

COMPARATIVE STUDY ON THE TREND OF EVOLUTION OF LABOUR RESOURCES IN AGRICULTURE IN ROMANIA AND THE REPUBLIC OF MOLDOVA

Ana URSU, PhD, Researcher. gr. sch. II,
Institute for Agricultural Economy and Rural Development
Bucharest, Romania

<https://orcid.org/0000-0003-1822-9690>, ursu.ana@iceadr.ro

DOI: <https://doi.org/10.36004/nier.cecg.II.2023.17.12>

Abstract. *In the current context of global demographic developments, there are concerns about the growth of the world's population relative to available resources, as well as concerns about climate change on a national and global scale and poverty as a factor holding back a nation's economic prosperity. The study aims to present a multitude of statistical indicators of human development and labour resources in agriculture in order to facilitate both the analysis of the current situation and the shaping of appropriate trends in agricultural labour resources. Statistical data as well as specific documentary sources are used for the study and the methodological approach will be from demographic, economic, social, technological and environmental perspectives. The major findings showed that labour resources in agriculture of the two countries are facing similar major challenges, and their increasing or decreasing trends are influenced by the same determinants.*

Keywords: demography, quality of labour resources, development indicators, comparability indicators, outlook indicators.

JEL: J1, J21, J24, J43, N3, N5, O1

UDC: 331.101.262:631(498+478)

Introduction. The European documents point to "major challenges facing regions, cities and rural settlements in terms of demographic change". The terms used in the document refer to the specific factors that determine demographic change: unequal distribution of the population, declining numbers of people of working age, the imbalance between young people and those over 65, migration, etc. (Journal of the European Union, 2020). Other transitory determinants were and are the Brexit, the COVID 19 pandemic, the war in Ukraine. (European Commission, 2023).

Both in Romania and Moldova the rural population is mostly concentrated in agriculture. The evolution of the agricultural labour force in the two countries is a different process compared to the economy as a whole, mostly due to the seasonality of agricultural activity, in the sense that it is not used with the same intensity throughout the year, which can have a negative influence on incomes. (Cojocaru, 2000). The work process in agriculture can be characterized by the diversity of agricultural work (different branches of production, different work to obtain each

product, nature of efforts - physical, intellectual), the variability in time of agricultural work (farmer's effort, determined by weather and calendar factors, will have a variable intensity in the use of the means of production, and natural conditions will cause wear and tear on machinery), as well as hardship (often difficult conditions restricting the labour market for agriculture, the remuneration system not being correlated with that of effort, etc.). (Zahiu, 1992).

The approach we have taken is to inform and seek common similarities between the two countries and to outline possible solutions resulting from trends in labour resource indicators in agriculture. The paper starts by analysing indicators on the population employed in agriculture and then moves on to identify common characteristics for labour resources in agriculture. We try to establish the causality of increasing or decreasing labour resources in agriculture and quantify the relationships between indicators where possible. Essentially, we looked at whether the results obtained in the agricultural sector are similar in demographic, economic and social aspects.

Research methodology. The data used to identify the demographic, economic and social specificities of Romania and Moldova are data from the National Institute of Statistics of Romania and the National Bureau of Statistics of the Republic of Moldova. Regarding the labour force in agriculture, statistical data from the Household Labour Force Survey (AMIGO) as well as data from the Labour Force Survey (AFM) were used. The analysis of the above-mentioned indicators was carried out by using research methods, for which we mention the analysis and synthesis of quantitative and qualitative data, as well as the analysis of the phenomena characterizing the agricultural activity in the two countries.

Main results. Seen as a productive resource, i.e. a resource that produces work, the agricultural labour force is one of the key resources for sustainable development. The standard of living in any causal model will be influenced by existing human capital, the quantity, quality and structure of the labour force. (Cojocaru, 2000). The complexity of the relationship between the population and the economy, adjusting the pattern of human resource development according to food availability, is difficult. The contradictions between economic, social and demographic systems in different areas must be taken into account so as not to have repercussions for future generations. For both Romania and Moldova, there should be no fear of demographic growth, which would require high food demand, but there should be a fear of demographic decline with medium- and long-term implications, with implications for the quality of human resources, labour productivity, activity rates of the active population, accentuation of demographic ageing processes, consumption relations, etc. (Bulgaru, 1996).

Demographic indicators: The indicators total population, rural population, total employed population and employed population in agriculture were used to determine the potential labour force in agriculture as well as the degree of participation of the rural and national employed population. From the table presented, information can be obtained on the trend in the evolution of the indicators and the changes in their structure.

Table 1: Evolution of the main indicators of the human potential of agriculture and the rural environment, 1914-2022, Romania

Nr. crt	Year	Total population (thousands pers.)	Rural population (thousands pers.)	Total employed population (thousands pers.)	Population employed in agriculture (thousands pers.)	(%) *	(%) **	(%) ***
0	1	2	3	4	5	6	7	8
1	2014	19953	9200	8614	2442	46,1	26,5	28,3
2	2015	19876	9172	8535	2184	46,1	23,8	25,6
3	2016	19761	9124	8449	1952	46,2	21,4	23,1
4	2017	19644	9112	8671	1975	46,4	21,7	22,8
5	2018	19533	9027	8689	1938	46,2	21,5	22,3
6	2019	19426	8962	8680	1844	46,1	20,6	21,2
7	2020	19354	8880	8521	1747	45,9	19,7	20,5
8	2021	19202	8905	7755	911	46,4	10,2	11,8
9	2022	19042	9083	7779*	865*	47,7	9,5	11,1
Annual growth rate (%)		-0,58	-0,16	-1,27	-12,2			

Source: own calculations based on INSSE data, Tempo-online data, AMIGO - Employed population by activity, by employment status and residence background, (Tempo_AMG110T_23_5_2023, *For the year 2022 are data from TRIM IV

* *Share of rural population in total population (%) - Column 6:* the share of rural population in total population averages 46.3%, with a minimum of 46.1 (in 2014, 2015, 2019) and a maximum of 47.7% (in 2022).

** *Share of population employed in agriculture in total rural population (%) - Column 7:* share of population employed in agriculture in rural population is on average 19.4%. Compared to 2014, the population employed in agriculture has decreased by 17 percentage points (from 26.5% to 9.5%).

*** *Share of population employed in agriculture in total employed population (%) - Column 8:* Share of population employed in agriculture in total employed population decreased by 17.2 percentage points (from 28.3% to 11.1%). The average for the period 2014-2022 is 20.7%.

Ratio of total population employed in agriculture (column 2/column 5): one person employed in agriculture produces agricultural goods and services, on average for the period 2014-2022, for 12.5 inhabitants.

Table 2: Evolution of the main indicators of human potential of agriculture and rural environment, 1914-2022, Moldova

Nr. crt	Year	Total population (thousands pers.)	Rural population (thousands pers.)	Total employed population (thousands pers.)	Population employed in agriculture (thousands pers.)	(%) *	(%) **	(%) ***
0	1	2	3	4	5	6	7	8
1	2014	2858	1724	870	207	60,3	50,4	23,7
2	2015	2836	1710	847	196	60,3	49,5	23,2
3	2016	2803	1686	832	202	60,1	49,4	24,3
4	2017	2755	1649	800	181	59,9	48,5	22,6
5	2018	2707	1610	794	194	59,5	49,3	24,5
6	2019	2664	1570	872	183	58,9	55,5	21,0
7	2020	2635	1540	834	176	58,4	54,2	21,1
8	2021	2596	1503	843	181	57,9	56,1	21,5
9	2022	2539	1456	862	179	57,3	59,2	20,8
Annual growth rate (%)		-1,47	-2,09	-0,11	-1,75			

Source: Own calculations based on data from National Bureau of Statistics of Moldova, Labour Force Survey, <http://statbank.statistica.md>

* *Share of rural population in total population (%) - Column 6:* the share of rural population in total population is on average 59.2%, down 3 percentage points in 2022 compared to 2014.

** *Share of population employed in agriculture in the total rural population (%) - Column 7:* the share of population employed in agriculture in the rural population is on average 52.5%. Compared to 2014, the population employed in agriculture increased by 8.8 percentage points (from 50.4% to 59.2%).

*** *Share of population employed in agriculture in total employed population (%) - Column 8:* Share of population employed in agriculture in total employed population decreased by 3 percentage points (from 23.7% to 20.8%). The average for the period 2014-2022 is 22.5%.

Ratio of total population/population employed in agriculture: one person employed in agriculture produces agricultural goods and services, on average for the period 2014-2022, for 14.4 inhabitants.

The population employed in agriculture in Romania represents 91.3% of the rural population and 8.7% of the urban population.

The significant share is held by own-account workers (on average 53.7%, col 8) and unpaid family workers (33.5%, col 9), the latter registering a decrease of 15 percentage points in 2022 compared to 2014. Romania has fewer employees in agriculture (12.4%), but the trend is upwards (14 percentage points in 2022 compared to 2014). Also noteworthy is the increase in the category of employers by 2 percentage points in 2022 compared to 2014.

Table 3: Population employed in agriculture by occupational status, Romania

<i>Year</i>	<i>Pop occup y in agr, of which</i>	<i>Employees in agricultur e</i>	<i>Patron s</i>	<i>Self-employe d</i>	<i>Lucrator unpaid family worker</i>	<i>% (col 2/co 1 1)</i>	<i>% (col 3/co 1 1)</i>	<i>% (col 4/co 1 1)</i>	<i>% (col 5/co 1 1)</i>
0	1	2	3	4	5	6	7	8	9
2014	2441,9	177,6	3,9	1283,3	977,1	7,3	0,2	52,6	40,0
2015	2183,8	177,8	4,4	1202,4	799,3	8,1	0,2	55,1	36,6
2016	1951,9	194,0	4,9	1052,2	700,8	9,9	0,3	53,9	35,9
2017	1974,9	198,2	3,8	1077,6	695,2	10,0	0,2	54,6	35,2
2018	1938,1	202,2	4,3	1056,2	675,3	10,4	0,2	54,5	34,8
2019	1843,8	200,7	8,8	993,9	639,4	10,9	0,5	53,9	34,7
2020	1747,3	195,1	8,7	938,3	604,8	11,2	0,5	53,7	34,6
2021	911,4	201,0	7,0	476,8	226,5	22,1	0,8	52,3	24,9
2022*	865,3	188,5	6,0	455,0	215,8	21,8	0,7	52,6	24,9

Source: own calculations based on INSSE data, Tempo-online data, AMIGO - Employed population by activity, by employment status and residence background, (Tempo_AMG110T_23_5_2023, *For the year 2022 are data from TRIM IV

The population employed in agriculture in Moldova represents 95.4% of the rural population and 4.6% of the urban population.

The significant share is held by own-account workers (on average 47.6%, col 8), decreasing by 18.4 percentage points in 2022 compared to 2014, and by the category of employees (32.3%, col 6), with an increase of 10.2 percentage points, an increase of 0.3 percentage points among employers. Also noteworthy is the unpaid family worker category with an increase of 8 percentage points in 2022 compared to 2014.

Table 4: Population employed in agriculture by occupational status, Moldova

<i>Year</i>	<i>Pop occup y in agr, of which</i>	<i>Employee s in agricultu re</i>	<i>Patron s</i>	<i>Self-employed</i>	<i>Lucrator unpaid family worker</i>	<i>% (col 2/co 1 1)</i>	<i>% (col 3/co 1 1)</i>	<i>% (col 4/co 1 1)</i>	<i>% (col 5/co 1 1)</i>
0	1	2	3	4	5	6	7	8	9
2014	206,5	62,9	0,4	119,8	23,4	30,5	0,2	58,0	11,3
2015	196,2	53,8	0,3	102,9	39,2	27,4	0,2	52,4	20,0
2016	201,8	51,1	0,8	101,7	48,2	25,3	0,4	50,4	23,9
2017	180,8	52,9	0,3	89,1	38,6	29,3	0,2	49,3	21,3
2018	194,2	54,8	0,4	97,2	41,8	28,2	0,2	50,1	21,5
2019	182,8	65,4	0,8	80,9	35,7	35,8	0,4	44,3	19,5
2020	175,9	64,4	0,4	75,4	35,6	36,6	0,2	42,9	20,2
2021	181,2	67,7	0,3	75,6	37,7	37,4	0,2	41,7	20,8
2022	179,3	72,9	0,8	71,0	34,6	40,7	0,4	39,6	19,3

Source: Own calculations based on data from the National Bureau of Statistics of Moldova, Labour Force Survey, <http://statbank.statistica.md>

Labour force aspects: employment rates are higher for men, both in Romania (53.9% for men compared to 40.7% for women) and in Moldova (49.1% for men compared to 47.0% for women). Table 5.

Table 5: Structure of the active and unemployed population in the country as a whole average 2014-2022

Indicators	Romania*	Moldova**
Total active population	8974 thousands of people	962 thousands of people
Men in work (%)	53,9	49,1
Working women (%)	40,7	47,0
Unemployed men (%)	3,4	2,4
Unemployed women (%)	2,0	1,5

Source*: Own calculations based on INSSE data, Tempo-online data - AMIGO - Labour force participation by gender and residence,

Source:** Own calculations based on data from National Bureau of Statistics of Moldova, Labour Force Survey

Even with unemployment in the economy, agriculture cannot be said to be in the ascendant of labour supply and demand. Compared to non-agricultural sectors, "in agriculture there is an under-employment market segment which generates part-time farming (due to seasonality of activity) and a tendency to minimise permanent labour force". (Cojocaru, 2000)

Rural employment issues: The employed population in rural areas is on average 42.2% in Romania and 32.8% in Moldova, while the inactive population is 47.4% in Romania and 49.8% in Moldova. The inactive rural population holds a significant share for both Romania (47.4%) and Moldova (49.8%) Table 6. The inactive population is defined as the sum of "economically inactive persons who are looking for a job but are not available to start working" and "economically inactive persons who are not looking for a job but are available to start working". (INSSE, 2022).

Table 6: Labour force participation of the population in rural areas average 2014-2022

Indicators	Romania*	Moldova**
Rural population	9051667 people	1605262 people
Rural labour force (%)	44,8	33,8
Rural employed population (%)	42,2	32,8
Someri BIM rural (%)	2,6	1,0
Rural inactive population (%)	47,4	49,8

Source*: Own calculations based on INSSE data, Tempo-online data - AMIGO - Labour force participation by gender and residence,

Source:** Own calculations, National Bureau of Statistics of Moldova, Labour Force Survey, Population aged 15 and over by Labour Market Relationship, Sexes, Means, Years and Quarters, <http://statbank.statistica.md>

The labour market in agriculture is dominated by the structures of organisation and management of capital in the industry, i.e. agricultural holdings (the demand for labour will come from them) and family households (which may or may not be commercial in nature, as they rely mostly on family labour). Modern commercial farms tend to reduce the permanent labour force, relying on seasonal labour in the peak season. There are two situations in which there is an "active demand" for labour (the difference between the labour needed and the labour available) and a "passive demand" (represented by available or permanent labour). The use of less skilled labour results in an organisational solution with low efficiency, due to the quantity and quality of work performed by farmers". (Cojocaru, 2000). Knowing the structure of working time and considering it as a factor of productivity cannot be done on the basis of a clear analysis of the activities that make up a day's work on the farm, which cannot be reduced to a sum of time intervals, in which the services are or are not related to obtaining agricultural production.

Education statistics in agriculture and rural areas provide the information needed to analyse developments over time and space. The highest share of the population employed in agriculture in Romania is for the age segment 35-49 years (40.6%) and for Moldova 45-54 years (50.2%), followed by the age segment 50-64 years (25.1%) and 55-64 years (43.7%) Figure 1 and Figure 2. We can state that the probability of giving up working in agriculture decreases with age. The 15-24 age group is more mobile and more determined to increase their income, so they can leave farming for non-agricultural activities. Also another group of those aged 65 and over, being in a small percentage, is associated with retirement or exit from farming. (INSSE, 2020).

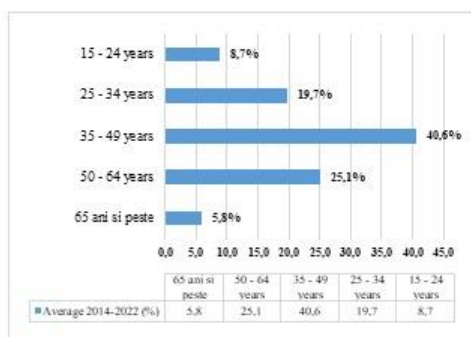


Figure 1: Occupied population by rural age groups, Romania

Source: own calculations based on data, AMIGO - Employed population by activity, by employment status and residence backgrounds

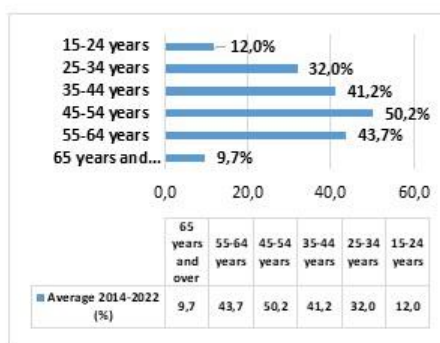


Figure 2: Population employed in agriculture by age group, Moldova

Source: own calculations based on data from the National Bureau of Statistics, Labour Force Survey

The level of education of those working in agriculture in Romania is associated with an increase of specialists with secondary education (35.5%), and in Moldova with secondary education (34.9%).

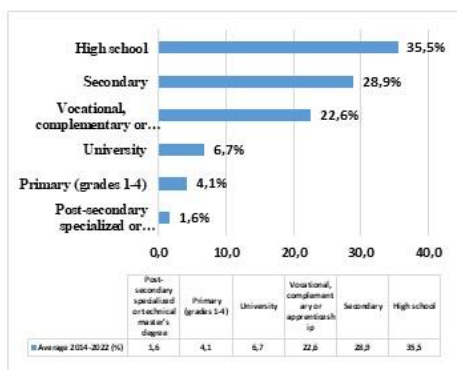


Figure 3: Employed population by education level, rural, Romania

Source: own calculations based on AMIGO data - Employed population by activity, by occupational status and residence backgrounds

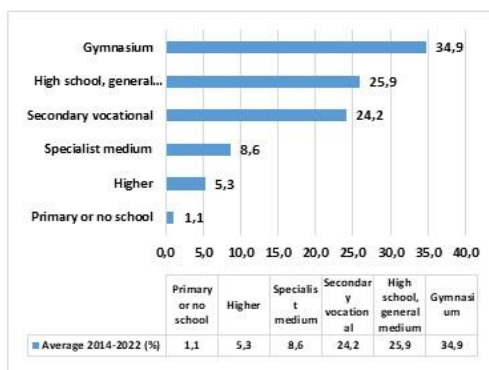


Figure 4: Employed population by level of education, Moldova

Source: Own calculations based on data from National Bureau of Statistics, Labour Force Survey

Investment in agriculture: In Romania, investments allocated to agriculture are on average 5.05% (5285.8 million lei/1138.34 million euro), and in Moldova 9.32% (2418.6 million lei/119.5 million euro), being below investments in industry (the share of investments in industry in total investments is 31.8% in Romania and 12.4% in Moldova). As a result of the specific nature of agricultural activity, achieving a level of economic performance requires a technical endowment that must be carried out at a higher pace than in industry, both because of the backlog and because agricultural machinery and equipment are used seasonally. Modern agriculture requires a high level of technical endowment per agricultural worker precisely because of the seasonal use of a large part of fixed capital and the need to ensure food security. (Zahiu et. al., 2010).

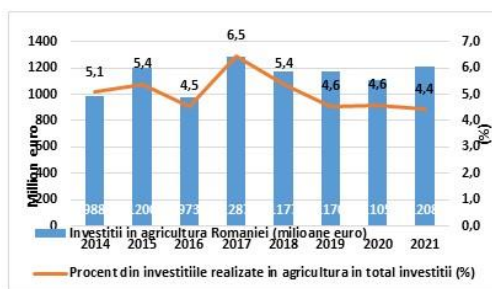


Figure 5: Investments in agriculture, Romania

Source: Own calculations, Net investments by activities of the national economy at the level of section and division, CAEN REV.2

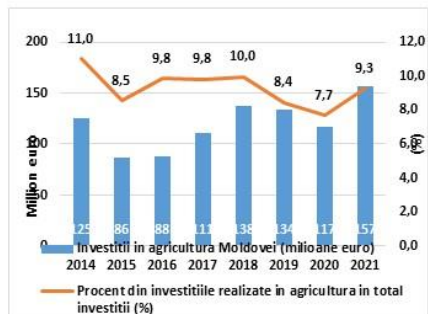


Figure 6: Investment in agriculture, Moldova

Source: Own calculations, Investment in long-term tangible assets by Economic Activities

Household income: For the period 2014-2022, peasant households earned less than half of their income from agriculture. In *Romania*, cash income accounts for 66.1% and income in kind for 33.9%. Income from the sale of agri-food products, livestock and poultry represents 21.4%, and consumption from own resources 33.1%. Table 7.

Table 7: Structure of household income, 2014-2021

Indicators	% of total monthly income Romania
Money income	66,1
Gross wages and other salary entitlements	13,3
Income from sales of agri-food products, livestock and poultry	21,4
Income from self-employed non-agricultural activities	10,3
Income from social benefits	9,9
Income from the sale of household assets	5,0
Income from nature	33,9
The value of income in kind obtained by employees and recipients of social benefits	0,8
Countervalue of consumption from own resources	33,1
Total income	100,0

Source: own calculations based on INSSE data, Tempo-online data, ABF Structure of total household income by income category and number of persons in the household

In *Moldova*, the structure of average monthly income per person includes 61.1% of disposable income, 20.8% of income from social benefits and 18.1% of other income. Income from individual agricultural activity represents 8.2%. Table 8.

Table 8: Average monthly disposable income per person, income sources, 2014-2022

Indicators	% of total monthly income Moldova
Total disposable income	61,1
Wage activity	46,4
Individual agricultural activity	8,2
Income from individual non-agricultural activity	6,3
Property income	0,2
Social benefits	20,8
.. pensions	17,0
.. child benefits	1,1
.. welfare	0,5
Other income	18,1
.. sender	14,7
Total income	100,0

Source: own calculations based on data Average monthly disposable income per person >> Regional statistics >> Standard of living of the population >> Disposable income of the population by source of income and statistical regions, 2019-2022, <http://statbank.statistica.md/>

Income from wage activity in Romania is 13.3% and in Moldova 46.4%, this category being identified with labour cost effort. In the case of agriculture in Moldova the number of employees is higher than in other categories of agricultural labour, which is reflected in the higher percentage of income. In the case of Romania, the number of employees is lower and the costs of unpaid labour are not reflected in the costs of agricultural production.

Discussion and conclusions. Agriculture in Romania and Moldova is dominated in terms of labour resources by own-account workers (53.7% in Romania and 47.6% in Moldova) and unpaid family workers (33.5% in Romania and 19.8% in Moldova). This structure of labour resources creates a new segment of agricultural relations, namely the relationship between own-account workers and unpaid family workers, who often represent a permanent labour force, which sometimes contradicts the variation in labour needs over time.

The increasing use of salaried labour force, both in Romania (12.4%) and in Moldova (32.3%), a phenomenon confirmed by the evolution of the number of employees in agriculture, is also explained by the entry into the labour force of qualified people, which is also evidenced by the high share of people attending high school (35.5% in Romania and 25.9% in Moldova) or those with vocational school (22.6% in Romania and 24.2% in Moldova), etc., but also of unskilled workers, possibly those with secondary education.

In Romania, approximately 46.3% of the population lives in rural areas, and in Moldova 59.2%. The share of the population employed in agriculture in the total rural population is 19.4% in Romania and 52.5% in Moldova. The annual growth rate of the population employed in agriculture is negative (both in Romania (-12.2%/year) and in Moldova (-1.75%). Against the background of the reduction of the population employed in agriculture, in Romania it seems that agriculture is starting to lose the "*occupational buffer label*" (Zahiu et al., 2010), but Moldova remains in this area.

The seasonality of employment in rural areas is also significant. The effect of "*income from social pressures*" (9.9% in Romania and 20.8% in Moldova) can also be associated with the inactive rural population (47.4% in Romania and 49.8% in Moldova) with an effect on employment reduction. However, the diversification of rural activities in the form of *income from non-agricultural activities* (10.3% in Romania and 6.3% in Moldova) contributes to the reduction of seasonal employment.

Investment in agriculture accounts for 5.05% of total investment in Romania and 9.32% in Moldova, below investment in industry, which affects labour productivity.

The study has its limitations in that the population employed in agriculture and its share in the employed population at the national economy level is not sufficient information for the organisation of the productive system in agriculture. The work should be continued by correlating the indicators presented above with long-term economic trends in employment, labour productivity and investment.

REFERENCES

- Avizul Comitetului European al Regiunilor – Schimbările demografice: propuneri privind măsurarea și combaterea efectelor negative în regiunile UE. (2020). *Jurnalul Oficial al Uniunii Europene*, 63,33.
- Biroul Național de Statistică al Republicii Moldova. *Populația de 15 ani și peste pe Relația cu piața forței de muncă, Sexe, Medii, Ani și Trimestre*. Ancheta Forței de Munca. <http://statbank.statistica.md>
- Bulgaru, M. (1996). *Dreptul de a mânca*. Editura Economica.
- Cojocaru, C. (2000). *Analiza economico financiară a exploatațiilor agricole și silvice*. Ediția a doua. București: Editura economică.
- European Commission. (2023). *The impact of demographic change – in a changing environment*. Commission Staff Working Document https://commission.europa.eu/system/files/2023-01/the_impact_of_demographic_change_in_a_changing_environment_2023.PDF
- INSSE. (2022). *Labour Force in Romania employment and unemployment*. The methodology and organization of survey (AMIGO). <https://insse.ro/cms/ro/tags/forta-de-munca-romania-ocupare-si-somaj>
- INSSE. (2023). *ABF Structura veniturilor totale ale gospodăriilor, pe categorii de venituri și numărul persoanelor din component*. Date Tempo-online.
- INSSE. (2023). *AMIGO - Populația ocupată pe activități, după statutul profesional și medii de rezidență* . <http://statistici.insse.ro/shop/?page=tempo2&lang=ro&context=15>
- Zahiu, L. (1992). *Agricultura mondială și mecanismele pieței*. București: Editura Arta Grafică.
- Zahiu, L., Toma, E., Dachin, A., & Alexandri, C. (Coord.). (2010). *Agricultura României – între așteptări și realități*. București: Editura CERES