healthcare and scientific institutions, social infrastructure; (ii) introduction of the European social quality approach in the public

governance system; (iii) measures that facilitate the transition of employees from informal to formal employment status; (iv) support of the return to the Motherland of Ukrainian refugees who currently live in host European and other countries.

Discussion and conclusions. Further discussion is required on the issues of interaction with relevant stakeholders aimed at replenishing national human capital, primarily with the government's social partners, with the most socially vulnerable groups, as well as with partners in the EU to strengthen Ukraine's capabilities as a candidate country. It would be useful to discuss relevant practices of other countries affected by large-scale military conflicts. The key findings of the study demonstrate the institutional necessity for post-war replenishment of Ukrainian human capital: *firstly*, post-war implementation of the Triple Nexus approach taking into account national specifics and the consequences of martial law; *secondly*, institutional reforms to strengthen the interaction of the education sector (vocational, higher and lifelong learning) and the domestic labour market; *thirdly*, introduction of a state strategy with a priority on long-term investment in national human capital; *fourthly*, a post-war revision of the Demographic Development Strategy of Ukraine for the period until 2040 and the operational plan for its implementation, adopted in 2024 (the still ongoing great war is constantly changing the demographic situation of Ukraine).

REFERENCES

- Becker, G. (1964). *Human Capital*. N.Y.: Columbia University Press.
- Blackburn, K., Hung, V. T. Y., & Pozzolo, A. F. (2000). Research, Development and Human Capital Accumulation. *Journal of Macroeconomics*, 22(2), 189-206. [https://doi.org/10.1016/S0164-0704\(00\)00128-2](https://doi.org/10.1016/S0164-0704(00)00128-2)
- Burlai, T., & Kostyrytsia, V. (2025). Ukraine's Post-War Solidarization Based on International and EU Approaches. *Economy and Sociology*, 1, 26-40. <https://doi.org/10.36004/nier.es.2025.1-03>
- Koval, O. P., & Vlasenko, R. V. (2023). A New Social Policy as a Way to Restore Human Capital. *Ukrainian Society*, 3(86), 126-136. [In Ukrainian]. <https://doi.org/10.15407/socium2023.03.126>
- Mincer, J. (1958). Investment in Human Capital and Personal Income Distribution. *Journal of Political Economy*, 66, 281-302.
- Shumska, S. (2022). Human Capital in the Global World and in Ukraine: Long-Term Trends and the Impact of COVID-19. *Economy and Society*, 44. <https://doi.org/10.32782//2524-0072/2022-44-80> [In Ukrainian].

AGE-BASED DISCRIMINATION IN LABOUR LAW: PROTECTING OLDER WORKERS IN THE CONTEXT OF EXTENDING WORKING LIFE

Alexandra TIGHINEANU, *PhD in law, Associate Professor,*
Academy of Economic Studies of Moldova
<https://orcid.org/0000-0002-3770-5501>
alexandra.tighineanu@ase.md

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.25>

UDC: 349.2-053.9

JEL Classification: J14, J78, J71, J26, K31

***Abstract.** Population aging and the extension of working life require a profound reevaluation of the role of older workers in the labour market. Rather than benefiting from recognition and professional stability, they increasingly face age-based discrimination - in the form of hiring refusals, restricted access to professional training, wage discrimination, or disguised dismissals. This article offers a critical analysis of the European and national legal frameworks concerning equal treatment in employment, with a focus on existing legal mechanisms for preventing and sanctioning age-based discrimination. It identifies legislative gaps and inconsistencies between anti-discrimination regulations and labour market policies. In parallel, the paper explores good practices from other European countries that promote “age-friendly workplaces” and intergenerational integration.*

***Keywords:** older workers, discrimination, labour market, age criteria, equal treatment*

Introduction. Population aging is one of the most significant social transformations of the 21st century, both in the member states of the European Union and in the Republic of Moldova. The European population is ageing rapidly due to increased life expectancy and declining birth rates. According to Eurostat, in 2024, the EU population on January 1, 2024, was estimated at 449.3 million people. Older people (aged 65 and over) accounted for 21.6%. In 2024, compared to 2023, the share of older people increased in 26 EU countries, while it decreased only in Malta. In 2024, approximately 17% of the population of the Republic of Moldova was aged 60+. According to data from the Labour Force Survey, in 2023, the number of economically active older persons (aged 60 and over) was 97,000, which represents 10.4% of the total economically active population and 16.2% of the total population in the same age group. In 2023, the employed population aged 60 and over numbered 95,000 people, representing 10.7% of the total employed population. The accelerated aging of the population, both in the European Union and in the Republic of Moldova, is transforming the labour market into a complex challenge that goes beyond the demographic dimension and calls for legal and economic solutions aimed at protecting older workers, adapting working conditions, and promoting continuous vocational training.

Literature review. Research on age-based discrimination in labour law highlights that it remains one of the most persistent forms of inequality in the contemporary labour market. At the European level, Directive 2000/78/EC establishes the legal framework for equal treatment in employment and occupation, including the prohibition of age discrimination; however, the literature shows that its practical implementation often remains limited and fragmented. Recent studies indicate that older workers are more vulnerable to dismissals, professional marginalisation, and exclusion from lifelong learning programmes (OECD, 2020; Eurofound, 2022). In the Republic of Moldova, the issue of age discrimination in employment relations is less addressed in the specialized literature compared to the European Union. However, the legal framework includes certain guarantees regarding equal treatment. Despite these legal provisions, Moldovan studies emphasize that law enforcement remains weak, case law on age discrimination is limited, and public policies on active aging and lifelong learning are still underdeveloped (Romandaş and Boişteanu, 2012). Therefore, similar to European trends, the Moldovan context reveals a discrepancy between the legal framework and its practical application, highlighting the need for more robust institutional mechanisms and integrated labour market policies to support older workers.

Research methodology. This study uses a qualitative and doctrinal approach to legal research, combined with elements of comparative analysis. The doctrinal method is used to examine the relevant national, European, and international legal framework governing age discrimination in employment. Similarly, the comparative method is used to identify the extent to which national regulations are aligned with European Union legislation in this regard, as well as to conduct a comparative analysis of regulations in different European countries on protection against age discrimination. The statistical method is also used to reflect statistical data (Eurostat reports, National Bureau of Statistics of Moldova, OECD, and ILO) in order to present the demographic and socio-economic realities underlying the extension of working life.

Main results. International and national legal regulations ensure equal rights in the labour market for older workers in the context of extending working life, but nevertheless, age discrimination in this regard persists. Given that Moldovan labour legislation is aligned with European Union requirements, the Moldovan Labour Code contains a series of provisions relating to the employment of older persons: Article 8 stipulates: "Any direct or indirect discrimination against employees on the basis of sex, **age**, race, skin color, ethnicity, etc. is prohibited.". Article 183 provides for the preferential right to remain in employment in the event of redundancies due to staff reductions for employees who have no more than **five years left until reaching retirement age**. However, the labour legislation of the Republic of Moldova provides for certain restrictions regarding older persons, more specifically those who have reached retirement age. Art. 55, paragraph 1, letter f provides that an individual employment contract may be concluded for a fixed term "f) with **retired persons**, in accordance with the legislation in force, due to age or length of service and who are not employed - for a period of up to 2 years, which, upon expiry, may be extended by the parties.". Article 86 of the Labour Code provides grounds for

termination of an individual employment contract at the employer's initiative: "y1) the employee's status as a pensioner due to reaching the age limit."

Discussion and conclusions. In light of the above, we believe that protecting older workers requires a complex approach that goes beyond simply prohibiting discrimination by law. This requires certain actions, including:

- Continue to harmonize the national regulatory framework with the requirements of European directives and the case law of the Court of Justice of the European Union.
- Develop and implement retraining and vocational training programs for people over 50;
- Encouraging an inclusive organizational culture, in which age diversity is seen as an asset for the transfer of knowledge and experience;
- Involving social partners and civil society in the development of policies and strategies on active aging and combating age discrimination.

REFERENCES

- International Labour Organization (ILO). (2025). *Demographic situation in 2024*. https://statistica.gov.md/en/demographic-situation-in-2024-9696_61837.html
- International Labour Organization (ILO). (1958). *Discrimination (Employment and Occupation) Convention: no. 111, June 25*. https://normlex.ilo.org/dyn/nrmlx_en/f?p=NORMLEXPUB:12100:0::NO::P12100_Ilo_Code:C111
- National Bureau of Statistics of the Republic of Moldova (2023). *Elderly population in the Republic of Moldova in 2023*. https://statistica.gov.md/en/elderly-population-in-the-republic-of-moldova-in-2023-9578_61476.html
- Labour Code of the Republic of Moldova: no. 154 of March 28 2003. (2003). *Official Gazette of the Republic of Moldova*, 159-162, art. 648. https://www.legis.md/cautare/getResults?doc_id=113032&lang=ro
- Law of the Republic of Moldova on Equality: no. 121 of May 25 2012. (2012). *Official Gazette of the Republic of Moldova*, 103, art. 355. https://www.legis.md/cautare/getResults?doc_id=144449&lang=ro#
- Romandaş, N., & Boişteanu, E. (2012). Some reflections on prohibiting discrimination in the workplace and ensuring equal rights for all employees. *National Institute of Justice Review*, 4(23), 43-48. [In Romanian]. <https://www.inj.md/sites/default/files/17/2.%20Unele%20reflectii%20privind%20interzicerea%20discriminarii.pdf>

REGIONAL DISPARITIES OF THE NEET YOUTH RATE IN ROMANIA

Mariana BĂLAN, *PhD in mathematics and economics,*
Hyperion University of Bucharest, Romania

<https://orcid.org/0000-0003-4326-4826>

dr.mariana.balan@gmail.com

Carmen UZLĂU, *PhD in law and economics,*
Institute for Economic Forecasting,
Romanian Academy, Bucharest, Romania

<https://orcid.org/0000-0002-3033-9318>

carmen_uzlau@yahoo.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.26>

UDC: 316.346.32-053.6(498)

JEL Classification: C42, E24, I20, J21, J82, R11, R12, R23

Abstract. *The issue of young Romanians in the NEET category is a particularly sinuous one, with a vast range of nuances and a sufficiently consistent casuistry. In Romania, the interest for this category of population is even greater, because the share of NEET youth is the highest in the EU-27: 19.4% in 2024. Economic disparities in Romania's development regions are also compatible with other dimensions of inequality, such as life expectancy, employment and unemployment rates, schooling, private and public material resources. All this leads to relatively large differences between regional NEET youth rates, across different age groups. The paper presents a brief analysis of the NEET youth group evolution at the level of the development regions of Romania. Regional disparities of NEET youth rates have been quantified by using statistical methods. The obtained results confirm the negative trends in terms of increasing regional disparities of this population segment in Romania and allow to highlight their determinants.*

Keywords: *young NEET, risk factors, regional disparities, vulnerabilities*

Introduction. In the current context, the transition of young people to adulthood is becoming increasingly complex (as structural determinants change rapidly, traditional social structures are dismantled and individual choices are accentuated).

Economic circumstances and competition on the labour market, at national level, in general and in the development regions in particular, have an impact on the NEET rate, the lack of employment opportunities being the main factor contributing to its growth.

According to Eurostat statistics, all regions in Romania have a very high NEET rate. In 2024, in three of them, the values of this indicator exceeded 25 %.

The paper aims to use a sample of economic indicators selected at the level of the eight development regions of Romania and statistical methods for quantifying regional disparities in terms of young NEETs in the 15-29 age group.

Literature review. The non-linearities in the youths' transition path to adult life are usually seen as dysfunctions that negatively affect the well-being of both individuals and the society. This phenomenon manifests itself differently in different societal circumstances (e.g., Cieslik, Barford and Vira 2022; O'Higgins et al., 2023).

The issue of regional disparities in relation to the NEET youth rate, of reducing the inequalities between them, has been addressed in the recent years in few studies and specialized papers.

The regional dimension of unemployment was first examined by Blanchard and Katz (1992). Others analyse the presence of different patterns in both youth unemployment and NEET rates in groups of regions before and after the Great Recession, concluding that the persistence of youth unemployment and young NEETs varies according to macroregions.

The identification and quantification of regional inequalities have also been carried out using various mathematical-statistical methods: Gini coefficient and the Lorenz curve, variance coefficients, standard deviation, the Theil index, the Atkinson index, beta-convergence, the '3 Sigma' rule, the principal component method, the method of distances between regions in abstract metric space, the Herfindahl-Hirschman index, the concentration coefficient, and the coefficient of absolute structural changes (Zaman, Goschin and Vasile, 2013).

Research methodology. Various statistical methods were used to quantify regional disparities of NEET rate: the relative distances method, the Gini coefficient, Lorenz curve and the tail index.

Main results. The aggregation of regional disparity indices corresponding to GDP per capita and a set of labour market indicators (employment rate, NEET rate and job vacancy rate), along with other macroeconomic indicators (early school dropout rate, youth external migration, relative poverty rate), into a composite average index allowed for a better ranking of regions in terms of existing inequalities at a given moment, as well as their evolution over time, which can help explain the circumstances under which some young people may fall into the NEET category.

The use of the Gini index to highlight inequalities between regions in terms of NEET youth distribution showed that for the period 2019-2024, it has an oscillating variation, but with a slightly upward general trend, which can be considered by some specialists a negative phenomenon, and for others a normal phenomenon for an emerging economy, such as that of Romania.

The analysis of regional disparities regarding the evolution of the NEET youth number using the Lorenz curve revealed that the differences in the regional NEET rate became more prominent as a result of the health crisis.

The interdependence of the regional GDP – NEET population aged 15-29 analysed with the help of Theil index showed an oscillating evolution hereof in the period 2015-2023. The increasing level of the Theil index after 2020 indicates that the degree of divergence between regions accentuated in terms of the variables considered.

Discussion and conclusions. The results of using different statistical methods to estimate disparities of the NEET rate of youth aged between 15-29 at the level of the development regions of Romania indicate an upward trend of territorial inequalities during 2019-2023, with some deviations by subperiods, depending on the evolution of the regional economy and the consequences of the health crisis.

The differences in the NEET rate at the level of the development regions of Romania are also interdependent on the regional socio-economic and geographical disparities, the process of reducing the regional gaps of the NEET rate being a long one and achieved taking small steps.

REFERENCES

- Blanchard, O. J., & Katz, L. F. (1992). Regional evolutions. *Brookings Papers on Economic Activity*, 23, 1, 1-76. https://econpapers.repec.org/article/binbpeajo/v_3a23_3ay_3a1992_3ai_3a1992-1_3ap_3a1-76.htm
- Cieslik, K., Barford, A., & Vira, B. (2022). Young People Not in Employment, Education or Training (NEET) in sub-Saharan Africa: Sustainable Development Target 8.6 Missed and Reset. *Journal of Youth Studies*, 25 (8), 1126-1147. <https://doi.org/10.1080/13676261.2021.1939287>
- Eurostat. (n.d.). *Statistici Eurostat*. <https://ec.europa.eu/eurostat>
- Institutul Național de Statistică al României (INS). (n.d.). *Baza de date statistice TEMPO*. <http://statistici.insse.ro/tempoins/>
- O'Higgins, N., Barford, A., Coutts, A., Elsheikhi, A., Caro, L. & Brockie, K. (2023). How NEET Are Developing and Emerging Economies? What Do We Know and What Can Be Done about It? Chapter 3. In: *Global Employment Policy Review 2023. Macroeconomic Policies for Recovery and Structural Transformation* (pp. 53-81). Geneva: International Labour Organization. https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@ed_emp/documents/publication/wcms_882222.pdf
- Zaman, G., Goschin, Z., & Vasile, V. (2013). Evoluția dezechilibrelor teritoriale din România în contextul crizei economice. *Romanian Journal of Economics*, 37, 2(46). 20-39. <https://ideas.repec.org/a/ine/journl/v2y2013i44p20-39.html>

INEQUALITY INDICATORS: FROM GINI TO ATKINSON AND PALMA

Ecaterina HEGHEA, *PhD in economics,*
National Institute for Economic Research,
Academy of Economic Studies of Moldova,
<https://orcid.org/0000-0002-7677-8295>
heghea.ecaterina@ase.md

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.27>

UDC: 330.564.2(478)

JEL Classification: D31, I32, C43

Abstract. *This paper explores the theoretical and methodological framework of income inequality indicators, emphasizing their relevance for assessing socioeconomic disparities in the Republic of Moldova. As the country experiences deepening stratification due to market transitions, the need for robust statistical tools becomes increasingly important. The study aims to analyze and systematize the principal indicators used to quantify inequality, including the Gini coefficient, Lorenz curve, Atkinson index, Palma ratio, Theil index and income ratios by quintiles and deciles. These indicators reflect various dimensions of inequality and offer complementary perspectives for policy design. The methodological approach combines theoretical analysis with a critical evaluation of empirical applications, particularly in the Moldovan context. The paper discusses the benefits and limitations of each indicator, highlighting how methodological choices can influence the interpretation of inequality dynamics. Results demonstrate that reliance on a single metric may obscure important aspects like polarization and distributional asymmetries. By integrating complementary measures, such as decomposition techniques and sensitivity to income distribution tails, the study provides a more nuanced understanding of inequality. This work contributes to the refinement of inequality measurement systems and supports the development of evidence-based policies aimed at reducing income disparities and promoting inclusive socioeconomic development. The article was elaborated within the Project selected in competition "Stimulating excellence in scientific research 2025-2026" 25.80012.0807.37SE "The perfection of instruments for reducing income inequality and reducing poverty of the population in the process of European integration of the Republic of Moldova", institutional funding, ANCD.*

Keywords: *income inequality, Gini coefficient, Atkinson index, Palma ratio, Theil index, Lorenz curve, income distribution, Republic of Moldova*

Introduction. Income inequality remains one of the central challenges for both developed and transition economies. In the Republic of Moldova, socioeconomic transformation has generated structural opportunities while also producing significant disparities in income distribution. As market reforms advanced, the need

for precise tools to measure and interpret inequality became evident. Traditional indicators such as the Gini coefficient and the Lorenz curve provide valuable insights but often overlook polarization, sensitivity to distribution tails, or wealth concentration at the top. A multidimensional approach that integrates complementary indicators is therefore essential for a comprehensive understanding of inequality and for designing effective redistributive policies.

Literature review. Recent research explores more rigorous and varied ways to measure income inequality, particularly emphasizing the methodological robustness of inequality indicators. Kim (2024) criticizes conventional indicators, showing that measurement errors and assumptions can lead to misleading conclusions about inequality trends. Complementing this, Trapeznikova (2019) offers a detailed comparison of Gini, Palma, Theil, Lorenz and highlights how each responds differently to changes at various parts of the income distribution. Evidence from UNCTAD (2023) demonstrates that financial inclusion can mitigate both wealth and income disparities, while in developing countries the impact is less consistent. Alternative metrics are also emerging: Kvålseth (2025) proposes a ranking-based inequality measure which improves sensitivity to extremes of the distribution. Studies of digitalisation show that access to technology and financial services interacts with economic uncertainty in complex ways, altering how inequality evolves (Jamil, Law, Khair-Afham et al., 2023). Taken together these studies suggest that a diversified measurement framework, combining traditional indices with such newer alternatives, offers more nuanced insights, especially important for transition economies such as Republic of Moldova.

Research methodology. The methodological framework of this paper relies on a comparative and analytical approach. The study applies both theoretical systematization and empirical evaluation of inequality indicators such as the Gini coefficient, Lorenz curve, Atkinson index, Palma ratio, Theil index, and income ratios by quintiles and deciles. Data are drawn from international reports (World Bank, OECD, UNCTAD) and national statistics, with a focus on Republic of Moldova as a case study of a transition economy. The approach highlights not only the technical features of each indicator but also their policy relevance, allowing for a comprehensive assessment of their capacity to capture income distribution dynamics.

Main results. The analysis shows that different inequality indicators capture distinct aspects of income distribution. The Gini coefficient remains widely used, but it is less sensitive to extremes of the distribution. The Lorenz curve adds a visual dimension, yet does not provide sufficient analytical detail on its own. The Atkinson index, by incorporating inequality aversion, is particularly relevant for evaluating welfare implications in societies with high poverty risk. The Palma ratio highlights polarization by comparing the richest 10% and the poorest 40%, offering a clearer view of top-heavy concentration. The Theil index allows decomposition of inequality into within-group and between-group components, which is crucial in Republic of Moldova where rural-urban and sectoral divides are strong. Quintile and decile ratios remain simple but effective tools for illustrating disparities in public debates. Applied to Republic of Moldova, these measures reveal consistent patterns

of inequality: rural households earn less than urban households, property ownership significantly increases household welfare, and informal economic activity undermines both accurate measurement and the efficiency of redistribution. The results underline that inequality is not only a market outcome but also a product of institutional and structural weaknesses.

Discussion and conclusions. Findings confirm that a single indicator cannot fully describe complexity of income inequality. Republic of Moldova requires a multidimensional monitoring framework that combines classical and newer measures. Gini remains important for comparability, but indices such as Palma, Atkinson, and Theil provide more policy-relevant insights. Addressing inequality also demands institutional reforms. Redistributive mechanisms must be strengthened, access to education and healthcare expanded, and regional gaps reduced. At the same time, policies that encourage formalization of employment and financial inclusion could improve equity and sustainability. In conclusion, adopting complementary inequality indicators and aligning them with targeted policies can help Republic of Moldova move toward more inclusive development and stronger social cohesion.

Acknowledgments: The article was elaborated within the Project selected in competition "Stimulating excellence in scientific research 2025-2026" 25.80012.0807.37SE "The perfection of instruments for reducing income inequality and reducing poverty of the population in the process of European integration of the Republic of Moldova", institutional funding, ANCD.

REFERENCES

- Jamil, M., Law, S. H., Khair-Afham, M., Trinugroho, I. (2023). Financial inclusion and economic uncertainty in developing countries: The role of digitalisation. *Economic Analysis and Policy*, 79, 786-806. <https://doi.org/10.1016/j.eap.2023.06.039>
- Kim, Y., Park, J., & Ju A.-J. (2024). New approach to measuring income inequality. *Heliyon*, 10(4), e26482. <https://doi.org/10.1016/j.heliyon.2024.e26482>
- Kvålseth, T. O. (2025). Rank-based inequality measures: an alternative to Gini's index. *International Review of Economics*, 72(2), 1-19. <https://doi.org/10.1007/s12232-024-00481-8>
- Osakwe, P. N., & Solleder, O. (2023). *Wealth distribution, income inequality and financial inclusion: A panel data analysis*. UNCTAD Working Paper 4. Geneva: UNCTAD. https://unctad.org/system/files/official-document/wp-2023d3-no4_en.pdf
- Trapeznikova, I. (2019). Measuring income inequality. *IZA World of Labor*, 462, 1-10. <https://wol.iza.org/articles/measuring-income-inequality/long>

UNDERSTANDING INCOME DIFFERENTIATION: A SOCIO-ECONOMIC PERSPECTIVE ON MOLDOVA

Iulia GARABAJII, *Scientific researcher,*
National Institute for Economic Research,
Academy of Economic Studies of Moldova,
<https://orcid.org/0009-0000-9634-6281>
garabajii.iulia@ase.md, iuliagarabajii@gmail.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.28>

UDC: 330.564.2(478)

JEL Classification: D31, I32, J31

Abstract. *This study explores the multifaceted nature of income inequality in the Republic of Moldova, analyzing the structural and individual factors that influence the distribution of monetary and non-monetary income. The research highlights the growing concern over inequality as a driver of social instability and economic inefficiency. The primary objective is to identify and classify the determinants of income differentiation by grouping them into systemic and individual factors. These include economic, political, demographic, social, professional, and psychological influences. The methodology consists of an analytical review of theoretical frameworks and empirical data, structured according to established economic classifications. Key findings indicate that income inequality is shaped not only by productivity and property ownership, but also by institutional asymmetries, unequal access to education, and unequal bargaining power in labour markets. Furthermore, factors such as urban-rural residence, family structure, and informal economies exacerbate disparities. The study concludes that while certain drivers of inequality may be inherent to market dynamics, many are institutional and policy-driven. Effective mitigation therefore requires targeted policy reforms, improved redistributive mechanisms and support for equal opportunities. This comprehensive approach is essential to ensuring inclusive development and social cohesion in Moldova. The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.*

Keywords: *income inequality, Republic of Moldova, social stratification, economic factors, redistribution, structural disparities*

Introduction. The issue of income differentiation in the Republic of Moldova is deeply intertwined with the country's social and economic transformation. The transition from a centrally planned to a market-oriented system has generated new opportunities, but also created pronounced disparities between groups of population. While income inequality is a universal phenomenon, in Republic of Moldova its scale and persistence are influenced by structural imbalances, institutional weaknesses and the slow pace of the middle-class consolidation. Social cohesion is

thus fragile, as disparities between urban and rural areas, between educated and less educated groups and between those with or without property ownership remain strong.

Literature review. Recent literature emphasizes that income inequality is shaped by both structural and institutional dynamics. World Bank (2024) introduced a new inequality indicator, highlighting that within-country disparities above a Gini threshold of 40 undermine poverty reduction and social cohesion. Gradin (2024) shows that despite some stabilization of relative inequality, absolute income gaps have continued to expand globally due to rising capital shares and technological change. The role of education is particularly important: OECD (2024) data reveal persistent rural-urban and socioeconomic divides in Eastern partnership countries, including Republic of Moldova, which translate into unequal income opportunities. Financial inclusion has also emerged as a determinant, as unequal access to banking and credit services exacerbates poverty and restricts mobility (Ali et al., 2023). Overall, the literature points to a multidimensional understanding of inequality, where education, financial inclusion, institutional effectiveness and redistribution policies interact to shape income differentiation.

Research methodology. The study is based on an analytical review of theoretical frameworks and empirical evidence on income inequality, with a focus on Republic of Moldova in the broader context of transition economies. The methodology applies a classification of determinants into systemic factors, such as macroeconomic performance, fiscal and redistributive policies, demographic dynamics, institutional quality and spatial disparities and individual factors, including education, skills, property ownership, labour productivity and risk preferences. Secondary data from international reports and national statistics are combined with comparative insights from recent studies on Eastern Europe to highlight both universal drivers of inequality and Moldovan specific patterns. This approach allows for identifying structural asymmetries while contextualizing them within global debates on inclusive growth and social cohesion.

Main results. The findings indicate that income differentiation in the Republic of Moldova reflects a combination of structural distortions, demographic pressures, and institutional weaknesses. Wage disparities persist across sectors and regions, often disconnected from productivity and skill levels, suggesting that institutional asymmetries play a central role in shaping earnings. Property ownership continues to act as a key determinant of long-term inequality, with asset concentration allowing some households to accumulate wealth while others remain trapped in poverty. Educational and healthcare inequalities further deepen disparities in income opportunities, with rural households facing limited access to services and higher exposure to vulnerability. The prevalence of informal economic activities undermines official redistribution mechanisms, reducing the effectiveness of taxation and social transfers. Overall, the results demonstrate that inequality in Moldova is not only market-driven but also shaped by institutional inefficiencies and uneven policy implementation.

Discussion and conclusions. The persistence of income inequality in the Republic of Moldova highlights the multidimensional nature of the problem.

Structural factors such as demographic dependency, regional divides, and labour market distortions interact with individual-level determinants including education, skills, and household composition. Institutional asymmetries, manifested through weak redistributive capacity and limited governance effectiveness, amplify these dynamics, preventing equitable income distribution. Addressing inequality therefore requires a comprehensive policy approach that strengthens the fiscal and social protection systems, expands access to education and healthcare and supports regional development. At the same time, investments in human capital and financial inclusion can provide vulnerable groups with the means to improve their income prospects. The consolidation of a strong middle class, through fair wages and secure employment opportunities, is essential for enhancing social cohesion and long-term stability. In conclusion, reducing income differentiation in Republic of Moldova depends not only on economic growth but on the effectiveness of policies that promote equity, opportunity, and inclusive development.

Acknowledgments: The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.

REFERENCES

- Gradín, C. (2024). Revisiting the trends in global inequality. *World Development*, Elsevier, 179(C), 106607. <https://www.sciencedirect.com/science/article/pii/S0305750X24000779?via%3Dihub>
- Haddad, C. N., Mahler, D. G., Diaz-Bonilla, C., Hill, R., Lakner, C., & Lara Ibarra, G. (2024). *The World Bank's new inequality indicator: The number of countries with high inequality*. World Bank Policy Research Working Paper 10796, 1-22. <https://documents1.worldbank.org/curated/en/099549506102441825/pdf/IDU-bd155bac-6d78-43af-8833-f87564a9d6c8.pdf>
- Shah, S. M. & Ali, A. (2023). *Macro Dimensions of Financial Inclusion Index and its Status in Developing Countries*. MPRA Paper 118036, 1-20. University Library of Munich. <https://mpra.ub.uni-muenchen.de/118036/1/Final%20Paper1Shah-Ali.pdf>
- World Bank. (2024). *Poverty, Prosperity, and Planet Report 2024: Pathways Out of the Polycrisis*. Washington, DC: World Bank. <https://doi.org/10.1596/978-1-4648-2123-3>

STATE REGULATION OF PROCESSES AIMED AT REDUCING INCOME INEQUALITY IN THE REPUBLIC OF MOLDOVA

Anatolii ROJCO, *PhD in economics, Associate Professor, Researcher, National Institute for Economic Research, Academy of Economic Studies of Moldova,*
<https://orcid.org/0000-0003-2089-696X>
rojco@mail.ru

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.29>

UDC: 330.564.2(478)

JEL Classification: D63, H23, H24, I38

Abstract. *The actuality of the article is determined by the fact that income inequality is one of the most serious problems in the Republic of Moldova, which requires state regulation of processes in this area. The purpose of the article is to develop a set of measures aimed at reducing income inequality among the population of the Republic of Moldova. This goal is achieved through methodological approaches that, on the one hand, involve increasing the incomes of low-income population groups and, on the other hand, redistributing high and very high incomes from wealthy groups. Research results. Measures have been developed to reduce income inequality among the population. These include: a) increasing the minimum wage by aligning it with EU standards. It is proposed to gradually increase the minimum wage to reach 50% of the average monthly wage in the national economy; b) increasing pension amounts by improving the pension system. In particular, it is recommended to modernize the indexation coefficient to reflect not only the depreciating effect of consumer price index growth but also the growth in average wages in the economy; c) improving the personal income taxation system. It is proposed to: i) increase the amount of personal tax exemption and introduce tax deductions for medical treatment and education; ii) replace the current flat tax system with a progressive taxation scale. The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.*

Keywords: *income inequality, state regulation, minimum wage, indexation coefficient, tax scale, tax deductions*

Income inequality is one of the most pressing socioeconomic challenges in the Republic of Moldova. A high level of inequality is evidenced by the fact that in 2024, the 10% least affluent people possessed only 2.8% of the total income of the entire population, whereas the 10% most affluent people accumulated 26.4% of all income (NBS, 2025). This situation underscores the objective need for state regulation of income differentiation in the Republic of Moldova.

Methodological approaches to regulating income inequality envisage implementing measures that, on the one hand, support the most vulnerable social

groups and, on the other, curb the growth of incomes among the economically strongest groups. In this context, state regulation aimed at reducing income differentiation should be based on a comprehensive set of measures to increase the incomes of low-income groups within the social protection system, while also redistributing high and very high incomes from affluent segments of the population. As international experience shows, the most significant impact on reducing income inequality comes from measures to raise the incomes of low-income groups. Such measures should target two fundamentally different categories of the population: those who are economically active and those who are not.

For low-income, economically active individuals, it is necessary to develop measures that ensure stable employment and increase the minimum wage.

Targeted incentives for employment should enhance job opportunities for the unemployed who require additional support, particularly persons with disabilities, pre-retirement and retirement-age individuals, and youth under 18, through the introduction of job quotas.

In the Republic of Moldova, raising the minimum wage should be guided by the regulatory experience of EU countries. In these countries, according to the European Social Charter, the minimum wage is set as a percentage of the average wage. To prevent excessive income differentiation, the European Committee of Social Rights recommends that the minimum wage should be at least 60% of the national average wage.

In the Republic of Moldova, as of January 1, 2025, the minimum monthly wage has been set at 5,500 MDL (HG 846/2024), representing 37.7% of the average monthly wage in the national economy for the first quarter of 2025 (14,567.5 MDL). To meet EU standards in this area, it is advisable to gradually increase the minimum wage to 50% (and subsequently to 60%) of the national average wage.

For economically inactive individuals who cannot provide for themselves and require social protection, primarily pensioners, whose numbers are increasing due to population aging, it is necessary to adopt a set of special measures. This includes continuing the practice of raising the minimum old-age pension (from April 1, 2025 – 3,055 MDL). It is recommended to modernize the pension indexation coefficient so that it reflects not only inflationary effects from the Consumer Price Index but also growth in the average wage. Moreover, indexation should apply only to pensions not exceeding the national average wage. The creation of a voluntary, supplementary private pension system, complementing state pensions, should also be considered.

To improve the material well-being of needy families, the following measures are advisable:

- strengthening the targeting of social assistance by providing benefits exclusively to families in genuine need;
- introducing food vouchers for large families.

State regulation aimed at reducing income differentiation involves the redistribution of high and very high incomes of affluent individuals, to be achieved through *the improvement of the personal income taxation system*.

Since October 1, 2018, the Republic of Moldova has applied a flat personal income tax rate of 12% on annual taxable income, regardless of its amount. While

this system has certain advantages (simplicity of administration and improved tax collection), it does not facilitate increased taxation of high personal incomes for redistribution purposes. Therefore, to reduce excessive income inequality, it is advisable to replace the flat tax with a progressive personal income tax system aligned with the principle of social justice.

An important element of the personal income tax system is determining the level of the non-taxable personal allowance. International experience shows that if the non-taxable allowance is lower than the subsistence minimum, it contradicts the principles of social justice. In 2024, in the Republic of Moldova, the non-taxable monthly allowance was 2,475 MDL – 697.6 MDL (or 22.0%) less than the subsistence minimum for a working-age person (2,963.8 MDL). Therefore, it is necessary to gradually increase the non-taxable allowance to match the subsistence minimum for a working-age person. This measure would help reduce the post-tax income gap between high- and low-paid categories.

In addition, it is recommended to:

- increase the child tax allowance, gradually bringing it closer to the subsistence minimum for children of the relevant age;
- introduce deductions for expenses on medical treatment and education, alongside developing a mechanism for implementing this approach.

Acknowledgments: The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.

REFERENCES

Hotărârea Guvernului Republicii Moldova privind stabilirea cuantumului salariului minim pe țară pentru anul 2025: nr. 846 din 18-12-2024. *Monitorul Oficial al Republicii Moldova*, 533-535, art. 967.

National Bureau of Statistics (NBS). (2025). *Aspects of the standard of living of population of the Republic of Moldova* (Results of the Household Budget Survey). Chisinau: BNS.

https://statistica.gov.md/files/files/publicatii_electronice/aspecte_nivelul_trai/Publicatia_CBGC_editia_2025.pdf

SUBJECTIVE WELL-BEING IN EU COUNTRIES: EXPLORING ECONOMIC AND SOCIAL DRIVERS

**Maria KOMPANEETS, PhD in economics, Associate Professor,
Moldova State University**

<https://orcid.org/0009-0006-4067-3025>
maria.kompaneets@usm.md

**Ludmila GOLOVATAYA, PhD in economics, Associate Professor,
Moldova State University**

<https://orcid.org/0009-0003-9361-4553>
ludmila.golovataia@usm.md

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.30>

UDC: 330.59(4)

JEL Classification: C01, E01, F63, I3

Abstract. *The aim of this study is to analyze the role of economic factors in shaping subjective well-being across the countries of the European Union. The authors employed correlation analysis to examine the relationship between GDP per capita (adjusted for purchasing power parity) and the Happiness Index. The analysis was based on data from the World Happiness Report 2025 and GDP per capita (PPP) for the year 2024. Spearman's rank correlation coefficient was calculated, yielding a statistically significant result of $r = 0.779$. The findings indicate that GDP plays a substantial—though not exclusive—role in influencing individuals' perceptions of happiness. The results support the hypothesis that economic factors are critical to subjective well-being only up to a certain threshold. Beyond this point, non-material dimensions—such as health, a sense of security, social connections, institutional trust, and other aspects of quality of life—become increasingly important. Thus, subjective well-being is a multifaceted construct that cannot be fully explained by economic indicators alone. Enhancing overall life satisfaction in society requires an integrated approach that takes into account both material and non-material factors.*

Keywords: *happiness economy, subjective well-being, GDP per capita, life satisfaction, quality of life, correlation analysis*

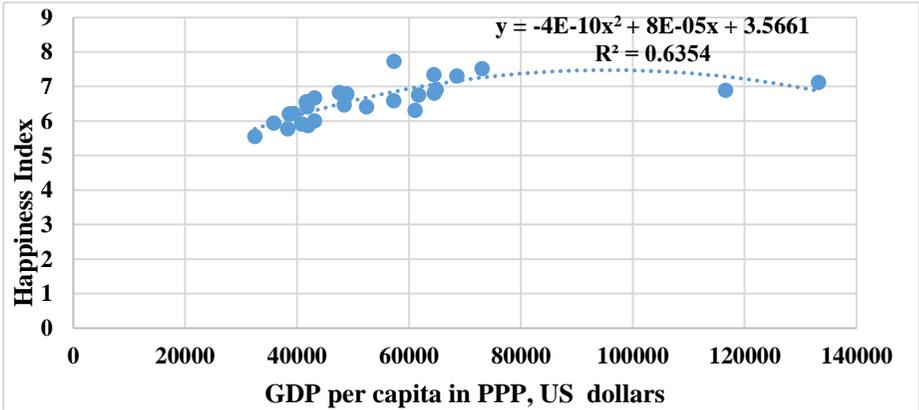
Introduction. The issues of improving quality of life and human well-being are the subject of research across various branches of scientific knowledge. The emergence of a distinct interdisciplinary field at the intersection of economics, psychology, and sociology has become known as the economics of happiness. This approach enables the assessment of a country's attractiveness in terms of life satisfaction. Since the concept of happiness is based on individuals' subjective evaluation of their own economic and social status, it is particularly important to determine the role of each component in achieving life satisfaction.

Literature review. The economics of happiness as a scientific field has been actively developing since the late 20th century. Its origins are commonly associated with the work of R. Easterlin and colleagues, who formulated the so-called Easterlin Paradox (Easterlin, 1974). Subsequently, numerous scholars confirmed the hypothesis of a positive correlation between economic wealth and perceived well-being (Layard, 2005; Rustichini & Proto, 2014). Since 2012, annual studies of happiness levels have been published in the World Happiness Report, reflecting the role of various variables in shaping the Happiness Index.

Research methodology. In this study, indicators characterizing life satisfaction and economic well-being for European Union countries in 2024 were examined and analyzed. Correlation analysis methods were applied, and Spearman’s rank correlation coefficient was calculated for the relationship between GDP per capita and the Happiness Index.

Main results. In the global happiness ranking, EU countries generally occupy relatively high positions. Among the top five happiest countries in 2025, four are EU members, with Finland recognized as the leader for the eighth consecutive year. To assess the influence of the economic component on residents’ perception of well-being in the EU, the authors analyzed the relationship between GDP per capita (PPP, 2021 USD) and the Happiness Index using a second-order polynomial regression (*Figure 1*).

Figure 1. The relationship between GDP per capita (based on purchasing power parity) and the happiness index in EU countries (2025)



Source: compiled by the authors based on

<https://tradingeconomics.com/country-list/gdp-per-capita-ppp?continent=Europe>,
<https://worldhappiness.report/ed/2025/>.

It is important to note the nonlinear nature of the relationship between economic wealth and subjective happiness. At lower levels of GDP per capita, increases contribute to a substantial rise in the Happiness Index. However, at higher GDP levels, the growth rate of subjective well-being slows, indicating a diminishing returns effect and illustrating the Easterlin Paradox. This suggests that economic factors are important for happiness only up to a certain threshold, beyond which non-

material aspects of quality of life play a larger role. The graph shows a second-order polynomial regression curve with a coefficient of determination $R^2 = 0.6354$, reflecting a moderately strong relationship between the variables and the saturation effect at high GDP levels. Thus, approximately 63.5% of the variation in subjective well-being can be explained by economic wealth. This indicates a substantial, though not exclusive, role of GDP as a factor influencing residents' perception of happiness. The influence of non-economic factors (36.5%) —such as social relationships, freedom of choice, trust in institutions, education, health, and others—is also significant for EU countries.

Discussion and conclusions. For EU countries, it is characteristic that beyond approximately \$60,000–\$80,000, further increases in GDP per capita do not lead to a significant rise in happiness. This finding supports several concepts in behavioral economics and well-being research. Thus, although economic wealth plays a significant role in shaping subjective well-being for EU residents, the concept of happiness should not be reduced solely to material conditions. A comprehensive approach that also takes non-material aspects into account is necessary to enhance overall life satisfaction in society.

REFERENCES

- Easterlin, R. A. (1974). Does economic growth improve the human lot? Some empirical evidence. In: P. A. David, & M. W. Reder (Eds.), *Nations and households in economic growth: Essays in honor of Moses*, 89-125. <https://www.sciencedirect.com/science/article/abs/pii/B9780122050503500087>
- Layard, R. (2005). Happiness: Lessons from a new science. *Penguin Press. Foreign Affairs*, 84(6). https://www.researchgate.net/publication/30529548_Happiness_Lessons_From_A_New_Science
- Rustichini, A., & Proto, E. (2014). *GDP and life satisfaction: New evidence*. https://cepr.org/voxeu/columns/gdp-and-life-satisfaction-new-evidence?utm_source
- Trading Economics. (2024). *GDP per capita PPP by country – Europe*. <https://tradingeconomics.com/country-list/gdp-per-capita-ppp?continent=Europe>
- World Happiness Report*. (2025). <https://worldhappiness.report/ed/2025/>

IN-WORK POVERTY AMONG YOUTH IN MOLDOVA

Svetlana RUSU, *PhD in economics,*
National Institute for Economic Research,
Academy of Economic Studies of Moldova
<https://orcid.org/0000-0002-1250-9125>
svetarusu1602@gmail.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.31>

UDC: 364.662-053.6(478)

JEL Classification: I32, J13, J31, J61, O15

Abstract. *This work examines the issue of young people experiencing poverty despite being employed in the labour market in the Republic of Moldova. The author analyzes the underlying economic structures and the resulting social impacts of this phenomenon. Utilizing national statistical data and migration trends, the paper reveals a consistent disparity between the average earnings of young Moldovans and the minimum resources required for basic survival. The results indicate that low-paying employment traps young individuals in Moldova in a state of economic insecurity, restricting their prospects for personal and professional growth and fueling emigration. The author proposes that comprehensive policy interventions and governmental programs should be implemented in order to create employment opportunities, particularly in rural regions, to disrupt the cycle of poverty affecting young workers and to reduce the number of those who want to migrate. The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.*

Keywords: *working poor, youth employment, labour market, emigration, low wages*

Introduction. The working poor is a characteristic phenomenon not only for the Moldovan labour market but also for many developed countries. The working poor are those who, despite holding jobs, struggle to rise above the poverty line, meaning their salaries are insufficient for basic living. Young adults, especially, find themselves in a precarious position, balancing career ambitions with a financial landscape characterized by inadequate earnings. Data from the National Bureau of Statistics (NBS) indicates that, in 2024, more than 35% of employed individuals aged 18-34 receive either the minimum wage or earnings below the basic subsistence level in cities, with the percentage reaching nearly 50% in rural areas. This situation exacerbates social fragility, hinders economic development, and amplifies the outward migration of people from the country.

Literature review. Recent studies on the "working poor" in Eastern Europe (Eurofound, 2022) suggest that youth economic vulnerability is driven by multiple

factors: economic transition, lack of local opportunities, labour market inequalities, and ineffective public policies. In Moldova, the IDIS Viitorul report (2024) confirms that youth salaries are significantly lower than the national average, with limited access to stable jobs. Furthermore, the International Organization for Migration Report (IOM, 2024) identifies a direct link between youth migration and low wages.

Research methodology. This research is based on the statistical analysis of data and on the descriptive analysis method.

Main results. The analysis of statistical data and consulted sources revealed that the phenomenon of youth in-work poverty in Moldova is deeply rooted in the country's economic and social structure. In 2024, the average gross monthly salary of young people in Moldova was approximately 8,500 MDL (~440 EUR), while the minimum subsistence basket for an adult exceeded 10,000 MDL. These figures indicate that over 40% of employed young people cannot ensure a decent living, placing them squarely in the "working poor" category.

The situation is even more severe in rural areas, where approximately 50% of employed youth earn below the subsistence level. This reality reflects both the lack of well-paid jobs in rural areas and internal migration to urban centers or abroad. According to IOM (2024), 45% of young people who emigrated between 2019-2023 cited low wages as the main reason for leaving.

Poorly paid work directly affects young people's ability to accumulate financial capital, access favourable credit, invest in education, or secure housing. The lack of stable financial prospects keeps young people dependent on family support and exposes them to social exclusion risks. Moreover, accepting unskilled jobs or positions below their qualifications affects not only individual potential but also the quality and competitiveness of Moldova's labour market.

Another significant finding is the close relationship between economic opportunity scarcity and external migration. Young people see migration as a way to escape poverty, contributing to rural depopulation, workforce shrinkage, and a negative impact on Moldova's social security system. According to IDIS Viitorul estimates (2024), the economy loses approximately 10% of its potential GDP annually due to youth emigration and underutilization of qualified labour.

Additionally, according to the Ministry of Labour and Social Protection (2023), the average gross salary in Moldova represents only 18-26% of the average in EU-15 countries, highlighting the insufficient economic convergence. In 2024, the national average gross monthly salary was 14,096.7 MDL, with a real growth of 9% compared to the previous year (NBS, 2024). However, the sectors predominantly employing young people — agriculture, trade, hospitality — report salaries between 10,000 and 11,000 MDL, far below the necessary level for a decent life.

In 2024, approximately 135,000 young people (aged 15-34) were registered as NEETs (not in employment, education, or training), representing around 25% of the total youth population — a worrying indicator of socio-economic exclusion (delucru.md, 2024). Furthermore, state investment in active employment services is five times lower than the average in Southeast Europe and thirty times lower than in the EU, reflecting a lack of real and effective support for youth labour market integration (Ministry of Labour and Social Protection, 2023).

Discussion and conclusions. Data analyzed presents a critical reality: young people in Moldova are trapped in a cycle of low-paid employment, which prevents them from achieving a decent standard of living and drives them toward migration or social dependency. This phenomenon negatively impacts not only the personal development of young people but also the economic and social progress of the entire country. Furthermore, a social pact between the state, business environment, and trade unions is essential to ensure the establishment of a minimum wage adjusted to the real cost of living. Moreover, Moldova requires active youth retention policies and the creation of local economic opportunities, especially in rural areas, to combat exodus and contribute to the country's social and economic stabilization. Only through consistent and well-directed measures can the "working poor" phenomenon among youth be mitigated, paving the way for sustainable and inclusive development.

Acknowledgements: This article was developed within the framework of the Subprogram 030101 “Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.

REFERENCES

- Eurofound. (2022). *Working poor in Europe: Trends and challenges*. Luxembourg.
- Institute for Development and Social Initiatives (IDIS) Viitorul. (2024). *Impact of migration on Moldova's economy*. Analytical Report. Chişinău: IDIS Viitorul.
- International Organization for Migration (IOM). (2024). *Study on migration motivations among Moldovan youth*. Chişinău: IOM.
- Ministry of Labour and Social Protection (2021). *National Employment Strategy 2021-2025*. <https://psm-nes.mol.pna.ps/docs/الاستراتيجية%20الوطنية%20للتشغيل%20en.pdf>
- Ministry of Labour and Social Protection (2023). *National Employment Program 2022-2026*. Chişinău.
- National Bureau of Statistics of the Republic of Moldova (NBS). (2024). *Wages and population income in 2024*. Chişinău. <https://statistica.gov.md/en>
- One in four young Moldovans neither works nor studies*. (2024). <https://www.delucru.md/ru/articles/pochemu-molodie-lyudi-v-moldove-ne-khotyat-rabotat>

**INVISIBLE SURVIVAL STRATEGIES – THE INTERACT¹ Project:
RETHINKING SOCIAL INCLUSION THROUGH THE LIVED
EXPERIENCES OF HOMELESS WOMEN IN ROMANIA**

**Carmen CIORNEI, *Head of The Social Protection Department,
The Directorate of Social and Medical Assistance (DSMA),
Cluj-Napoca, Romania,***
carmenciornei.dasm@gmail.com

**Crina MOISA, *Senior policy officer,
The Directorate of Social and Medical Assistance (DSMA),
Cluj-Napoca, Romania,***
crinapop.dasm@gmail.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.32>

UDC: 364.6(498)

JEL Classification: I38, J16, R31, Z18

Abstract. *Homelessness among women represents one of the least visible yet most acute forms of social exclusion. This paper addresses the intersectional vulnerabilities of homeless women in Romania, including gender-based violence (GBV), problematic substance use (PSU), and mental health (MH) challenges. The article draws on some of the activities carried out within the “Intersectional Approach to Combating Homelessness for Women” (INTERACT) project, co-funded by the European Union through the European Social Fund Plus (ESF+), which aims to develop a pilot intervention model adaptable to different European contexts. INTERACT project runs during 1.10.2024 – 30.09.2027, in partnership with organizations from Germany, Greece, Iceland, Italy, Portugal and Romania, and seeks to address the multiple vulnerabilities faced by women experiencing homelessness or living in precarious conditions. The project primarily targets homeless women, especially those with multiple vulnerabilities and complex assistance needs, as well as policymakers in related social policy fields, institutional actors and civil society. A central component of the project is the creation of the Pilot Intervention Model, based on interdisciplinary collaboration and recognition of the intersectional dimension of homelessness. Using desk research, national and local data (Cluj-Napoca, Suceava), and comparative examples of European best practices, the analysis explores invisible survival strategies, service gaps and opportunities for integrated assistance. The findings highlight the necessity of*

¹ Project reference: 101172611 — INTERACT — ESF-2023-HOMELESS – Funded by the European Union. The viewpoints and opinions expressed in this article are solely those of the author and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.

trauma-informed approaches, Housing First (HF) policies and gender-sensitive interventions. The INTERACT Pilot Intervention Model will provide professionals and decision-makers with tools for designing interventions grounded in human rights, gender equality and systemic collaboration. The conclusions indicate that the social inclusion of homeless women cannot be achieved through fragmented services but through integrated, intersectional and sustainable policies.

Keywords: *homeless women, intersectionality, trauma-informed care, Housing First, social inclusion.*

Introduction. The phenomenon of homelessness is multidimensional, linked to poverty, housing precarity, unemployment, MH problems, PSU, and GBV. Homelessness among women, often hidden, remains underrepresented in statistics and is rarely addressed specifically by public policies. The Lisbon Declaration (2021) and the *OECD Toolkit to Combat Homelessness* (2024) reaffirm the European commitment to eradicate homelessness by 2030, highlighting the importance of HF approaches and integrated services. In this context, INTERACT project aims to develop a pilot model for implementing gender-sensitive interventions.

Literature review. Definitions of homelessness vary: the ETHOS typology (FEANTSA, 2005) distinguishes rooflessness (living on the street), houselessness (temporary accommodation), insecure housing and inadequate housing. Romanian research (Dan & Dan, 2005) defines homelessness as the extreme form of social exclusion, generated both by individual vulnerabilities and structural factors. A feminist and intersectional perspective shows that women's pathways into homelessness are often linked to domestic violence, caregiving responsibilities and systemic discrimination. International evidence confirms the efficiency of the HF approach (Finland), integrated service centers (the Netherlands), co-planning of services (Italy), and CHRS reintegration centers (France).

Methodology. The analysis is based on: examining national and local strategies and data from Romania (Cluj-Napoca, Suceava); European models and OECD recommendations; the results of the desk research phase of the INTERACT project. In 2024, the Emergency Social Center (DASM), Cluj-Napoca assisted 76 people, of whom 73.7% were women, while in Suceava, the "Sfânta Vineri" shelter hosted 74 people, of whom 26% were women. These figures highlight both gender differences and the hidden nature of the homelessness phenomenon.

Main results. *Romanian context* - official data are fragmented; services are insufficiently coordinated; local good practices exist but are not scaled up. *Invisible survival strategies* - women resort to temporary housing with acquaintances, avoid shelters due to stigma or fear of losing their children, which makes them invisible in statistics. *Existing services* - emergency shelters and some specialized centers exist, but there is a lack of long-term solutions, women-specific services and integrated support for mental health and addictions. *INTERACT pilot intervention model* - proposes a gender-responsive framework that includes: trauma-informed care, reduction of the risks associated with PSU, HF pathways, interdisciplinary cooperation, competences and monitoring tools for professionals.

Discussions and conclusions. Homeless women embody the intersection of poverty, gender inequality and structural exclusion. Their survival strategies remain invisible to policies that rely on restrictive definitions of homelessness. Sustainable solutions require: systematic collection of gender-disaggregated data, broader implementation of the HF approach, trauma and gender-sensitive services, genuine interdisciplinary collaboration. The INTERACT model provides a coherent framework adaptable to diverse national contexts but based on common European standards. Its implementation in Romania can transform policies from reactive and fragmented interventions into integrated, sustainable and human rights-anchored solutions. The Joint National Report highlights differences in the status quo among partner countries and the need for country/region-specific focus. Nevertheless, the need for increased accessibility to HF resources and better-systematized interdisciplinary cooperation among services and intervention providers, integration of services, adoption of trauma-informed and harm reduction practices, as well as the application of gender-sensitive approaches to efficiently support homeless women with complex service needs are common. Romania faces significant challenges in addressing homelessness, particularly among vulnerable women. Although relevant legislative frameworks and public policies exist, major gaps persist in implementation, data reliability and interdisciplinary cooperation. An integrated, gender-sensitive, and trauma-centered approach is essential for the sustainable implementation of the INTERACT project. The national focus of the INTERACT project in Romania should center on promoting coordinated data collection and reporting and on developing gender-sensitive policies that recognize the specific barriers homeless women face in accessing housing and support services. Trauma-informed care is crucial in addressing the psychological impact of intimate partner violence, a frequent factor associated with housing loss. At the local level, emphasis must be placed on promoting a holistic approach based on interinstitutional collaboration and community engagement in homelessness interventions, as these are essential elements for efficiently combating the phenomenon and supporting homeless women according to their specific needs.

REFERENCES

- Adrian-Nicolae, D., & Dan, M. (2005). Persoanele fără adăpost din România – o estimare a numărului acestora. *Calitatea Vieții*, 16 (1-2), 101-122. <https://revistacalitatevietii.ro/journal/article/view/542>
- Amore, K., Baker, M., & Howden-Chapman, P. (2011). The ETHOS definition and classification of homelessness: An analysis. *European Journal of Homelessness*, 5(2), 19-37. https://www.researchgate.net/publication/265799835_The_ETHOS_Definition_and_Classification_of_Homelessness_An_Analysis
- Dan, A. N. (2003). Housing exclusion in Romania: The case of the homeless. *Calitatea Vieții*, 14(3-4), 215-230.

- FEANTSA. (2005). *ETHOS – European Typology of Homelessness and Housing Exclusion*. Brussels: FEANTSA. https://www.enipssa.pt/documents/10180/12068/EN_EthosLeaflet/6d1bd1a5-29cf-407a-9388-6e9ceda230f8
- FEANTSA. (2024). *Gender and Homelessness: Policy Brief*. Brussels: FEANTSA.
- INTERACT Consortium. (2025). *Pilot Model of Interventions: Draft 1*. University of Iceland, RIKK.
- INTERACT Project Consortium. (2025). *Desk Research Report Romania (WP1)*. Direcția de Asistență Socială și Medicală. Cluj-Napoca.
- INTERACT Project Consortium. (2025). *National Report: Comparative Analysis of Homelessness in Six European Countries*, March.
- Organisation for Economic Cooperation and Development (OECD). (2024). *Toolkit to Combat Homelessness*. Paris: OECD Publishing. <https://doi.org/10.1787/oecd-homelessness-2024>

MECHANISMS FOR MEASURING THE IMPACT OF THE SOCIAL ECONOMY ON SUSTAINABLE DEVELOPMENT: PERSPECTIVES FOR THE REPUBLIC OF MOLDOVA

Dorin VACULOVSKI, *PhD in economics, Associate Professor,*
Academy of Economic Studies of Moldova
<https://orcid.org/0000-0002-1500-0113>
dorinvaculovsky@yahoo.com

Viorica TOARTĂ,
Independent Consultant in Social Policy, Monitoring and Evaluation
<https://orcid.org/0000-0001-9057-0151>
viorica.toarta@gmail.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.33>

UDC: 316.4(478)

JEL Classification: H43, I38, L31, O35, Q01

Abstract. *The social economy plays a crucial role in fostering social inclusion by supporting vulnerable groups, strengthening community cohesion, and promoting sustainable development. Its capacity to generate social, economic, and environmental benefits underscores the importance of impact measurement for integration into public policies and for informing strategic decision-making. This article reviews international practices of social economy impact assessment, with a focus on European Commission initiatives. It examines tools such as the GECES framework, SROI methodology, EU evaluation mechanisms, self-assessment tools, theories of change, and SDG-aligned standardized indicators. These approaches allow for the quantification of impacts and offer replicable, adaptable models applicable across diverse contexts. In the Republic of Moldova, where the social economy is in the process of consolidation and is gaining strategic importance, the adoption and adaptation of these methodological frameworks can support organizations in self-assessing their impact and authorities in monitoring performance. Furthermore, they contribute to evidence-based policymaking, the prioritization of resources, and the alignment of the sector with European and global sustainable development objectives.*

Keywords: *social economy, social inclusion, sustainable development, impact measurement mechanisms and tools*

Introduction. The social economy has evolved from a mechanism addressing market failures to a driver of sustainable development, especially evident during the COVID-19 crisis (Krlev et al., 2021). In the EU, it includes 4.3 million enterprises, 11.5 million jobs (6.3% of workforce), and around 8% of value added (European Parliament, 2022; European Commission, 2024). Beyond its economic role, the sector is a pillar of sustainable development, reducing inequalities, strengthening community cohesion, and fostering a fair and inclusive economy. It also plays a

strategic role in shaping public policies and implementing sustainable development strategies across local, national, and European levels, integrating economic, social, and environmental objectives within a coherent framework.

Measuring impact has therefore become central to the EU Social Economy Action Plan and the UN Sustainable Development Goals. For Moldova, this is timely given the sector's emerging role.

Literature review. Impact measurement in the social economy attracts increasing attention both is attracting both among researchers and the European Commission and other international institutions and organizations. Frameworks such as Comprehensive Impact Measurement (CIM) and Social Return on Investment (SROI) integrate economic, social, and environmental dimensions (OECD/EU, 2024; Sauer, 2025). Tools include: (i) EU tools as: GECES framework, ESF+, InvestEU, Interreg; (ii) Self-assessment models and theory of change; (iii) Standardized indicators aligned with SDGs (Lall, 2019; Servin, 2025).

Research methodology. The analysis is based on documentary review and mapping of frameworks relevant for measuring social economy impact. Sources included EU and OECD guides, scientific literature, and national methodological tools developed with partner support.

Main results. The analysis shows that frameworks like CIM, SROI, IRIS+ and GECES allow integrated assessments of economic, social, and environmental results. Their robustness stems from methods correcting for attribution, deadweight, displacement, and drop-off, but complexity hinders broad application.

European and global organizations support harmonization of methodologies, yet challenges remain: (i) limited standardization of indicators, restricting comparability; (ii) insufficient attention to indirect and long-term impacts; and (iii) underrepresentation of qualitative and intangible effects.

For Moldova, applying these frameworks can: (i) help organizations self-assess and improve transparency; (ii) guide authorities in monitoring and evaluating performance; (iii) provide evidence for policymaking and resource allocation; and (iv) align strategies with SDGs and EU priorities.

Discussion and conclusions. The analysis of social economy impact measurement mechanisms revealed a diverse range of international frameworks and instruments that facilitate the integrated assessment of economic, social, and environmental dimensions. Despite this diversity, the lack of coherent standardization of indicators limits comparability across organizations and regions, while the evaluation of indirect and long-term effects requires better methodological harmonization.

In the context of the Republic of Moldova, the adoption and adaptation of these methodological frameworks can strengthen social economy organizations' capacity for self-assessment and transparent reporting, support the establishment of national monitoring and evaluation mechanisms, and provide a solid foundation for public policy, efficient resource allocation, and alignment with the Sustainable Development Goals and European priorities.

REFERENCES

- Carini, C., Galera, G., Tallarini, G., Avila, R. C., & Jérôme Schoenmaeckers, J. (2024). *Benchmarking the socio-economic performance of the EU social economy. Improving the socio-economic knowledge of the proximity and social economy ecosystem. Study. Contract: EISMEA/2022/OP/0015 (Lot 1)*. Brussels: European Commission. <https://euricse.eu/wp-content/uploads/2024/09/benchmarking-the-socio-economic-performance-of-the-EA0224285ENN-1.pdf>
- European Parliament (2022). *Report on the EU action plan for the social economy 2179(INI)*. Committee on Employment and Social Affairs. https://www.europarl.europa.eu/doceo/document/A-9-2022-0192_EN.pdf
- Krlev, G., Pasi, G., Wruk, D., & Bernhard, M. (2021). Reconceptualizing the Social Economy. *Stanford Social Innovation Review*. https://ssir.org/articles/entry/reconceptualizing_the_social_economy#
- Lall, S. (2019). Measuring Social Impact in Social Enterprises: Learning for Organizational Improvement. *Journal of Social Entrepreneurship*, 10(2), 145-162. <https://doi.org/10.1080/19420676.2019.1623410>
- Organisation for Economic Co-operation and Development (OECD). (2023). *Policy Guide on Social Impact Measurement for the Social and Solidarity Economy*. OECD Publishing. <https://doi.org/10.1787/270c7194-en>
- Organisation for Economic Co-operation and Development (OECD). (2024). *Measure, Manage and Maximize Your Impact: A Guide for the Social Economy*. Report. Local Economic and Employment Development (LEED). Paris: OECD Publishing. <https://doi.org/10.1787/2238c1f1-en>
- Sauer, S., Bartolomucci, F., Groot, M., Then, V., & Jacob, Frank (2025). Closing the gap: The comprehensive approach to measure societal impact. *Societal Impacts*, 5, 100111. <https://doi.org/10.1016/j.socimp.2025.100111>
- Servin, J. L. (2025). *Indicator Development for Measuring Social Solidarity Economy Activities*. MDPI. <https://www.mdpi.com/2076-0760/14/6/329>

LEGAL RESEARCH AND DISABILITY STUDIES: TOWARDS A TRANSDISCIPLINARY AND UNITARY HUMAN RIGHTS-BASED APPROACH

Angela MICCIO, *Single-cycle Master's degree in Law, University of Naples,
President of the movement "Let's give to the law a soul!", Let's take action! Soul
and courage!*,

Human Rights Forum "rEVOLution", Italy

<https://orcid.org/0009-0008-4721-7051>

angelamiccio1@gmail.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.34>

UDC: 342.7

JEL: I31, K36, K38

Abstract. *This paper intends to analyze the importance of asking how disability studies can improve legal research and how strictly legal research can contribute to the development of disability studies. Attention will be paid to the intersection between legal studies and disability studies. It will analyze the reality in which we live, where the medical model of disability is still prevalent, and the critical issues and prospects after nearly twenty years since the adoption of the UN Convention on the Rights of Persons with Disabilities by the UN General Assembly. The research methods used concern an analysis of reality, giving voice to experiences of people with disabilities and their family members, family caregivers, siblings, and a comparative analysis with a connection to disability studies. The results will highlight how the approach to disability must be based on human rights and respect for human dignity. The results will also highlight how legal studies focus on the technical elements specific to the field in which they operate, taking sociological elements into consideration, and enhancing the transdisciplinary nature of the approach. The objective pursued is the full participation of the individual who is no less entitled to rights and responsibilities than other subjects.*

Keywords: *legal research, fact, law, disability studies, human dignity, human rights, UN Convention on the Rights of Persons with Disabilities (CRPD), inclusion, persons with disabilities and their families, family caregivers, siblings, trans-disciplinary*

Introduction and actuality. Giving the law a soul: this should have been, according to judge Livatino, killed by the mafia on the morning of 21 September 1990, the judge's primary task. The protection of the person and respect for human dignity are among the objectives of the "Let's give to the law a soul" Let's take action! Soul and courage! Movement, Human Rights, law and disability studies Forum – study center "rEVOLution". A society cannot be called civil if it does not take care of the most fragile people, of fragility which is power in itself. The movement, Forum – study center are the

Promoters the appeal “Stop segregating residences!”, “Stop institutionalization!” (Miccio, 2013, 2014, 2015, 2019a, 2019b).

This paper – in memory of the judge Livatino (on the 35th anniversary of his death) and of all the victims of every form of injustice, persons with disabilities and their families – intends to highlight the importance of the relationship between legal research and disability studies. It is necessary to understand how disability studies can improve legal research and how strictly legal research can contribute to the development of disability studies. Years after the adoption of the UN Convention on the rights of persons with disabilities and the enactment of other laws, the analysis of reality presents a picture that is certainly not reassuring. Families, family caregivers, siblings are still invisible figures who require full and timely recognition. Adult with intellectual disabilities as well as children are considered as a separate topic or they are not considered. Recognition of the dignity of a person presupposes active respect for human rights (Nussbaum, 2002; Nussbaum, 2007; Barton & Armstrong, 1999; Lawson, 2005). Most services are still based on the medical model of disability. The independent living of people with disabilities is not taken into consideration. The most recent theorizing in the ethics of care and the capability approach as a useful tool for an integrated approach (Nussbaum, 2007; Sen, 2009) have not been carefully considered. When people in conditions of extreme dependence are accorded little dignity, the dignity of those who provide care is also nullified (Nussbaum, 2007). The caregiver is exposed to the so-called Burden, which is a state of chronic stress. In 2009 in Stockholm to Elizabeth Blackburn was awarded the Nobel Prize for Medicine for her studies on the involvement of telomeres and telomerase in premature aging and reduced ageing life expectancy and poor health of family caregivers. Family caregivers live from 9 to 17 years less than everyone else! (Epel et al., 2004).

Research methodology. Legal research seeks and explains the appropriate rules of conduct to prevent/resolve conflicts between citizens. It is not theoretical; its purpose is practical: to resolve people's problems. Distinctions between facts are inherent in legal experience. Legal research involves a formal and abstract process. It's important to identify the elements which “create” a relevant object for the law. In our case, the fact considered is “disability”. Legal rule starts from the fact, operates on it, and returns to the fact. Disability Studies provide jurists with a deeper understanding of the fact on which the legal rule is based. Disability is a human rights issue. At the basis of the UN Convention on the rights of persons with disabilities there is a new model of justice (Sen, 2009). Disability Studies are interdisciplinary, internal and external to the academic world. They are for (and with) people and not about people. The approach in disability studies is new. It's very important to give voice to experiences of people with disabilities and their family members, family caregivers, siblings, and use a comparative approach and analysis.

Main results and conclusions. Legal research and practice can benefit from Disability Studies to achieve the effective inclusion of people with disabilities. The focus is not strictly on the individual's physical and intellectual impairments but respect for human dignity, awareness- raising, the full participation of the individual who is no less entitled to rights and responsibilities than other subjects, and moving

towards a constructive dialogue between capability approach, ethics of care and disability studies. Understanding the facts has a particular importance in the legal world but it is good to enhance a transdisciplinary approach based on human rights.

REFERENCES

- Barton, L., & Armstrong, F. (1999). *Disability, human rights and education*. Buckingham: Open University Press.
- Epel, E. S., Blackburn, E. H., Lin, J., Dhabhar, F. S., Adler, N. E., Morrow, J. D., & Cawthon, R. M. (2004). Accelerated telomere shortening in response to life stress. *Proceedings of the National Academy of Sciences*, 101(49), 17312-17315. <https://doi.org/10.1073/pnas.0407162101>
- Lawson, A. (2005). The Human Rights Act 1998 and Disabled People: A Right to be Human? In: C. Harvey (Ed), *Human Rights in the Community*. Oxford: Hart Publishing.
- Miccio, A. (2013). Law and disability studies: paper in the international conference about disability. In: *The international conference about disability. Let's give to the law a soul: archive*. Naples: University of Naples.
- Miccio, A. (2014). Breaking the isolation towards the most fragile people and their families. In: *The international conference. Let's give to the law a soul: archive*. Naples: University of Naples.
- Miccio, A. (2015). Being a person, respect for human dignity: the missing perspective. In: *The international conference. Let's give to the law a soul. Let's take action! Soul and courage! Human Rights Forum "rEVOLution"*. Naples: University of Naples.
- Miccio, A. (2019a). From disability studies to fragility studies. In: *UN Convention on the rights of persons with disabilities: a human rights issue: the international conference. Let's give to the law a soul!* Naples: University of Naples.
- Miccio, A. (2019b). Ten years after the Italian ratification of the CRPD. In: *UN Convention on the rights of persons with disabilities. Forty-one years after the Basaglia law. Fifteen years after the support administration law. Critical issues and prospects: the international conference of Neuroscience*. Naples: University of Naples.
- Nussbaum, M. C. (2002). *Giustizia sociale e dignità umana*. Bologna: Il Mulino.
- Nussbaum, M. C. (2007). *Le nuove frontiere della giustizia. Disabilità, nazionalità, appartenenza di specie*. Bologna: Il Mulino. <http://pi.lib.uchicago.edu/1001/cat/bib/7718018>
- Sen, A. (2009). *The Idea of Justice*. Cambridge, Massachusetts: The Belknap press of Harvard University Press. <https://dutraeconomicus.wordpress.com/wpcontent/uploads/2014/02/amartya-sen-the-idea-of-justice-2009.pdf>
- United Nations. (2006). *Convention on the rights of persons with disabilities*. New York. <http://www.un.org/esa/socdev/enable/documents/tccconve.pdf>

**DIGITALIZATION OF CULTURAL HERITAGE
AS A TOOL FOR SUSTAINABLE DEVELOPMENT AND SOCIAL
INCLUSION: THE INNO4CULT PROJECT**

Elena PRUS, *Habilitated PhD in Philology,*
Free International University of Moldova,
<https://orcid.org/0000-0001-9419-5459>
eprus@ulim.md

Anatolie BABIN, *Researcher,*
Academy of Economic Studies of Moldova,
<https://orcid.org/0000-0002-7253-0890>
anatolii.babin@ase.md

Ion BARABULA, *MA in Arts, President of AO "Be Up", Academy of*
Music, Theatre and Fine Arts (AMTAP),
<https://orcid.org/0009-0004-2204-6410>
beup.org@gmail.com, ibarabula60@gmail.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.35>

UDC: 008:004(478)

JEL Classification: O33, R11, Z10, Z18

Abstract. *In the face of global challenges such as climate change, demographic shifts, and increasing social inequality, sustainable development necessitates innovative and inclusive approaches. One such solution is the digitization of cultural heritage, which not only preserves cultural memory but also fosters social cohesion and regional development. The INNO4CULT project supports this direction by integrating advanced digital tools - such as augmented reality (AR), 3D visualization, and automated text analysis - into cultural heritage preservation and education. A multilingual and interoperable digital platform is being developed to ensure open access to digitized artifacts and educational content. Community involvement plays a central role in this initiative, through participatory events, digital heritage laboratories, and the creation of cultural-touristic routes. This approach fosters both sustainability and social inclusion, in line with the Council of Europe's Strategy 21. The paper presents conceptual and practical models of digital transformation of cultural heritage in the context of territorial, social, and economic development, and provides policy recommendations for strengthening transnational cooperation in culture and education.*

Keywords: *digitization of cultural heritage, sustainable development, Strategy 21, social inclusion, digital technologies, INNO4CULT, transnational cooperation*

Introduction. Cultural heritage plays a vital role in shaping regional identity, cohesion, and sustainable development. In the 21st century, the digital transformation of this heritage is not only a technological challenge but also a social imperative. The increasing accessibility of digital tools enables broader public engagement, democratizes access to cultural resources, and supports lifelong learning.

The INNO4CULT project addresses these aspects by creating a platform that combines technology, education, and community participation. This aligns with the Council of Europe's **Strategy 21**, which emphasizes sustainability, inclusiveness, and the need for innovative methods to preserve and promote cultural assets.

Literature review. Digital heritage has been a growing field of interest in both academic and policy-making circles. The European Commission and the Council of Europe have consistently stressed the need for digital tools in cultural preservation (UNESCO, 2019; Council of Europe, 2018). Several studies point to the benefits of digitization in terms of accessibility, tourism development, and identity reinforcement (Cameron & Kenderdine, 2007; Giaccardi, 2012).

However, challenges remain in terms of infrastructure, digital literacy, and inclusivity, especially in rural and disadvantaged areas. The INNO4CULT project builds on these findings by introducing a participatory model of digital heritage creation and dissemination.

Research methodology. The project adopts a mixed-methods approach, combining:

- **Technological tools:** AR, 3D scanning, and AI-based text analysis;
- **Participatory practices:** workshops, cultural co-creation events, regional mapping;
- **Policy frameworks:** analysis of national and European strategies (especially Strategy 21);
- **Comparative regional analysis:** evaluation of social and economic impacts across different Moldovan regions.

The methodological framework allows for the integration of quantitative indicators (access rates, engagement levels) and qualitative assessments (interviews, feedback from participants and cultural operators).

Main results. Preliminary results demonstrate the following:

- Increased community involvement in heritage-related activities;
- Improved accessibility to cultural content through digital formats;
- New opportunities for cultural tourism and local entrepreneurship;
- Positive feedback from educators and students involved in the digital labs.

The regional differences in terms of digital readiness were evident, requiring targeted support for certain areas. However, the project's inclusive model proved adaptable across diverse socio-economic contexts.

Discussion and conclusions. Digitizing cultural heritage is more than a technical exercise - it is a driver of territorial development, social inclusion, and cultural resilience. The INNO4CULT project showcases how integrated digital strategies can revitalize local communities, empower youth, and support the broader goals of sustainable development.

Future policy directions should emphasize:

- Capacity-building in digital skills, especially in underserved regions;
- Sustainable funding mechanisms for digital culture initiatives;
- Stronger cross-border cooperation within the EU and its neighborhood.

The alignment with Strategy 21 ensures that digital heritage projects are not isolated technological interventions, but part of a broader cultural, educational, and social ecosystem.

REFERENCES

- Cameron, F., & Kenderdine, S. (Eds.). (2007). *Theorizing Digital Cultural Heritage: A Critical Discourse*. MIT Press. https://www.academia.edu/81964778/Theorizing_Digital_Cultural_Heritage_A_Critical_Discourse
- Council of Europe. (2018). *European Heritage Strategy for the 21st Century – Strategy 21*. <https://www.coe.int/en/web/culture-and-heritage/strategy-21>
- European Commission. (2018). *A New European Agenda for Culture*. COM 267 final. Brussels. <https://www.open-heritage.eu/a-new-european-agenda-for-culture/>
- Giaccardi, E. (Ed.). (2012). *Heritage and Social Media: Understanding Heritage in a Participatory Culture*. London: Routledge, <https://www.taylorfrancis.com/books/edit/10.4324/9780203112984/heritage-social-media-elisa-giaccardi>
- United Nations Educational, Scientific and Cultural Organization (UNESCO). (2009). *Charter on the Preservation of the Digital Heritage*. <https://unesdoc.unesco.org/ark:/48223/pf0000179529>

COMPARATIVE ANALYSIS OF AI-POWERED VIDEO GENERATION PLATFORMS FOR RESOLVING SOCIAL PROBLEMS

Vlada COLESNICOVA, *PhD Student ASEM, Scientific researcher, Vladimir Andrunachievici Institute of Mathematics and Computer Science, Moldova State University,*
<https://orcid.org/0000-0001-9916-212X>
vlada.colesnicova@math.usm.md

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.36>

UDC: 316.472.4+004.896

JEL Classification: A14, Z1

Abstract. *This research analyzed the current AI-powered video generation platforms. The general purpose of research is to determine the unique features, operational performance, and inherent limitations of each solution. Analyzed platforms are the following: Invideo.io for social media content; Google Veo and OpenAI's Sora for cutting-edge video creation. Evaluation used several criteria: the quality of generated videos, the speed of generation, their economic model (free vs. credit-based), and most importantly, how accurately they interpreted text prompts. The results reveal differences in the capabilities and performance of these platforms. This comparative analysis suggests that choosing AI video generation platforms require careful thought. It's vital to consider specific user needs, weighing factors like video quality, operational speed, cost, and prompt interpretation accuracy to achieve maximum effectiveness and relevance for diverse tasks in resolving social problems. Acknowledgments: Project SIBIA – 011301, “Information systems based on Artificial Intelligence” has supported part of the research for this paper.*

Keywords: *AI video generation, platform comparison, generative AI, video synthesis*

Introduction. Over the past year, neural networks for video creation have improved significantly, and it is now possible to generate videos with sound and speech. Modern technologies can help optimize video content, select music and sound effects, and improve visual effects. This simplifies the generation of engaging and entertaining videos that attract audiences. AI for video generation is increasingly being used by companies to promote their products and services, as well as by various social organizations, such as pharmacies, hospitals, or clinics, to advertise medicines, which is an excellent way to increase brand awareness and attract new customers, or in educational sphere – generation the short videos to help the students in understanding the complicate theoretic themes. With the help of short videos, companies can engage their target audience in an exciting way. Advertising in hospitals and clinics should be gentle, delicate, and unobtrusive. The tone should be subdued, and the wording should be as correct as possible. Using artificial intelligence to generate the videos offers companies numerous advantages. This

includes increased reach, as videos can be distributed on platforms used by millions of people. In addition, companies can achieve higher engagement rates by using short videos, as videos are often more interesting and engaging than other forms of advertising. Sometimes, an advertising campaign requires a video very urgently. Ordering it from a professional studio is expensive and time-consuming. Using complex software is also expensive and, without training, hardly possible. This research presents a some solutions of the problem for specialists with zero video design skills.

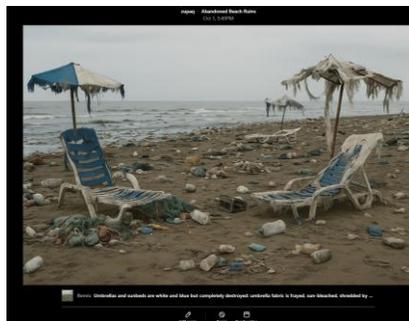
Literature review. Today, modern AI video techniques are used everywhere: in video games, movies, and television. However, before the invention of computers, video animators had to use complex methods to produce animations, which involved laborious and painstaking work, as all frames had to be created manually. The advent of computer and graphics processing equipment radically changed this process. It is generally accepted that it was in the 1980s that fundamental changes took place, leading to the emergence of new technologies that became widely used in the film industry, which in turn allowed a transition from traditional methods of creating video and animation to more technically advanced ones. In 1962, American scientist Ivan Sutherland developed the Sketchpad system, which allowed images on the screen to be controlled using a computer. And in 1963, Disney Studios used the Audio Animatronics system, which brought computer models of animals and humans to life. Starting in the 1970s, experiments with 3D animation began, and the first such experimental work is considered to be the short film “Computer Animation of a Hand” (1971), created by students Edwin Catmull (who later became president of Disney and Pixar) and Fred Park (a future scientist in the field of computer engineering) [9]. It should be noted that 3D animation was also used by George Lucas in the filming of Star Wars (1977) and by Disney Studios in Gary Nelson's film The Black Hole (1979). Nevertheless, it was in the 1980s, in the era of digitalization, that creative approaches to the creation of video clips and animation underwent a transformation. With the appearance of AI-powered video generation platforms, recent scientific articles have begun to describe working with various tools for quickly generating videos for social sphere.

General purpose and research methodology. The general purpose of research is to determine the unique features, operational performance, and inherent limitations of each solution. The logic of the sequence of solving specific scientific and cognitive problems in this research uses a relevant set of general scientific (comparison, analysis, generalization, typology) and special methods (visual-iconic, artistic-evaluative, or critical). The following general scientific methods were used in elaborating of this research: synthesis, logical analysis, monographic analysis, and comparative analysis of selected platforms.

Main results. Analyzed platforms are the following: Invideo.io for social media content; Google Veo and OpenAI's Sora for cutting-edge video creation. Evaluation used several criteria: the quality of generated videos, the speed of generation, their economic model (free vs. credit-based), and most importantly, how accurately they interpreted text prompts. *InVideo.io* – this is a browser-based program for generating videos from clips and photos. It features a large database of

ready-made templates and allows you to use effects, frames, filters, stickers, transition settings, and background music. No special training is required to use the editor. It does not need to be installed on your computer and does not require lengthy configuration. InVideo works perfectly with a stable internet connection. The editor does not have high technical requirements for your computer. Basic options are available for free. Premium features and the ability to save videos without watermarks are unlocked after paying for a business plan. The “unlimited” package gives you full access. The left panel of the video editor contains tools for adding templates, images, photos, music, captions, stickers, collages, masks, and shapes. These elements can be moved, resized, colored, and combined with animation. The options are simple and intuitive. Videos are saved in 720p quality and higher. Only a premium subscription allows you to choose 1080p format. The discounted monthly cost is \$30. A very convenient feature for integrating videos into social networks allows you to instantly send a video to a social network or YouTube. *Google Veo* - this is Google's newest and most powerful neural network. It doesn't just generate realistic videos — it generates high-resolution videos, has a better ability to understand physics, has good consistency, and has built-in support for generating voices, sounds, etc. For creators of high-end video content and individuals with sufficient budget, this is probably the best tool available. *Sora* - this is an AI-based video generation neural network from OpenAI that can create short videos from text prompts, based on reference images, photos, or even other videos. With Sora Video Editor, you can create videos up to 20 seconds long while maintaining high image quality, and the neural network clearly follows your instructions.

Figure 1. Screenshot from a video generated by AI Sora



Source: https://sora.chatgpt.com/g/gen_01k6g3vsfrhrhve4410f79cfb2

Discussion and conclusions. The author explains the relevance of the chosen theme by the fact that with the development of modern technologies, certain creative professions are disappearing. The research is indeed timely, and using animation as an example, it is difficult to replace human creative participation in the creation of a work of art with AI technologies without losing the artistic value of the result. The results reveal differences in the capabilities and performance of these platforms. The analysis of different platforms is provided objectively, informatively, and accurately. There common features of researched platforms are as follows: these are next-

generation video editors that can replace expensive software, save money on advertising services, and allow you to start earning money by creating custom videos. They have no restrictions on use and can be flexibly customized to the individual needs of the user in a matter of minutes. This comparative analysis suggests that choosing AI video generation platforms require careful thought. It's vital to consider specific user needs, weighing factors like video quality, operational speed, cost, and prompt interpretation accuracy to achieve maximum effectiveness and relevance for diverse tasks in resolving social problems.

Acknowledgments: Project SIBIA – 011301, “Information systems based on Artificial Intelligence” has supported part of the research for this paper.

REFERENCES

- Create videos Without limits. (n.d.). <https://invideo.io/>
- OpenArt. All-in-One Video Creation Tools. (n.d.). <https://openart.ai/video/>
- Turn your ideas into videos with hyperreal motion and sound. (n.d.). The new Sora app. <https://openai.com/sora/>
- Turner, C. (2022). Neuromedia, cognitive offloading, and intellectual perseverance. *Synthese*, 200, 66, 1-26. <https://doi.org/10.1007/s11229-022-03472-w>
- Беляева, М & Харисов, Э. (2020). Применение нейронных сетей в компьютерной анимации. *Colloquium-journal*, 35, 1(87), 27-29. <https://cyberleninka.ru/article/n/primenenie-neyronnyh-setey-v-kompyuternoy-animatsii>
- Зайцев, А. (2024). Нейросети в современном анимационном искусстве: эстетические инновации и новые горизонты. *Культура и искусство*. 12. <https://doi.org/10.7256/2454-0625.2024.12.72074>
- Мартынов, М. (2024). Влияние ИИ на анимационную индустрию: перспективы и тенденции. *Актуальные исследования*, 36(218), 23-33. <https://apni.ru/article/10031-vliyanie-ii-na-animacionnuyu-industriyu-perspektivy-i-tendencii>
- Петере, С. (2024). Нейросети для генерации изображений: области применения и юридические проблемы эксплуатации. *Вестник науки*, 1, 3(72), 442-447. <https://cyberleninka.ru/article/n/neyroseti-dlya-generatsii-izobrazheniy-oblasti-primeneniya-i-yuridicheskie-problemy-ekspluatatsii>
- Тарасов, И. (2024). Нейросети в документальном телефильме: тенденции и перспективы. Серия 1. Проблемы образования, науки и культуры. *Известия УрФУ*, 30, 2, 34-45. <https://doi.org/10.15826/izv1.2024.30.2.024>
- Уразова, С. (2023). Нейромедиа как новый формат образов цифровой реальности. *Вестник ВГИК*. 15, 3(57), 140-150. <https://cyberleninka.ru/article/n/neyromedia-kak-novyy-format-obrazov-tsifrovoy-realnosti>

MULTIDIMENSIONAL INDICATORS OF POVERTY AND SOCIAL EXCLUSION: EUROPEAN EXPERIENCES AND PERSPECTIVES FOR THE REPUBLIC OF MOLDOVA

Oxana BARBĂNEAGRĂ, *PhD in economics, Associate Professor, National Institute for Economic Research, Academy of Economic Studies of Moldova,*
<https://orcid.org/0009-0008-2567-0170>
oxana.barbaneagra@ase.md

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.37>

UDC: 364.622(478)

JEL Classification: I32, J64, C38

Abstract. *The paper examines how EU indicators on poverty, inequality, and social exclusion—such as the Laeken indicators, AROPE, and the Multidimensional Poverty Index (MPI)—can be adapted to the Moldovan context, with a focus on vulnerable groups, particularly the unemployed. Based on a comparative analysis of EU practices and national data (household budget survey, MPI methodology), the study reveals persistent income inequalities (Gini coefficient) and multidimensional deprivation in health, education, housing, and employment. Despite progress in aligning with the EU acquis, challenges remain in measuring material deprivation and implementing EU-SILC. Adopting EU indicators will improve data comparability, support evidence-based policies, and help Moldova target the most disadvantaged households, reduce unemployment-related vulnerabilities, and promote the EU 2030 agenda on social inclusion. The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.*

Keywords: *social exclusion, poverty, unemployment, Laeken indicators, AROPE, multidimensional poverty index, EU-SILC*

Introduction. Social exclusion is a multidimensional phenomenon that requires combining various indicators to identify its causes, affected groups, and policy directions. As a candidate for EU membership, the Republic of Moldova is adopting EU social exclusion indicators to better monitor vulnerable groups and address inequalities caused by resource gaps. This paper reviews national methods for measuring exclusion and highlights opportunities to apply EU practices for more accurate assessment.

Literature review. The concept of social exclusion is interpreted in various ways in the literature, sometimes as a direct consequence of poverty, and other times as a multidimensional deprivation that prevents individuals from full participation in social life (Vremiş et al., 2010). At the EU level, social exclusion is defined as a dynamic process of cumulative disadvantages, leading to persistent deprivation (Room, 1995; Atkinson, 2002). Studies highlight the connection between poverty,

inequality, and exclusion, with particular reference to Laeken and AROPE indicators.

Research methodology. The methodology of the paper is based on secondary data analysis, drawing on national statistics and EU methodological frameworks. Special emphasis is placed on the Multidimensional Poverty Index based on the Alkire-Foster method, and the EU-SILC survey design. Additionally, comparative analysis was carried out between national practices and EU standards in measuring inequality and exclusion.

Main results. Poverty and social exclusion are interlinked but distinct: poverty reflects insufficient resources, while exclusion is a cumulative process of disadvantages (education, health, housing, civic participation) that limit social participation. In Moldova, poverty has deepened: in 2023, absolute poverty affected ~31% of the population and extreme poverty ~19%. Vulnerable groups include households headed by agricultural workers, pensioners, the unemployed, large families, and people with disabilities—among whom extreme poverty has doubled since 2017.

To align with EU and 2030 Agenda frameworks, Moldova applies Laeken indicators, AROPE, and a national Multidimensional Poverty Index (MPI) based on the Alkire-Foster method. The MPI (2022) shows 27.5% of the population living in multidimensional poverty, mainly deprived of health insurance (24.7%), sanitation (24.2%), and clean heating (23.4%). A combined analysis identifies four groups: only monetarily poor (20.1%), only multidimensionally poor (12.1%), both poor (13.5%), and non-poor (54.3%), underlining the need for differentiated policies. Persistent income inequality (Gini, 40.5% for the richest quintile vs. 7.6% for the poorest) sustains polarization and reinforces deprivation in education, health, and housing.

Discussion and conclusions. The Republic of Moldova is aligning its legislative framework on income, social inclusion, and living conditions statistics with European standards. Key steps include developing methodologies and tools for the EU-SILC, the European Health Interview Survey, and the Household Budget Survey. Efforts focus on implementing EU-SILC, producing and disseminating Household Budget Survey data, and introducing a new sampling frame for household surveys based on the 2024 Census. These measures will ensure comparability of national statistics with EU data. Applying EU indicators on social exclusion will provide a clearer picture of those at risk of poverty, supporting policies to reduce poverty and unemployment. By targeting key deprivations, Moldova can improve the well-being of vulnerable groups while advancing national strategies and the 2030 Agenda.

Note: The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.

REFERENCES

- Atkinson, A. B., Cantillon, B., Marlier, E., & Nolan, B. (2002). *Social indicators: The EU and social inclusion*. Oxford University Press.
- Balan, A. (2021). Income inequality in the Republic of Moldova: trends and ways to reduce it. *Economica*, 4(118), 32-43. <https://irek.ase.md/jspui/handle/123456789/1849>
- Government of the Republic of Moldova. (2023). *National Action Plan for the Accession of the Republic of Moldova to the European Union 2024-2027*. <https://gov.md/sites/default/files/document/attachments/pna-hg-829-2023.pdf>
- Gutium, T. (2025). *Methodology for assessing social exclusion in European countries*. <https://doi.org/10.36004/nier.cecg.IV.2022.16.8>
- Ivanov, S. (2017). Dynamics of inequality in the welfare of the population of the Republic of Moldova. In: *Social inequalities in the Republic of Moldova. The Formation of the Middle Class: collection of studies and articles: international scientific conference, February 23-24* (pp. 133-139). Chişinău: INCE. <https://rses.ince.md/handle/123456789/1148>
- National Bureau of Statistics (NBS). (2023). *Methodology for calculating the Multidimensional Poverty Index in the Republic of Moldova*. Chişinău. https://statistica.gov.md/files/files/despre/Statistica_experimentală/Metodologia_MPI.pdf
- National Bureau of Statistics (NBS). (2024). *Multidimensional poverty in the Republic of Moldova in 2024*. https://statistica.gov.md/ro/saracia-multidimensională-in-republica-moldova-in-anul-2024-10102_61803.html
- Partnership Center for Development (CPD). (2023). *Unequal Moldova. Analysis of the most relevant inequalities in the Republic of Moldova*. ProGen Policy Report. https://progen.md/wp-content/uploads/2024/11/CPD_Raport-Moldova-Inegala_2024-2.pdf
- Room, G. (1995). Poverty and Social Exclusion: The New European Agenda for Policy and Research. In: G. Room (Ed.), *Beyond the Threshold: The Measurement and Analysis of Social Exclusion* (pp. 1-9). Bristol: Policy Press.
- United Nations Development Programme (UNDP). (2024). *Analysis of multidimensional poverty in the Republic of Moldova in 2022*. Analysis Report. Chişinău: NBS. https://www.undp.org/sites/g/files/zskgke326/files/2024-11/mpi-statist_ro_0.pdf
- Vremiş, M., Craievschi-Toartă, V., Rojco, A., & Cheianu-Andrei, D. (2010). *Approaches to social exclusion in the Republic of Moldova. Methodological and analytical aspects*. Chişinău: IDIS Viitorul. https://files.acquia.undp.org/public/migration/md/Excluz_ENG_OUT_26-02-2010_OK.pdf

PROSPECTS FOR SUSTAINABLE DEVELOPMENT OF RURAL AREAS THROUGH SYNERGY BETWEEN AGRICULTURAL ENTREPRENEURSHIP AND TOURISM

Olga SHEPELEVA, PhD in economics,
Odesa National University of Technology, Odesa, Ukraine
<https://orcid.org/0000-0003-4128-2094>
shepelevaolga1313@gmail.com

Oleksandr BOHDANOV, PhD in economics,
Odesa National University of Technology, Odesa, Ukraine
<https://orcid.org/0000-0002-8505-3675>
bogdanov@wiktoriya.com

Serhii PIECHKA, PhD in economics,
Odesa National University of Technology, Odesa, Ukraine
<https://orcid.org/0000-0003-2688-2729>
sergeipeshka@gmail.com

Dmytro LITVINOV, PhD in economics,
Odesa National University of Technology, Odesa, Ukraine
<https://orcid.org/0000-0001-8612-3834>
dmitrijbavaria@gmail.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.38>

UDC: 338.48(478-22)

JEL Classification: L83, Q01, Q13, Q26, R11

***Abstract.** Despite the challenges posed by the war, the national agricultural sector remains one of the key drivers of the Ukrainian economy and a factor in the stability of the national economic system. The combination of agricultural entrepreneurship and tourism creates a synergistic effect-agricultural enterprises can offer tourists unique food and wine products, ecotourism routes, and agricultural education programs, which increases the competitiveness of the regions. Thus, the development of agriculture in conjunction with tourism can ensure sustainable growth in rural areas, improve the quality of life of the local population, and strengthen Ukraine's socio-economic integration into the global space. In Ukraine, the role of the creative economy, particularly tourism and craft production, is growing as important factors in the recovery and development of communities in wartime. Experience with interregional cooperation has shown that combining natural resources, cultural heritage, and entrepreneurial initiatives contributes to the creation of competitive products and creates additional employment opportunities for the population.*

***Keywords:** sustainable development, agritourism, agricultural entrepreneurship, rural areas, tourism, synergy*

Introduction. Despite the challenges posed by the war, the national agricultural sector remains one of the key drivers of the Ukrainian economy and a factor in the stability of the national economic system. In the context of current transformations, it is particularly important to improve the organizational and production structure of the agricultural sector, which will contribute to increasing its competitiveness and development based on the principles of equality of economic entities (NISS, 2025). The combination of agricultural entrepreneurship and tourism creates a synergistic effect-agricultural enterprises can offer tourists unique food and wine products, ecotourism routes, and agricultural education programs, which increases the competitiveness of regions (UNWTO, 2022).

Literature review. The integration of local products into the tourism experience is seen as a strategic tool for revitalizing the local economy (Giovanni, Elisabetta, Rosanna, 2016). An analysis of international tourism development highlights the growing demand for sustainable, local, and rural recreation, which opens up opportunities for rural areas, especially with the right policies for managing flows and service quality (OECD, 2024).

Research methodology. The UN Tourism (UNWTO) report indicates that one of the key aspects is the resilience of rural tourism after the COVID-19 pandemic, and it is this type of tourism that has demonstrated the ability to quickly adapt to new conditions and even experienced a surge in popularity, especially among domestic travelers (UNWTO, 2024). The OECD emphasizes the need to shift the focus of state support from direct subsidies for production to innovation, infrastructure development, and environmental outcomes, which is critical for creating synergies between tourism and agriculture (OECD, 2024). An analysis of studies on the development of rural green tourism in Ukraine indicates its significant potential, based on the natural resources and cultural wealth of the regions, the availability of private accommodation in villages, labour resources, environmentally friendly farm products, and the relatively low cost of recreation (Oliinyk, Danilova, 2025).

Main results. At the European Union level, tourism development is actively supported by investment programs and grants for startups, which helps reduce the risks of income instability and stimulates employment in small rural communities (European CAP Network, 2025). The UN launched a competition for the best tourist villages, The Best Tourism Villages by UN Tourism, which aims to use tourism as a tool for rural development, prosperity, and sustainability (UNWTO, 2025). In 2025, Ukraine hosted an interregional conference that brought together participants from 13 regions to discuss the development of agro-, ethno-, gastro-, medical-rehabilitation, and green tourism and the formation of cross-sector partnerships. According to DART, in 2024, the tourism industry brought in over UAH 270 million to the budgets (+20% compared to 2023), with the western regions showing the highest growth (+46%). The conference demonstrated that tourism and craft production can be key drivers of community recovery and development even in wartime (UNDP, 2025).

Discussion and conclusions. The combination of agribusiness and tourism creates a synergistic effect that ensures the competitiveness of regions and improves

the quality of life of the local population. Rural green tourism, having demonstrated resilience in crisis conditions, has the potential to become an important driver of economic recovery and community development. Examples of interregional cooperation in Ukraine confirm that a creative economy based on tourism and craft production can be an effective tool for Ukraine's sustainable development.

REFERENCES

- Giovanni, Q., Elisabetta, C., & Rosanna, S. (2016). Economic and Social Sustainable Synergies to Promote Innovations in Rural Tourism and Local Development. *Sustainability*, 8(7), 668. <https://doi.org/10.3390/su8070668>
- National CAP Networks. (2025). *Agricultural and Rural Inspiration Awards (ARIA)*. https://eu-cap-network.ec.europa.eu/search_en?fulltext=rural+green+tourism
- National Institute for Strategic Studies (NISS). (2025). *Key challenges for the agricultural sector and main tasks of the state agricultural policy for 2025*. <https://niss.gov.ua/doslidzhennya/sotsialna-polityka/klyuchovi-vyklyky-dlya-ahharnoho-sektoru-ta-osnovni-zavdannya>
- Oliinyk, V., & Danilova, O. (2025). Tourism organisation: rural green tourism, global experience and prospects for development in Ukraine. *Economy and Society*, 72. <https://doi.org/10.32782/2524-0072/2025-72-30>
- Organisation for Economic Co-operation and Development (OECD). (2024). *OECD Tourism Trends and Policies 2024*. Report. https://www.oecd.org/en/publications/oecd-tourism-trends-and-policies-2024_80885d8b-en/full-report.html
- United Nations Development Programme (UNDP). (2025). *Tourism and craft production as drivers of economic recovery: representatives of 13 regions of Ukraine discussed the potential of the creative economy*. <https://www.undp.org/uk/ukraine/news/turyzm-i-kraftove-vyrobnystvo-yak-rushiyi-ekonomichnoho-vidnovlennya-predstavnyky-13-oblastey-ukrayiny-obhovoryly-potentsial>
- UNWTO. World Tourism Organization (2024). *Tourism And Rural Development: From Local Governance To National Strategies*. <https://www.untourism.int/events/tourism-and-rural-development-from-local-governance-to-national-strategies>
- UNWTO. World Tourism Organization (2025). *UN Tourism opens call for Best Tourism Villages 2025*. <https://www.untourism.int/news/un-tourism-opens-call-for-best-tourism-villages-2025>

EVALUATION OF THE EUROPEAN UNION COUNTRIES' SYSTEM OF INDICATORS FOR MEASURING INCOME INEQUALITY AND POVERTY LEVEL AMONG THE POPULATION

Tatiana COLESNICOVA, *PhD in economics, Associate Professor, Head of Department "Social Research and Standard of Living", National Institute for Economic Research, Academy of Economic Studies of Moldova*
<https://orcid.org/0000-0001-9663-6991>
colesnicova.tatiana@ase.md

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.39>

UDC: 330.59(4)

JEL Classification: I32, D31, D33

Abstract. *This research analyzes the European Union countries' system of indicators used to measure income inequality and poverty level among the population. Income disparities within the EU are significant, however, the disparities are stark between member states. The Gini coefficient for income inequality stood at 29.6% in 2023, indicating moderate inequality. For example, Bulgaria and Lithuania have the highest levels of inequality, with Gini coefficients that exceed 35%, while for Slovakia, Slovenia, Belgium, and Czechia the levels are much lower, with coefficients below 25%. A substantial portion of the EU population is at risk of poverty or social exclusion. In 2023, approximately 21.4% of EU citizens, or nearly 95 million individuals, faced this risk. This figure includes those below the poverty threshold, those experiencing severe material deprivation, and those in low work-intensity households. Romania, Bulgaria, and Greece exhibit particularly high percentages of individuals at risk, especially in rural areas where there are limited job opportunities and services. In general, the system of indicators for measuring income inequality includes many different indicators, the most important of which are: the Gini coefficient (the most common indicator), the Lorenz curve (a graphical illustration of income distribution), the decile coefficient (the ratio of the income of the richest 10% to the poorest 10%), and indicators reflecting the share of certain population groups in total income. European Union countries use the Gini coefficient as the main indicator for measuring income inequality, which reflects the degree of income stratification in society. At the EU level, the ratio of the incomes of the richest 20% to the poorest 20% (S80/S20) is also used to assess the level of inequality. Comparing the Gini coefficient of the Republic of Moldova with that of neighboring countries reveals certain differences in the level of income inequality. Eastern European countries such as Romania and Ukraine also face inequality issues, but the dynamics of changes in the coefficient in these countries may differ. These differences reflect the overall socioeconomic status of the countries and the effectiveness of their social and economic policies. Analysis of neighboring countries allows Moldova to assess its achievements and shortcomings in the context of regional development. Acknowledgments: The article was elaborated within the*

Project selected in competition "Stimulating excellence in scientific research 2025-2026" 25.80012.0807.37SE "The perfection of instruments for reducing income inequality and reducing poverty of the population in the process of European integration of the Republic of Moldova", institutional funding, ANCD.

Keywords: *system of indicators, European Union countries, income inequality, poverty levels among the population.*

Introduction. Wealth distribution is one of the important indicators of equality in society. According to the latest data from the European Central Bank for the first quarter of 2025, which reveals economic inequality in European society, the richest 5% of families account for 44.5% of wealth. The wealthiest 10% of households in the eurozone own 57.4% of total wealth. Moreover, the top 5% of this category account for 44.5%, while the poorest 50% of households account for only 5% of wealth.

Literature review. This research analyzed the key instruments used to evaluate the welfare of the population in EU countries and performed a comparative analysis the information from relevant reports published by the largest Swiss financial holding company, providing a wide range of financial services worldwide – UBS and statistical data from European Central Bank. This research also utilized articles by researchers in this field, scientific monographs, reports, presentations, etc. The system of indicators for measuring income inequality includes many different indicators, the most important of them are: the Gini coefficient (the wide spread indicator), the Lorenz curve (a graphical illustration of income distribution), the decile coefficient (the ratio of the income of the richest 10% to the poorest 10%), and indicators reflecting the share of certain population groups in total income. There is also the Robin Hood index, also known as the Hoover index. This indicator determines the share of public income that needs to be redistributed between classes to achieve equality. Graphically, it is displayed as the longest vertical segment between the Lorenz curve and the baseline. The Robin Hood Index is used not only in finance. For example, it can help assess the availability of medical professionals in different areas. The wide spread of these tools is the Gini index. The Gini coefficient is a statistical indicator of the degree of social stratification, ranging from 0 to 1. The further its value deviates from zero and approaches one, the more income is concentrated in the hands of certain groups of the population, while “0” means complete equality. Algebraically, the coefficient can be calculated using several formulas, but the following is commonly used:

$$K_G = 1 - 2 \sum_{i=1}^n x_i \text{cum } y_i + \sum_{i=1}^n x_i y_i$$

Where:

x_i — the share of the population belonging to the i -th social group in the total population;

y_i — the share of income concentrated in the i -th social group of the population;
 n — the number of social groups;
cum y_i — the cumulative, i.e., accumulated share of the i -th group in the population.

General purpose and research methodology. The general purpose of research is to analyze and evaluate the European Union countries' system of indicators for measuring income inequality and poverty level among the population. The following general scientific methods were used in elaborating of this research: monographic analysis, statistical analysis, comparative analysis of EU countries.

Main results. UBS presented the Report “Global Wealth 2025” in which the Gini index for the distribution of national income in Europe as of 2024. According to the UBS Report, the highest economic inequality is recorded in Sweden, where the Gini coefficient is 0.75; and the lowest in Slovakia (0.38). Apart from Sweden, economic inequality is also high in Turkey (0.73), Cyprus (0.72), the Czech Republic (0.72), and Latvia (0.7). At the bottom of the ranking are Belgium (0.47), Malta (0.48), and Slovakia (0.5). Among the five leading economies in Europe, Germany has the highest level of economic inequality at 0.68. In other countries, the figures are slightly closer to zero: Spain at 0.56, followed by Italy (0.57), the United Kingdom (0.58), and France (0.59). Sweden is the best country in terms of social equality, but the distribution of wealth in this country is one of the most uneven in Europe. Experts point to several reasons for this, including the abolition of wealth taxes over the past decades and the fact that there is no inheritance, gift, or property tax in the country. In addition, very low corporate taxation creates many “opportunities for rich people to get even richer.” Another indicator of wealth distribution is the share of wealth held by the richest 5% of the population. According to ECB data for the first quarter of 2025, this share varies from 30.8% in Malta to 54% in Latvia among 20 European countries. Apart from Malta, the lowest economic inequality is observed in Cyprus (31.4%), the Netherlands (32.8%), Greece (33%), and Slovakia (34.4%). Among countries with a strong divide between rich and poor, Latvia is followed by Austria (53.1%) and Lithuania (51.7%), where the richest 5% of the population owns more than half of the total household wealth. The ranking of European countries where economic inequality thrives is as follows: Latvia and Austria (64%), Germany (60.5%), Italy (60.3%). In France, this figure is 54.8%, in Spain - 53.4%, and in Ireland (48.6%). Countries where wealth distribution is more equitable, albeit marginally: the Netherlands (46.2%), Greece (45.4%), Cyprus (44.8%), and Slovakia (44.1%).

Table 1. Wealth shares in UE by top 5% and 10% in Q1-2025

Country	Top 5%	Top 10%
Austria	53.1	64.0
Belgium	43.7	54.6
Cyprus	31.4	44.8
Estonia	44.6	56.2
Finland	45.3	57.8
France	41.3	54.8
Germany	47.5	60.5
Greece	33.0	45.4
Hungary	38.6	50.4
Ireland	36.0	48.6
Italy	48.3	60.3
Latvia	54.0	64.0
Lithuania	51.7	59.5
Luxembourg	40.3	52.4
Malta	30.8	42.7
Netherlands	32.8	46.2
Portugal	46.0	57.8
Slovakia	34.4	44.1
Slovenia	38.8	50.2
Spain	41.4	53.4

Source: European Central Bank (ECB)

Eurofound experts emphasize that home ownership is one of the main factors influencing differences in wealth distribution. In countries with higher levels of home ownership, wealth distribution inequality tends to be lower, while in countries where access to other financial assets is more widespread, economic inequality is higher. Comparison the Gini index of the Republic of Moldova with neighboring countries reveals certain differences in the level of income inequality. The Moldovan rank is last in terms of living standards. That's why Moldova being named the poorest country in Southeast Europe. One of three people live below the subsistence

level (absolute poverty rate of 33.6% in 2024). In rural areas, 43% of people live below the poverty line. The degree of stratification of society in terms of consumption is increasing, especially in urban areas. Eastern European countries such as Romania and Ukraine also face inequality issues, but the dynamics of changes in the coefficient in these countries may differ. These differences reflect the overall socioeconomic status of the countries and the effectiveness of their social and economic policies. Analysis of neighboring countries allows Moldova to assess its achievements and shortcomings in the context of regional development.

Conclusion. This research analyzed the key tools for evaluating inequality in the distribution of resources among people in EU countries. It examined in detail the Gini index, the most well-known and reliable indicator of this inequality. Today, the Gini index is the most informative indicator of social inequality. It most accurately shows how evenly income is distributed among a country's citizens. An analysis of the Gini index by EU countries is also presented. UBS data for 2022 covers more countries in terms of wealth share, including the top indicator in Europe, although the results may differ from ECB data. The economic inequality indicator changes over time.

Acknowledgments: The article was elaborated within the scientific Project for 2025-2026 25.80012.0807.37SE "The perfection of instruments for reducing income inequality and reducing poverty of the population in the process of European integration of the Republic of Moldova", institutional funding, ANCD.

REFERENCES

- Blatnik, N., Bobasu, A., Krustev, G., & Tujula, M. (2024). Introducing the Distributional Wealth Accounts for euro area households. *ECB Economic Bulletin*, 5. https://www.ecb.europa.eu/press/economic-bulletin/articles/2024/html/ecb.ebart202405_02~50a620f16b.en.html
- Euronews. (2025). *Wealth inequality across Europe: Which countries have the most unfair distribution?* <https://www.euronews.com/business/2025/09/12/wealth-inequality-across-europe-which-countries-have-the-most-unfair-distribution>
- Statista. (2025). *Gini coefficient for equalized disposable income in the European Union in 2024, by member state.* https://www.statista.com/statistics/874070/gini-index-score-of-eu-countries/?srsltid=AfmBOorf0aIXk3xFuEH6cIII-4UCSvwxbi5LY1FC3aY9t_Hsjv6eQel
- The Global Economy. (n.d.). *Gini inequality index - Country rankings.* https://www.theglobaleconomy.com/rankings/gini_inequality_index/Europe/
- Union Bank of Switzerland (UBS). (2025). *Global Wealth Report 2025. Crafted wealth intelligence.* <https://www.ubs.com/global/en/wealthmanagement/insights/global-wealth-report.html>

CARBON CAPTURE AND STORAGE TECHNOLOGIES: SUSTAINABILITY AND JOBS

**Silvia Elena ISACHI, Scientific Researcher,
Victor Slăvescu – Centre for Financial and Monetary Research, Romanian
Academy, Bucharest, Romania**

<https://orcid.org/0009-0004-5404-9050>
silvia.isachi@gmail.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.40>

UDC: 502.15

JEL Classification: Q01, Q40, J21

Abstract. *In this paper, we aim to analyze the long-term sustainability implications of large-scale deployment of carbon capture and storage (CCS) technologies and the potential for job creation. The main objective is to highlight the role of CCS in reducing greenhouse gas emissions in hard-to-decarbonize industrial sectors, such as cement, steel, and chemical, without compromising economic competitiveness. The methodology adopted is based on an integrated approach, combining the analysis of the environmental and economic benefits of CCS with the identification of technical, financial, and social challenges. At the same time, the paper highlights the impact on the labour market, focusing on sectors with job creation potential and on professional retraining opportunities in regions affected by the energy transition. The results suggest that CCS technologies can significantly contribute to reducing the carbon footprint and diversifying energy sources while generating new jobs in areas such as engineering, construction, and infrastructure operations. However, the implementation of these technologies faces obstacles related to costs, social acceptability, and the need for a clear legislative framework. The conclusions emphasize the importance of integrating CCS into coherent public policies and the need for collaboration between authorities, industry, and academia to ensure sustainable development.*

Keywords: *carbon capture and storage, energy transition, jobs, sustainability, decarbonisation, public policy*

Introduction. One of the greatest challenges of the 21st century is climate change. Reducing greenhouse gas (GHG) emissions is an important objective for the global economy, with a view to achieving climate neutrality by 2050. Carbon capture and storage (CCS) technologies play a key role in sectors that are difficult to decarbonize, such as cement, steel, refineries and petrochemicals.

The paper aims to analyze how CCS influences long-term sustainability and the labour market, by studying the existing literature and from an economic perspective.

Literature review. According to the IPCC report (2022), the implementation of CCS is indispensable for reducing global emissions, and the costs of the energy transition would increase significantly in the absence of this technology. The IEA

report (2021) estimates that by 2050, 15% of emission reductions will come from CCS. Studies show major differences between regions of the world in terms of the degree of implementation (Table 1).

Table 1. Examples of CCS implementation around the world

Country/ Region	Number of operational projects	Annual capture capacity (MtCO ₂)	Main areas
USA	13	~25	Energy, Chemicals, Oil
Norway	2	~2	Offshore, Gas
Canada	4	~7	Energy, Fertilizers
EU (devoloping)	10+	~20 (until 2030)	Heavy Industry

Source: data processing according to IEA (2021)

The literature highlights that although CCS is a promising solution, the main obstacles are high costs and social acceptance.

Research methodology. The methodology adopted is practical and is based on: *comparative analysis* of international studies and European pilot projects, *socio-economic assessment* with impact on employment by estimating direct, indirect and induced jobs and *SWOT analysis* for CCS in the European context.

Table 2. SWOT analysis for CCS

Strengths	Weaknesses	Opportunities	Threats
Reducing emissions in hard-to-decarbonize industries	High implementation costs	European Innovation Funds	Competition with cheaper renewable sources
Supporting the energy transition	Lack of mature infrastructure	Retraining of the workforce	The risk of "lock-in" in fossil fuels
Creating jobs	Low social acceptability	Export of technological know-how	Lack of clear regulations

Source: data processing according to IEA (2021) and Global CCS Institute (2023) reports

Main results. The study highlights the potential of CCS to contribute to climate goals, but also to socio-economic development. CCS projects have an *impact on the labour market* by generating jobs in three stages (Table 3). The results show

that CCS can support industrial regions in transition, but only through support policies and retraining programs.

Table 3. Employment estimates

CCS Stage	Job types	Estimated places / large project
Infrastructure Construction	Engineering, Civil Engineering, Logistics	2,000–3,000 temporary
Operation and Maintenance	Technicians, Operators, IT	200–300 permanent
Indirect Chains	Transportation, Services, Suppliers	500–800 temporary/permanent

Source: data processing according to reports from ZEP (2021), European Commission (2020)

Discussion and conclusions. The analysis shows that CCS can be an important component of the energy transition, with significant benefits for sustainability and the labour market. However, clear public policies and consistent investments are needed. Collaboration between authorities, industry and academia is vital, as is ensuring social acceptance through transparency and direct benefits for communities. In conclusion, CCS is not a stand-alone solution, but part of a mix of policies and technologies. If implemented correctly, it can support both emission reductions and sustainable economic development.

REFERENCES

- European Commission. (2020). *Clean energy transition – Employment and skills impacts*. Publications Office of the European Union. <https://doi.org/10.2833/2397>
- Global CCS Institute. (2023). *Global status of CCS 2023*. Melbourne: Global CCS Institute.
- Intergovernmental Panel on Climate Change. (2022). *Climate change 2022: Mitigation of climate change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press. <https://doi.org/10.1017/9781009157926>
- International Energy Agency. (2021). *CCUS in clean energy transitions*. Paris: IEA. <https://www.iea.org/reports/ccus-in-clean-energy-transitions>
- Zero Emissions Platform. (2021). *Jobs and CCS: Creating employment opportunities*. Brussels: ZEP. <https://zeroemissionsplatform.eu>

QUALITY OF HABITATION AND PERCEPTION OF URBAN SPACE. CASE STUDY: TÂRGU JIU CITY, ROMANIA

Ciprian NIMARĂ, *PhD in engineering,*
University of Petroșani, Romania
<https://orcid.org/0000-0003-0394-7841>
ciprian.nimara@yahoo.com, cipriannimara@upet.ro

Anca Jarmila GUȚĂ, *PhD in economics,*
University of Petroșani, Romania
<https://orcid.org/0000-0002-5148-4266>
ancaguta@upet.ro

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.41>

UDC: 316.334.56(498-21)

JEL Classification: I3, J1, Q1, R1

Abstract. *This study aims to highlight the city's existing local problems. We conducted an analysis of life quality in the municipality of Târgu Jiu, presenting the perception of the people surveyed regarding the image of the city and living, the quality of public services, the quality and protection of the environment, as well as the number and quality of cultural, sports and leisure events. With specific interpretations and conclusions, the paper is based on documentation from field observations and interpretation of data obtained from various authorized institutions.*

Keywords: *urbanization, life quality, public services, marginalized urban areas, inequity*

Introduction. Through systematic surveys, but also including the results of an opinion poll, we tried to complete the analysis on an objective basis, with a subjective image, as a premise for identifying the elements imprinted in the local collective mentality as essential, as well as for establishing the optimal action measures, in the short, medium and long term for sustainable development.

An important indicator that reflects the standard of living that we took into consideration in this paper is the rate of severe material deprivation. In the field we found areas which are territorially integrated, but they don't have access to the developed area and are characterized by social exclusion and segregation, poverty and increased crime.

Literature review. In relation to a systemic structure, such as the city, the quality of life requires the evaluation and adequate expression of the dynamics of that structure, assuming the balanced development of the connections between components, decided and controlled by the decision-making center. If we take an anthropocentric position, sustainable urban development can be seen as a long-term increase in the quality of life (Mavric and Bobek, 2015).

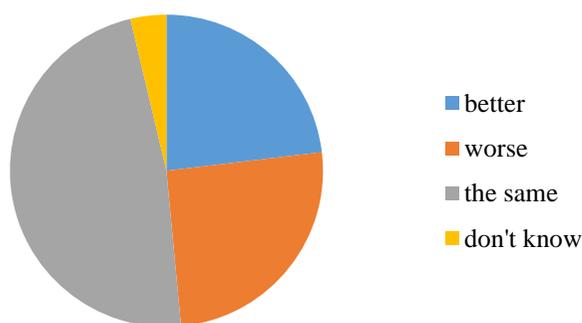
Based on literature review, we made an effort to identify generic attributes of marginalized urban areas and the way in which development planning tends to reply. Three major attributes are identified: the spatial expression of urban development, the functional appearance of land uses, activities and innovation, and a casual perspective featuring flows and drivers of change (Woltjer, 2014).

Research methodology. The sample of the present research includes 124 subjects over 18 years, living in the city of Târgu Jiu. The distribution of respondents in the sample is presented according to the socio-demographic characteristics, which were taken into account and the classification criteria presented in the following graphs, according to age, gender, level of education and income level. After processing the data, it appears that 66% of respondents are women and 34% are men aged between 18 and 65.

Respondents were grouped into age categories, so respondents aged between 18 and 35 represent 36%, those aged between 36 and 50 represent 45%, those aged between 51 and 65 represent 18%, while respondents aged over 65 represent 1%.

Main results. Even though statistical data indicates a decrease in the rate of severe material deprivation for the South West Oltenia development region, it remains almost 7% above the national average. The results demonstrate that 47.8% of the respondents say they have the same level of quality of life as before the 2020 pandemic and only 25.4% are dissatisfied, indicating a lower level of life than the one they had before 2020 (*Figure 1*).

Figure 1. Perception of life quality

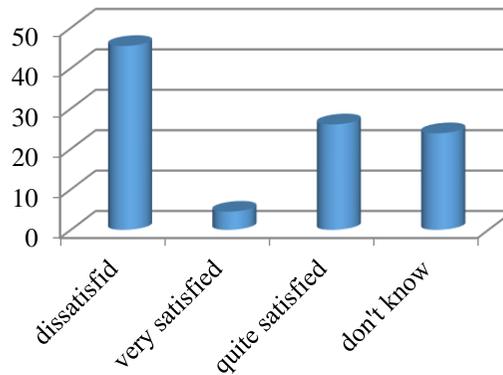


Source: processed data based on the opinion poll

According to research, in Târgu Jiu city 80.56% of the population is located in advantaged areas, 3.75% of the population in disadvantaged areas by housing, 6.24% of the population in disadvantaged areas by employment and 5.62% of the population in disadvantaged areas by human capital, resulting in a percentage of 1.92% of the population in marginalized areas. These marginalized urban areas refer to neighborhoods in Târgu Jiu city where most of the population lives in inadequate housing, without access to essential utilities, which accumulates disadvantages from the perspective of human capital, employment and housing.

To the question *How much trust do you have in local public institutions?* 27.6% of respondents were rather dissatisfied, 45.5% did not want to answer this question, and 4.5% declared themselves very satisfied (*Figure 2*).

Figure 2. Trust in local public institutions



Source: processed data based on the opinion poll

Discussion and conclusions. People living in the analyzed marginalized areas have a complex of social problems (lack of education, lack of qualifications, poor housing and hygiene conditions, health problems, etc.). To be overcome, these problems must be addressed in an integrated manner, through effective case management and individualized support services are essential, for each family.

Thus, the need to adopt a multi-sectoral and integrated strategy was identified to create a bridge between policies, on the one hand and concrete actions, on the other hand, through complementary investments.

REFERENCES

- Mavric, J., & Bobek, V. (2015) Measuring urban development and city performance. Chapter 5. In: V. Bobec (Ed.), *Perspectives on business and management* (pp. 71-99). Rijeka, Croatia: InTech. <http://dx.doi.org/10.5772/59635>
- Târgu Jiu City Hall. (2021). *Integrated urban development strategy of Târgu Jiu municipality 2021-2027*. https://targujiu.ro/dm_tgjiu/portal.nsf/pagini/sidu+targu+jiu+20212027-00018896
- Woltjer, J. (2014). A Global Review on Peri-urban development and planning. *Jurnal Perencanaan Wilayah dan Kota*. 25(1), 1-16. <https://doi.org/10.5614/jpwk.2014.25.1.1>

THE QUALITY OF DEMOCRACY PERCEIVED BY THE POPULATION OF ROMANIA IN MARCH 2023

Maria Livia STEFĂNESCU, *PhD in sociology, Researcher, Research Institute for Quality of Life, Romanian Academy, Bucharest, Romania,*
<https://orcid.org/0000-0001-8482-6050>
livia.stefanescu@gmail.com

DOI: <https://doi.org/10.36004/nier.cecg.II.2025.19.42>

UDC: 321.7(498)

JEL Classification: C43, C83, D72, R59

Abstract. *This paper aims to assess the degree of democratization perceived by the population of Romania with the intention of consolidating the current democracy. A total of 1013 people from Romania responded to the questions Q of a common European questionnaire in March 2023. We list some of the aspects addressed: knowledge of some essential features of democracy regarding the expression of opinions, ways of conducting debates, appreciation of the quality of information; citizens' satisfaction with the existing democracy in Romania; serious threats to democracy in Romania; characteristics in the conduct of free and fair elections as well as important aspects regarding the electoral campaign; perception of actions of disinformation of citizens; a hierarchy of media types according to the disinformation or fake news operations carried out; ways to effectively manage online platforms in order to reduce disinformation and information manipulation; analyzing the quality of information received from online platforms; the population's perception of the efficiency for entities dedicated to defending democracy. The X variables that define nuanced responses of the interviewed persons are, as a rule, of the ordinal categorical type. In such a situation, we proposed the TREND(X) indicator with the intention of evaluating the intensity of the positive trend for the variable X.*

Keywords: *population perception, level of democratization, Romanian sample, statistical analysis*

Introduction. The paper evaluates the population's perception of the level of democratization for Romania in 2023 year. The ultimate goal is to highlight effective levers for consolidating the current democracy in Romania.

A total of 1013 people from Romania responded to the questions of a common European questionnaire in March 2023 (Sample1, 2024).

Literature review. We will review some of the ideas promoted in the literature and which are also partially discussed in this material.

So, Hennen et al. (2020) analyze the conditions for forming opinions, making decisions and implementing them by ensuring democratic representativeness of citizen participation at the European level. Solutions are suggested to support the development of democracy by appealing to e-voting, e-participation and e-

governance. An important obstacle to the correct manifestation of the efficiency of democracy is the spread of populism. The decrease in the negative actions of populism is frequently studied in the literature. In this context, we note the work coordinated by Blockmans & Russack (2020).

Special attention is paid in practice to the methodology for the efficient implementation of reforms of the democratic process in the European Union (Schmitter & Trechsel, 2004).

Research methodology. A large part of the variables used in the statistical analyses of this study are of the ordinal categorical type (Agresti, 2010). This fact requires specific indicators in order to compare ordinal variables. As in the work of Ștefănescu (2023) we will apply the indicator TREND(X) to designate the value of the positive trend for the ordinal variable X.

Main results. We will operate with the data from the Sample1 file (2024) that characterizes Romania.

We present below the coding of the Q questions present in the European questionnaire as well as the meaning of the ten questions Q1-Q10. Specifically, the following variables are analyzed: the main characteristics of democracy (Q1.1-Q1.3); the level of satisfaction perceived by the population regarding the current democracy in Romania (Q2); the general features that characterize democracy (Q3.1-Q3.10); the most important defining elements in the case of free and fair elections (Q4.1-Q4.6); the features of an electoral campaign conducted freely and fairly (Q5.1-Q5.6); the population's perception for the phenomenon of disinformation (Q6); the types of media prone to disinformation or fake news (Q7.1-Q7.8); the ways of managing online platforms in order to prevent disinformation and manipulation of information (Q8.1-Q8.5); the procedures necessary for analyzing the quality of information received from online platforms (Q9.1-Q9.3); the population's trust in ten entities that can act to defend democracy (Q10.1-Q10.10).

With these clarifications, for example, by Q3.5 we will designate the fifth characteristic of democracy for question Q3.

Discussion and conclusions. Following the values of TREND index as well as the percentages of population preferences to the various Q1-Q10 questions in the common questionnaire, we place Romania in the lower half of the ranking of European democracies.

In the case of a Q question in which the interviewee opts for several options, we will extend the statistical analysis presented by specifying groups with the most agreed / disagreed options.

More sophisticated statistical models are needed that take into account all EU countries in order to rank these states according to several criteria of the democratic process. In this context, we have already highlighted the European group of Nordic countries, which is clearly superior in terms of democracy to the countries in Eastern Europe or the Balkans.

The results listed above have already been nuanced by operating with several C characteristics of the interviewees. We specify in this context: level of education; type of community; age of the respondent; gender; occupation; development regions

of Romania. Sometimes significant differences were highlighted in relation to the C characteristics of the interviewed person.

REFERENCES

- Agresti, A. (2010). *Analysis of ordinal categorical data* (2nd edition). New York: Wiley. <https://doi.10.1002/9780470594001>
- Blockmans, S., & Russack, S. (2020). *Deliberative democracy in the EU - Countering populism with participation and debate*. Center for European Policy Studies. London: Rowman, Littlefield International Ltd. https://cdn.ceps.eu/wp-content/uploads/2020/03/Deliberative-Democracy_2CU_Vol3.pdf
- Bozóki, A., Bring, S., Castiglione, D., Földt, B., Føllesdal, A., Gaxie, D., Gross, A., Lloyd, A., Lowndes, V., Mifsud Bonnici, U., Nanz, P., Pratchett, L., Ritchie, C., Schmitter, P., & Trechsel, A. H. (2004). *The future of democracy in Europe: trends, analyses and reforms: A Green Paper for the Council of Europe*. Council of Europe Publishing. <https://research.ceu.edu/en/publications/the-future-of-democracy-in-europe-trends-analyses-and-reforms-a-g/>
- European Commission. (2024). *Flash Eurobarometer 522*. Democracy. GESIS. <https://doi.org/10.4232/1.14252>
- Hennen, L., van Keulen, I., Korthagen, I., Aichholzer, G., Lindner, R., & Nielsen, R. Ø. (2020). *European e-democracy in practice*. Cham, Switzerland: Springer Open, Springer Nature.
- Stefanescu, M. L. (2023). The importance given by Romanians to research and innovation in order to ensure future development. In: *Economic Growth in the Conditions of Globalization: Proceedings of the International Scientific Practical Conference* (17-th edition, Vol. 2, pp. 425-437). Chişinău: ASEM-NIER. <https://doi.org/10.36004/nier.cecg.IV.2023.17.24>

Machetare: **Gorceag Silvia**
Design copertă: **Alexandru Sandulescu**

Bun de tipar 10.12.2025
Coli editoriale 10,10. Coli de autor 9,95. Coli de tipar 20,35 .
Comanda nr. 70.

Serviciul Editorial-Poligrafic
al Academiei de Studii Economice din Moldova
Chișinău, MD-2005, str. Bănulescu-Bodoni 59.
fax. (+37322) 74-37-94, tel.: (+37322) 50-11-30
www.ince.md
www.rses.ince.md