AGRARIAN ECONOMY AND RURAL DEVELOPMENT - REALITIES AND PERSPECTIVES FOR ROMANIA

Vili, Dragomir

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CONTENTS

RISK EVENTS IN SHEEP FARMING IN BULGARIA

HRISTINA HARIZANOVA – BARTOS[1], TSVETANA HARIZANOVA – METODIEVA[2], NIKOLA METODIEV[3]

Abstract

The aim of the research was to find some of the most often occurred risk events in sheep farms in Bulgaria. 22 sheep farms in Bulgaria were surveyed and questionnaire information was collected from them in 2020.As a result of the study, it was found that the number of farms in which a risk event had occurred in the last 5 years was almost equal to the number of farms in which such an event had not occurred. Of the climatic risks, the most common were drought, followed by hail and cold. Of the other risks, the most common were the sale of products below cost and infectious animal diseases. In the case of a risk event, the effect on the activity of the farm was usually from no effect to medium. As measures to deal with the risk event, the farmers responded differently: some of them financed their activity from another business; others were looking for better markets for their products; some coped at the expense of family deprivation, or waited for the risk event to pass. Also, some farmers had started vaccinating animals against diseases. The majority of farmers did not receive compensation from the state in the case of a risk event. Only 9% of farmers had insurance other than that required for machinery. The prevailing part of the farmers believed that the state did not adequately support them in terms of risk.

Keywords: sheep farming, risk factors, farm insurances

JEL Classification: *Q10, Q12*

INTRODUCTION

Risk is a term used to describe a situation in which the possible outcomes and possible alternatives for each situation are known and it means that there is more than one possible outcome (alternative) [5]. Risk related to the agricultural sector is any current or future hazard (event) with a significant negative impact. It is either idiosyncratic, incidental, unlikely to be associated with an unpredictable event, or systemic - very likely, a "predictable" event [1]. The occurrence of some of these risks and the associated impairments are largely unknown. This cognitive failure makes them very difficult to manage by individuals or markets. Some risks associated with meteorological conditions, such as drought and floods, have a systemic component, as they affect most farmers in an entire region or country [2]. It is difficult to gather information on this type of risk in the sector. Other risks (such as hail) are easier to combine and analyze. Some risks are catastrophic because they are very rare but cause great damage and are often systemic [4]. The development of agricultural production is characterized by greater instability compared to other sectors of the economy [3]. Of essential importance for agricultural production are the risks that determine the yield and the final agricultural production. Risks in agriculture arise as a result of the uncertainty of the factors determining the return on agricultural production.

The aim of the research was to find some of the most often occurred risk events in sheep farms in Bulgaria.

MATERIALS AND METHODS

A number of 22 sheep farms in Bulgaria were surveyed and questionnaire information was collected from them in 2020. The farmers were asked the following questions:

- Was there a risk event on your farm in the last 5 years?
- What climate risks most often occur on your farm?
- Which risks happen to your farm most often (except the climate)?

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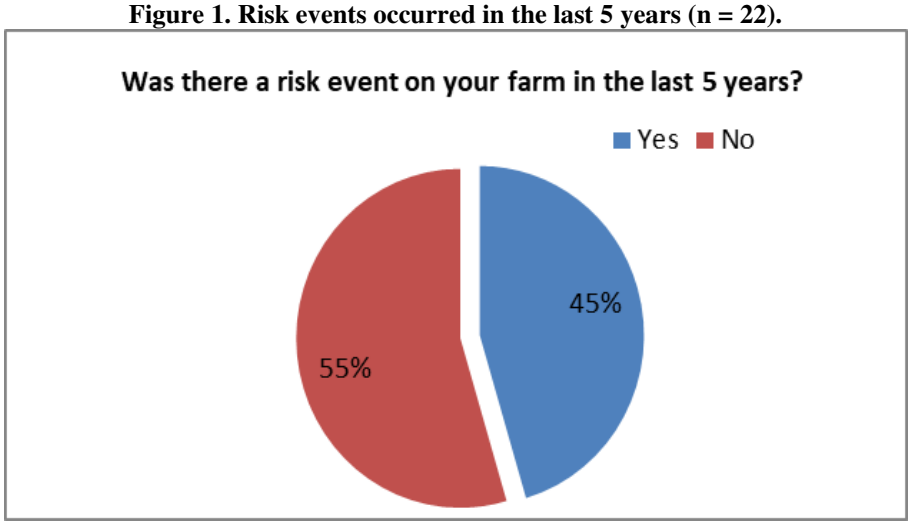
- What were the consequences of the risk occurred?
- What measures did you take to deal?
- Do you receive compensation from the state in case of a risk event?
- Do you have insurance other than that required for the machinery?
- Do you think that the state adequately supports your sector in terms of risk?

Based on the obtained data, the most common risk events and their effect on the activity of the studied farm were derived.The number of observations varied between 21 and 22 depending on how many farmers had answered the questionasked.

RESULTS AND DISCUSSIONS

More than half of the surveyed sheep farmers (55%) answered that in the last 5 years no risk event had occurred on their farms (Figure 1). Such an event occurred in 45% of the farms.

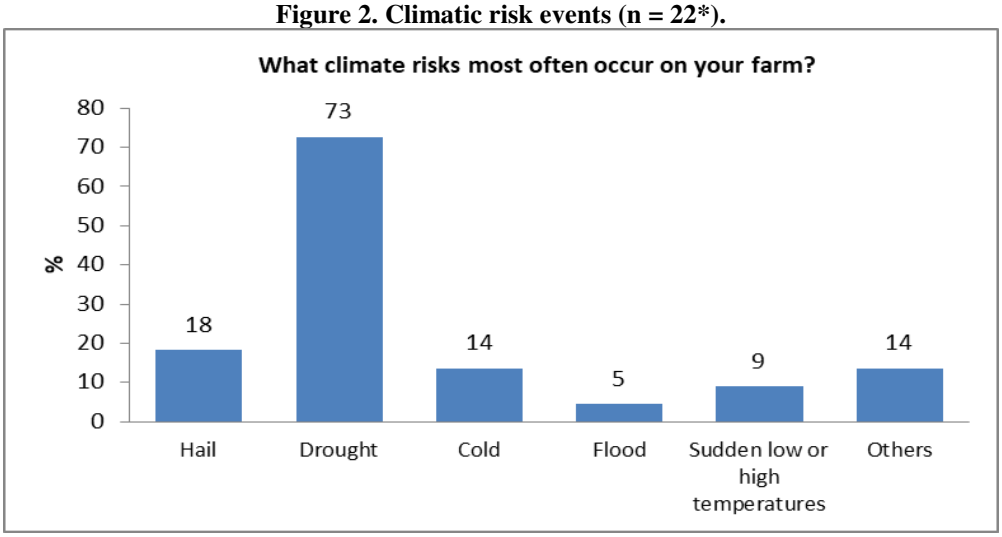
Figure 1. Risk events occurred in the last 5 years (n = 22).



Source: own analysis

In the surveyed farms, the most common risk related to climatic conditions was drought (73% of farms), followed by hail (18%) and cold (14%). 9% of sheep farmers reported sudden low or high temperatures, and 5% of them - floods.

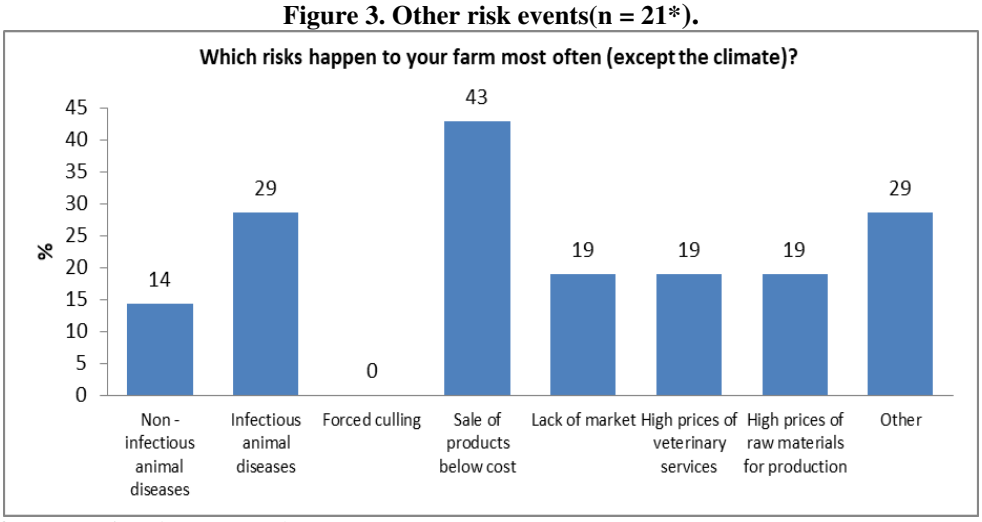
Figure 2. Climatic risk events (n = 22*).



*Some of the farmers pointed out more than one answer.
Source: own analysis

Other risk events related to climatic factors had occurred in 14% of farms (Figure 2).

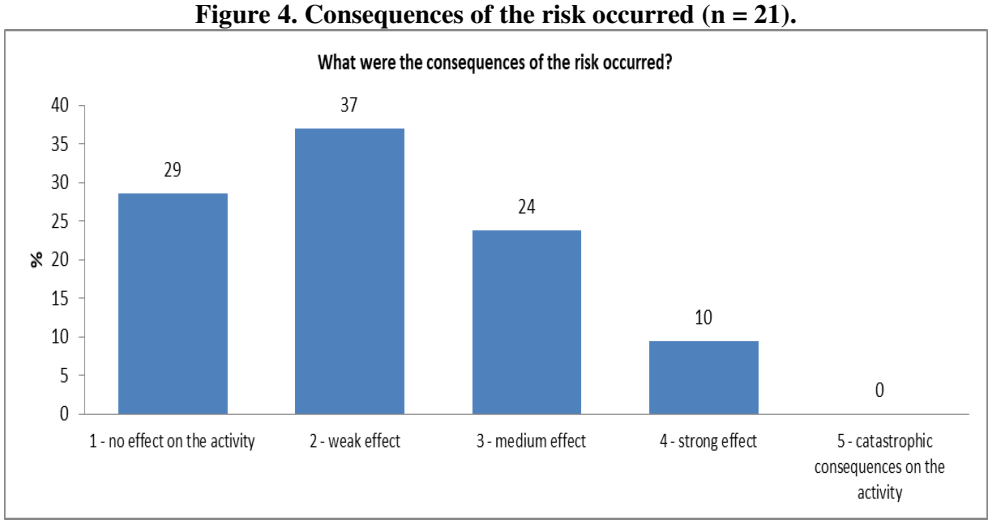
Figure 3. Other risk events(n = 21*).



*Some of the farmers pointed out more than one answer.
Source: own analysis

Almost half (43%) of sheep farms reported selling products below cost, and 29% of farms hadinfectiousanimal diseases. 19% of the respondents answered that the following risk events had occurred: lack of a market for the products, high prices of veterinary services and high prices of raw materials. Non-infectious animal diseases had been identified in 14% of farms. Other risk events occurred in 29% of farms(Figure 3).

Figure 4. Consequences of the risk occurred (n = 21).



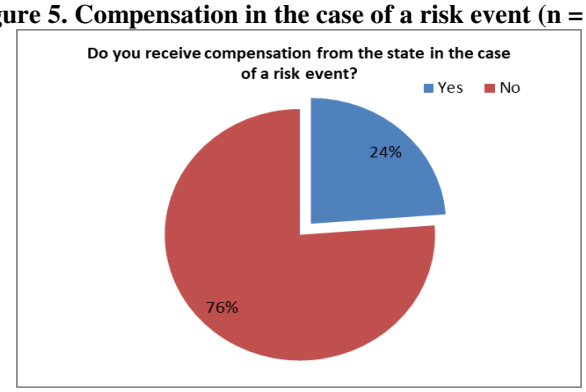
Source: own analysis

In 37% of the farms the effect on the activity as a result of the occurred risk was weak. In 29% of the farms no effect on the activity was observed as a result of the risk event. A medium effect was reported in 24% of the farms, and a strong effect was observed in 10% of them. Catastrophic effect on the activity was not observed in any of the farms (Figure 4).

To the question "What measures did you take to deal?", the farmers answered differently: some of them financed their activity from another business; others were looking for better markets for their products; some coped at the expense of family deprivation, or waited for the risk event to pass. Also, some farmers had started vaccinating animals against diseases.

A quarter of farmers (24%) reported receiving state compensation in the case of a risk event. The remaining three quarters (76%) of farmers did not receive compensation from the state when such an event occurred (Figure 5).

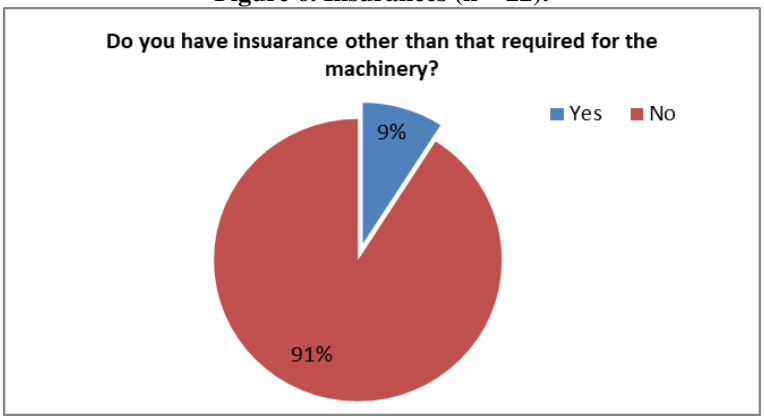
Figure 5. Compensation in the case of a risk event (n = 21).



Source: own analysis

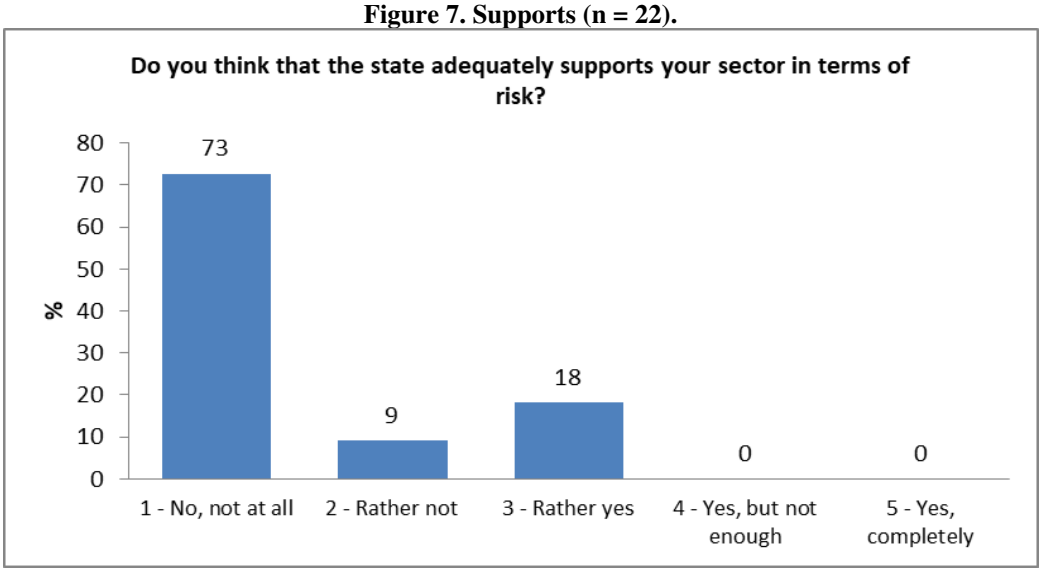
When asked if the farmers had insurance other than that required for the machinery, a small part of the respondents answered that they had (9%) and the rest (91%) reported that they did not (Figure6).

Figure 6. Insurances (n = 22).



Source: own analysis

Figure 7. Supports (n = 22).



Source: own analysis

The prevailing part (73%) of the farmers believed that the state did not adequately support them in terms of risk. 9% answered that the state rather did not support them enough, and 18% were in the opinion that the state rather helped them (Figure 7).

CONCLUSIONS

As a result of the study, it was found that the number of farms in which a risk event had occurred in the last 5 years was almost equal to the number of farms in which such an event had not occurred. Of the climatic risks, the most common were drought, followed by hail and cold. Of the other risks, the most common were the sale of products below cost and infectious animal diseases. In the case of a risk event, the effect on the activity of the farm was usually from no effect to medium. As measures to deal with the risk event, the farmers responded differently:some of them financed their activity from another business; others were looking for better markets for their products; some coped at the expense of family deprivation, or waited for the risk event to pass. Also, some farmers had started vaccinating animals against diseases.The majority of farmers did not receive compensation from the state in the case of a risk event. Only 9% of farmers had insurance other than that required for machinery. The prevailing part of the farmers believed that the state did not adequately support them in terms of risk.

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RECESSION IN THE ECONOMY OF THE REPUBLIC OF MOLDOVA

GAINA BORIS[1], FEDORCHUKOVA SVETLANA[2], KOBIRMAN GALINA[3]

Abstract

The economy of the Republic of Moldova has entered, since 2009, an economic recession, which has become deep in the last period of 2019-2021. Previously, the Republic of Moldova was severely affected by the so-called "theft of the billion" from the three state-owned banks, which caused great damage to the state economy, and also was affected by the drought of 2019-2020. The situation became instantly critical, when the whole world was affected by the virotic pandemic, caused by STAR Cov-2, the consequences of which became detrimental to the economy and social life of this state. A large number of employees lost their jobs, and part of the active population was placed in isolation and quarantine. Production and trade relations have been severely distorted and activities in the HORECA system have been suspended for a long time. The research / development system also suffered a lot, due to insufficient funding and the decrease in the volume of technology transfer works obtained under state programs, as well as cross-border projects and those funded by the European Union.

Keywords: economic recession, gross domestic product, research / development, drought, pandemic.

JEL classification: O3,Q1

INTRODUCTION

In the Republic of Moldova, every year begins with better expectations from the business environment, with generous promises from the authorities, but also with a series of chronic unresolved problems in the real sector of the economy.

As a result of the impact of the political crisis, pandemic and severe drought, the economy of the Republic of Moldova fell into decline in 2020, GDP decreased by 7.0%. The main factors that determined this decline in GDP were the consumption of the population, which decreased by 7.0%. At the same time, quarantine measures led to the paralysis of trade in industrial products, and severe drought affected agriculture. The employment level reached the minimum of the last five years.

MATERIALS AND METHODS

Data obtained by authors from the Ministry of Economy and Infrastructure, the National Institute of Economic Research, the Ministry of Agriculture, Regional Development and Environment, the Academy of Sciences of Moldova, the National Office of Vine and Wine, as well as quarterly reports were used as information sources. Annual reports of the National Bureau of Statistics of the Republic of Moldova were used too.

The set of working methods used: systemic analysis of data, their mathematical-statistical processing, determination of multiple socio-economic indices during the years 2008-2020, as well as determination and analysis of factors that contributed to the deep economic recession in the fields key for the Republic of Moldova.

RESULTS AND DISSCUSION

The coming in 2009 of the "democrats" in power in the republic "untied" the hands of the oligarchy in the country, which produced a strong political and economic deception.

The main economic activities that contributed to GDP growth in 2020 were: construction with 0,3% and financial and insurance activities with 0,2%. The other areas had a negative impact:

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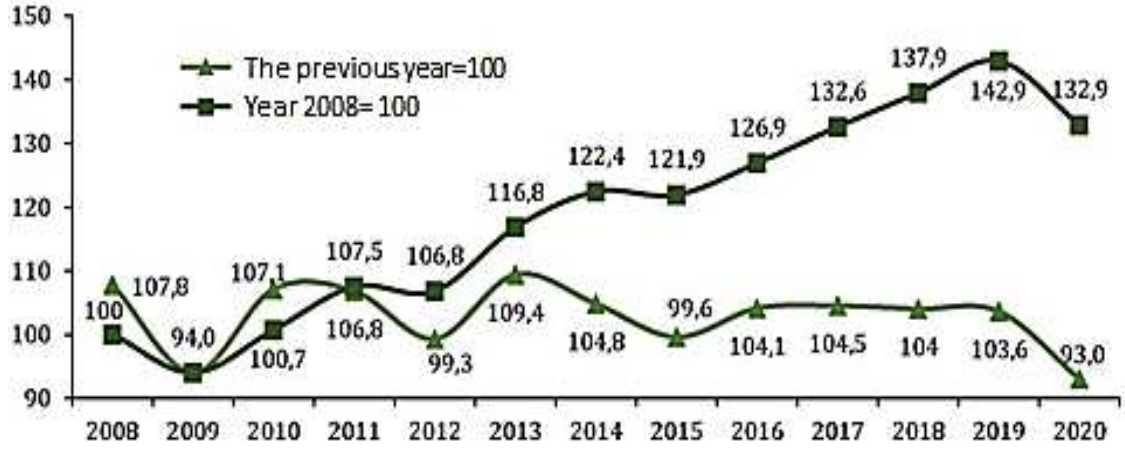
agriculture, forestry and fishing by 9.5%, wholesale and retail trade, accommodation and catering activities by 9.6% and others.

The total gross value added per economy in that period decreased by 6.9% compared to the similar period of the previous year, thus contributing to the formation of GDP - 87.0% and a decrease by 6.0%.

During this period, allocations for research / development decreased from 0.63% of GDP in 2014 to only 0.23% in 2020. The situation worsened in 2018-2020 due to the economic crisis, drought and COVID-19 – pandemic, fig.1.(Stratan A. 2020)

Figure 1. GDP evolution in the years 2008-2020, %



Sursa:.(Stratan A.2020)

In 2020, the Republic of Moldova was significantly affected by two negative phenomena: the COVID-19 pandemic and the severe drought in the agricultural sector, which had a direct impact on the evolution of the national economy. Thus, according to the provisional data for 2020, the gross domestic product, amounted to 206352 million MDL, in current market prices, registering a decrease in real terms by 7.0% compared to 2019.

Agriculture of the Republic of Moldova is the most important branch of the country's economy, which provides jobs for about 25% of the population with permanent residence (out of 2640.4 thousand inhabitants). The population established at the beginning of 2019 was 3542.7 thousand inhabitants. During this period, there was a high rate of emigration from Moldova to the Russian Federation, the States of the European Union, as well as to the United Kingdom.

In some sectors of the national economy there is a lack of staff: in education and kindergartens, in the state hospital system, agriculture, food industry, construction and others.

For example, there has been a loss of 15-20% of the apple and grape harvest due to insufficient labor in harvest campaigns, but also unfavorable weather conditions: long rains, low temperatures with autumn frosts (Gaina B,2020).

The crisis in agriculture of Moldova is generated by several factors: enormous difficulties in the commerce of agricultural production on the markets of the European Union, Great Britain, China, USA, Canada, Japan, and others due to the COVID-19 pandemic. The mass infection of the population with the SARS-CoV-2 virus has affected the production activity in the HORECA systems, trade, services, including many technological operations in agriculture.

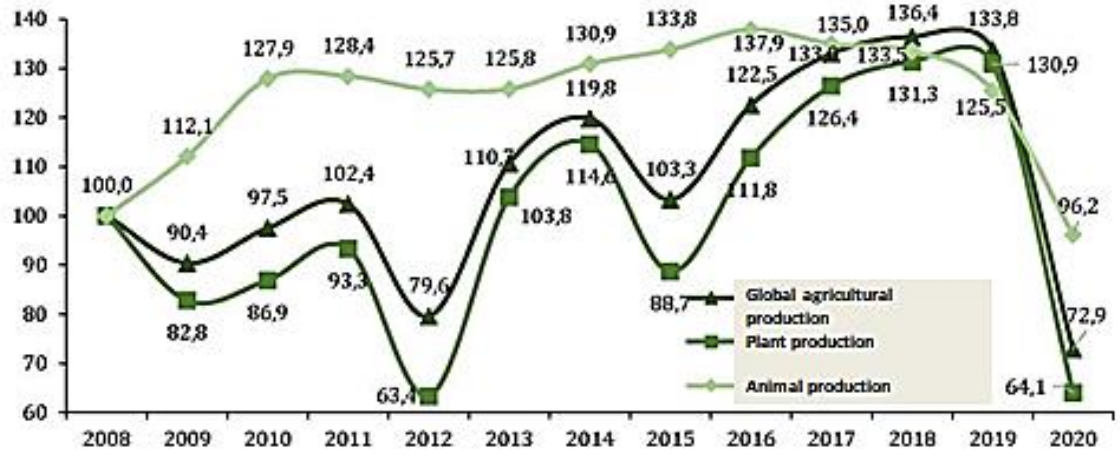
There is a significant increase in fuel prices every year, in the spring (especially) on the eve of the start of major works in the agro-industrial complex. For example, at the beginning of May 2021, fuel prices rose sharply (the price of 1 liter of A95 petrol was increased from 16.5 lei to 20.0 lei). And these unjustified increases are often made against the background of stable oil prices on the world market. And, as always, the rescue of the farmers of the Republic of Moldova consisted in the assistance of the neighboring state - Romania, which delivered 50 thousand tons of diesel fuel, which

is so necessary for the start and implementation of complex measures in the agricultural sector in the spring-summer of 2021.

For the Republic of Moldova, the year 2020 was a difficult year due to the drought that significantly affected, especially, the plant sector.

As a result, global agricultural production in households of all categories amounted to 30092.8 million MDL (in current prices), which shows a major reduction by 27.1% compared to 2019. This result was obtained following the significant decrease of vegetable production by 35.9% and animal production by 3.8% compared to the similar period of the previous year**, (Figure** 2)

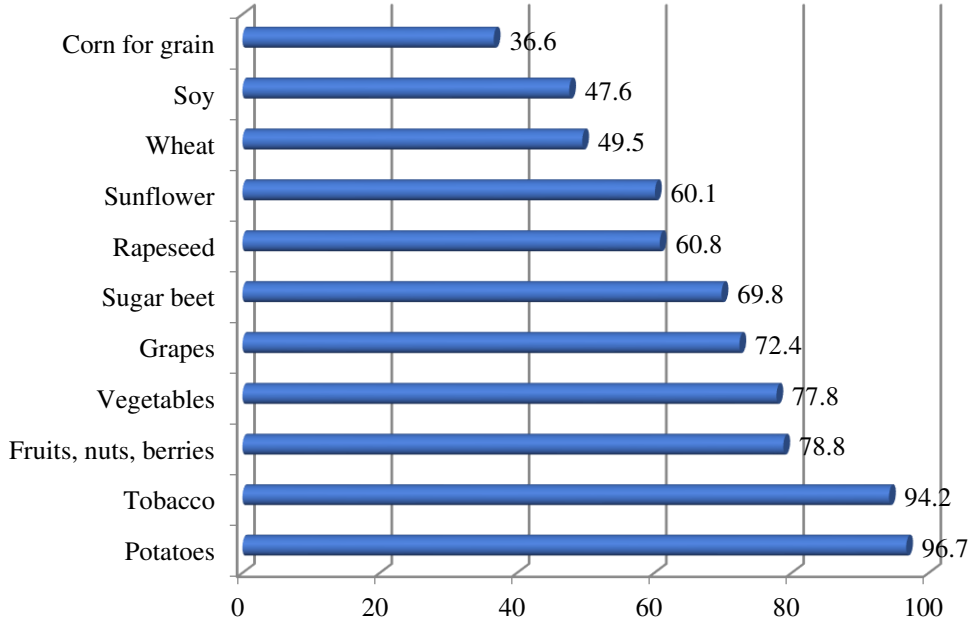
Figure 2. Evolution of the volume of agricultural production in the years 2009-2020, compared to 2008, %



Sursa:.(Stratan A.2020)

Severe drought caused significant decreases in the main agricultural products, the most considerable decreases in physical volume being recorded in the following crops: corn for grain (-63.4%); sunflower (-39.9%); wheat (-50.5%); fruits, nuts and berries (-21.2%); grapes (-27.6%) and vegetables (-22.2%), (Figure 3).

Figure 3. Agricultural production index for the main agricultural crops in 2020, compared to the similar period of the previous year,%



Sursa: (Stratan A. 2020)

During 2020, the livestock sector saw a reduction in the production of cattle and poultry (live mass) by 0.8%, a reduction in milk production by 12.4% and a reduction in egg production by 6.6 %. As a result of the recession in 2019-2020, there was a reduction in global agricultural production by 27.1%, which is due to the decrease in vegetable production by 35.9%, and also of animal production by 3.8% compared to the similar period of the previous year(Stratan A.2020, Sturza R.2020).

Moldova's budget deficit has created problems in providing the country with vaccines of any production, in order to reduce the degree of COVID-19 infection, morbidity and mortality caused by this disease, which already lasts the second year (since 2020).

In this case of crisis, the Romanian state came with the much needed help several times with: vaccines, medical equipment and devices, consumables, etc., also with medical specialists - consultants in the fight against the pandemic.

The tourist industry has also undergone great changes. Due to the restrictions imposed by the Government of the Republic of Moldova (Commission for Exceptional Situations) in order to fight the viral infection COVID-19, during 2020 the agencies specialized in tourist services received in the country only about 125 thousand people, which is 33.0 % compared to 2019. This fact led to the dismissal of people from the tourist business of the Republic of Moldova.

Recipient tourism amounted to 6.9 thousand tourists and hikers, which is only 35.0% compared to the similar period of the previous year. Issuing tourism decreased by 76.0% compared to the similar period of the previous year registering 74.7 thousand tourists and hikers.

Domestic tourism compared to the other compartments of tourism had a smaller reduction by 7.1% compared to the similar period of the previous year registering 42.8 thousand tourists and hikers. Of the total number of foreigners who visited the Republic of Moldova through travel agencies and tour operators during 2020, 95.1% visited the country for leisure, recreation and leisure, 3.4% for business and professional purposes and 1.4% for treatment purposes.

Most non-residents were from: Romania (73.4%), Ukraine (14.9%), the Russian Federation (3.1%), Turkey (1.6%) and the United Kingdom of Great Britain and Northern Ireland (1.1%).(Stratan A.2020, AȘM,2021).

Revenues in the national public budget decreased by 0.5% in the fourth quarter of 2020 compared to the previous one of the same period. We regret to note that the share of expenditures of the national public budget in 2020 increased by over 11,0% compared to 2019; During the same period, there was a deficit in budget execution of 3.5 times, and the debt balance was increasing by 26,1%.In these circumstances, the public sector debt in the country's GDP at the end of 2020 reached the figure of 35.2% (with an increase of 7.8 percentage points compared to 2019).

The labor force in the Republic of Moldova also decreased by **5.7%** compared to the similar period of the previous yearout of the 867.3 thousand people of the employed and the unemployed population. The average monthly salary in 2020 amounted to 8107.5 MDL (one of the lowest in Eastern European States), increased by only 6.2% in real value. The minimum subsistence level per person per month is 2088.4 MDL, being increased by only 2.8% compared to the previous year - 2019.(Stratan A. 2020, HG,2014).

The economic crisis in the Republic of Moldova has considerably affected the research / development sphere, which in 1990 reached a maximum of 0.73% of GDP. The revision of the legal framework for research activities began in 2004 with the adoption of the Code on Science and Research. At that time, the lowest share of financing was registered, namely 0.22% of GDP.

Thanks to the support of the state leadership, the Parliament and the Government of the Republic of Moldova in the next four years, research funding increased to 0,63% (in 2008), being the most significant. Real conditions have been created for the consolidation of the scientific community in the strategic direction of the country's development: medicine, food security, food safety, environmental protection, development of education, culture, science and so on.

By Government Decision no. 920 of November 7, 2014 on "Research and development strategy of the Republic of Moldova until 2020, provided that investments in research and development (% of GDP) will increase in 2020 to 1% compared to EU of 3.0%. The implementation

of the Strategy was to go through the following stages: elaboration of the normative framework, its approval, development of the research / development sphere, organizational reform, development of performances in the targeted field. (HG, 2014, Sturza R. 2020).

In reality, during the previous years, the allocations for science in the Republic of Moldova decreased respectively in 2012 to make up 0.4% of GDP and with a decrease of up to 0.23% in 2020.

This deplorable situation has harmed the research / development field, to which have been added: the economic crisis, the Covid-19 pandemic, the political crisis and other factors. Therefore, at the end of the exercise, we find irrevocably: the research / development strategy did not reach its provisions, which caused a modest success in the development not only of science and innovation, but also of the country's many economic fields during this time. (AȘM 2021).

The issue of the fight against global warming, especially with the frequent drought in the Republic of Moldova has become critical and therefore due to the unfavorable climatic conditions of 2019 and 2020, global grain production has decreased from 1.0 million. tons to 350-400 thousand tons, which is only the State Reserve. The English scientist Dr. Chris Foss calculated that in the years 2040-2050 in Dobrogea (Romania) and in the South of Moldova no branch of agriculture will progress (exist) in the absence of irrigation. (Chris Foss 2018).

In the Republic of Moldova, with the support of the US government, about 20 modern pumping stations for the waters of the Prut and Dniester rivers were resuscitated to economic agents - consumers of water for irrigation in vegetables, orchards, viticulture, but also for field crops. Several billion MDLs have been invested in these water pumping systems in the districts related to the mentioned sources: Vulcănești, Cahul, Cantemir, Leova, Hâncești (left bank of the Dniester), but also those on the right bank of the Dniester: ŞtefanVodă, Causeni ,AneniiNoi, Criuleni etc.

The obligations of the Government of the Republic of Moldova provided for the subsidization of economic agents - consumers of water for irrigation, in the procurement of modern and effective irrigation systems: by drip, underground and by sprinkling (depending on the provisions of the submitted projects).

We regret to note that the state authorities have not honored their obligations, farmers have not benefited from subsidies, and the expensive highways to bring river water to the consumer have remained (at best) frozen, unused (except for 3 5 of them), and in some cases the pumps, motors, metal and other components were detached (stolen) and sold abroad or to used metal.

Within the so-called “reorganizations” of the research / development sector in the Republic of Moldova were merged: Institute of Fruit Growing + National Institute of Vine and Wine + Institute of Food Technologies + Vegetable Growing Center; as a result, a “monster” was created (practical staff reductions did not take place, only 4 accountants and 2 technicians out of the 420 employees in total) with the name “Scientific-Practical Institute of Horticulture and Food Technologies”.

The "reform" of science, approved in 2018, by which the 18 academic institutes were transferred to the Ministry of Education, Culture and Research, which unbalanced the activity of several research / development and technology transfer projects, also failed.

Research funding has remained only at the level of previous years, to feel a decrease in state investment in agri-food research in the country. As a result, out of 21 PhD students (full-time and part-time), 10 people abandoned their research and emigrated to the European Union, being fluent in English, French, Romanian and Russian. The material base of the institute has remained poorly developed and at present, the experimental fields belong essentially to the economic agents (lease) and not to the state (de facto). (AȘM 2021,Taran A.2019).

Consequently, the number of technology transfer projects in this research / development entity has decreased 2 times, of the patents filed / obtained 3 times, of the articles with Impact Factor (IF) and in journals of categories A, B and C their number decreased 3 times. No Conferences, Scientific-Practical Seminars were organized in these fields, even online, which severely weakened the former science ties with practitioners in viticulture, fruit growing, vegetable growing and horticultural processing technologies. (HG 2014,Sturza R. 2020).

The welcome results in the field are due to the collaboration, and even to the help of Romanian scientists from the Academy of Agricultural and Forestry Sciences "Gheorghe Ionescu-Șișești" led by Professor ValeriuTabără, and those from the Romanian Academy in the person of academician Cristian Hera and others, but also of the teachers of the numerous universities of agricultural sciences and veterinary medicine of the neighboring state - Romania.

In the conditions of the economic recession in the Republic of Moldova, no science reform will be successful if it is not supported by colleagues from the European Union, including Romania.

CONCLUSIONS

In our view, it is necessary to take the following actions in order to recover the research / development situation:

1.To allocate for life, by Government decision, allowances for all researchers and teachers in the Republic of Moldova in the amount of 1000 MDL per month for holders of the scientific title of doctor and 2000 MDL for doctor habilitat. This practice exists in several European countries, USA, Canada, etc., which will motivate young researchers to write and defend theses in various fields of research / innovation.

2.To increase the salaries of PhD students from 800 MDL per month to 2500 MDL (with annual indexation) in order to provide young researchers from the Republic of Moldova with a necessary and sufficient material base for complex investments during their studies.

3.To extend the training of PhD and postdoctoral staff with scientists from scientific centers and universities in the EU, especially in Romania, USA, Canada, China and others, who are equipped with modern equipment and materials necessary for the high methodological level in research.

4.The Government of the Republic of Moldova to allocate state scholarships in the amount of at least 2500 MDL per month for students from "deficient" specialties that the national economy strictly needs, with the signing of legal obligations to work on the specialty for at least five years in the country. To provide young specialists with housing during their activity in these enterprises, entities, etc.

5.At the end of the COVID-19 pandemic, to resume practical activities in colleges and universities and to provide students with professional practices (pedagogical, technological, agricultural, zootechnical, etc.), which were stopped during the state of emergency in the Republic of Moldova.

6.To bring back within the Academy of Sciences of Moldova the 18 Academic Research Institutes in order to consolidate them and increase the overall effectiveness in the field of research / development in the Republic of Moldova. To approve by Government Decision the amendments formulated by the General Assembly of the Moldovan Academy of Sciences regarding the return of the academic institutes in its composition.

7.To provide in the state budget of the Republic of Moldova the financial resources necessary to start by the end of 2021 the elections of new members of the Academy of Sciences in accordance with current legislation and the Statute of the Moldovan Academy of Sciences, in order to fill vacancies and rejuvenate the academic body.

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IMPACT OF COVID-19 AND DROUGHT ON THE ECONOMY OF THEREPUBLIC OF MOLDOVA

TAMARA LEAH[1]

Abstract

The paper characterizes the cumulative impact of the pandemic and drought on the main economic sectors of the Republic of Moldova. Total Gross Added Value (GAV) per economy, with a share of 87.0% in the Gross Domestic Product (GDP) formation, contributed to the decrease of GDP by 6.0% in 2020 compared to 2019, the volume of GAV being decreasing by 6.9%. Agriculture, which contributed more than 1/3 to the decrease of GDP (2.7%) with a share of 9.5% to the formation of GDP and a decrease of GAV on the respective activities by 26.4%. Following the drought impact, the second consecutive year, the share of agriculture in the structure of the economy is less than 10%. Trade, transport and storage, HoReCa contributed by -2.1% to the decrease of GDP, with a share of 20.7% to the formation of GDP and a decrease of GAV on the respective activities by 9.6%. These 3 sectors absorbed the shock of the pandemic the most, given that by far the most affected sectors are those involving the interaction and mobility of the population. Industry contributed by -0.6% to the decrease of GDP, with a share of 14.0% to the formation of GDP and a decrease of GAV on the respective activities by 4.3%. The negative result in the industry is also explained by the impact of the drought, which contributes to the increase in the price of raw materials for the food and beverage industry. Net taxes on products, with a share of 13.0% in GDP formation, contributed to the decrease of GDP by -1.0%, their volume decreasing by 7.3%. Despite the crisis of the last year, wages have risen more than prices. The cost of living in 2020 has remained virtually unchanged, if we refer to the insignificant inflation of 0.39%.

Keywords: GDP, GAV, drought, agriculture.

JEL Classification: Q01, F63

INTRODUCTION

The COVID-19 crisis that began at the end of 2019 was declared a pandemic by the World Health Organization (WHO) on March 12, 2020. It caused enormous damage to the health, livelihoods and well-being of people around the world. The Republic of Moldova in 2020 was simultaneously affected by the COVID-19 pandemic and one of the most extreme droughts in the last two decades. The cumulative effect had a negative impact on the main economic sectors and geographical areas. In response, measures have been taken to mitigate the impact of the pandemic on the health of the population and to support businesses and workers affected. Most countries have also implemented measures that have contributed to achieving environmental goals. However, much remains to be done for recovery plans to accelerate the transition to a green economy, thus increasing resistance to external shocks (Coctailul din COVID, 2021).

MATERIAL AND METHOD

The statistical data published by the National Bureau of Statistics (www.statistica.md), approached comparatively, the publications on the pandemic and the state of the economy served as material. The research method is based on the quantitative and qualitative analysis of public policies, published documents.

RESULTS AND DISCUSSIONS

Gross Domestic Product (GDP) in 2020 amounted to 206.3 billion lei, in current (market) prices, decreasing in real terms by 7.0% compared to 2019. These data are the result of the simultaneous overlap of two cumulative impacts on the economy - COVID-19 and the drought, and represents the largest decline of the Moldovan economy in the last 25 years (Coctailul din COVID,

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2021). The recession of 2020 was more severe both compared to the crisis of 1998, marked by the collapse of the economy of the Russian Federation, and to the decline of 2009, marked by the international financial crisis.

The Gross Domestic Product, estimated for the I quarter of 2021, amounted to 46.5 billion lei, current (market) prices. Compared to the I quarter of 2020, GDP increased, in real terms, by 1.8% on the gross series and by 0.1% on the seasonally adjusted series. The evolution of the quarterly GDP in the period 2018-2021, calculated as gross series and seasonally adjusted series, is presented in Table 1.

Table 1. Evolution of quarterly GDP in the years 2018-2021

	Years	Quarter I	Quarter II	Quarter III	Quarter IV	Year
- in % compared to the respective period of the previous year						
Gross series	2018	104,0	105,5	103,7	104,2	104,3
	2019	104,5	105,9	104,3	100,2	103,7
	2020	100,9	86,0	90,3	96,7	93,0
	2021	101.8	-	-	-	-
Seasonally adjusted series	2018	104,3	105,9	103,8	103,9	-
	2019	103,6	105,2	105,1	99,5	-
	2020	99,7	93,8	89,4	96,3	-
	2021	100,1	-	-	-	
- in % compared to the previous quarter						
Seasonally adjusted series	2018	99,4	102,3	100,9	101,3	-
	2019	98,8	105,0	99,8	96,0	-
	2020	98,6	93,8	100,0	103,3	-
	2021	102,5	-	-	-	-

Source: NBS.www.statistica.md

GDP: Categories of resources. The total Gross Added Value (GAV) per economy, with a share of 84.9% in the formation of GDP, contributed to the increase of GDP by 0.6%, the volume of GAV being increasing by 0.7% compared to the one registered in the I quarter 2020. In particular, the following activities contributed to GDP growth in the I quarter of 2021 compared to the first quarter of 2020:

Extractive industry; manufacturing industry; production and supply of electricity and heat, gas, hot water and air conditioning; water distribution; sanitation, waste management, decontamination activities (+ 0.9%) with a share of 15.7% in GDP formation and an increase in GAV on those activities by 6.1%;

Constructions (+ 0.4%), with a share of 6.7% in the formation of GDP and an increase in GAV on the respective activities by 5.5%;

Information and communications (+ 0.4%), with a share of 6.8% in GDP formation and an increase in GAV on the respective activities by 6.5%;

Real estate transactions (+ 0.4%), with a share of 8.4% in GDP formation and an increase in GVA on the respective activities by 5.0%.

Negative impact on GDP developments had:

- Agriculture, forestry and fishing (-0.5%), with a share of 2.7% in GDP formation and a reduction of GAV on the respective activities by 13.9%;
- Financial activities and insurance (-0.3%), with a share of 4.3% in GDP formation and a reduction of GVA on those activities by 7.4%;
- Professional, scientific and technical activities, administrative services and support services (-0.3%), with a contribution of 3.1% to GDP formation and a decrease in GAV on those activities by 8.3%;

- Public administration and defense; compulsory social insurance; education; health and social assistance (they contributed -0.2% to the GDP change) with a share of 14.5% to the formation of GDP and a decrease of the GAV on the respective activities by 1.3%.
- Net taxes on products with a share of 15.1% in GDP formation, contributed to the change in GDP by + 1.2%, their volume increasing by 8.6% (Produsul Intern Brut, 2021).

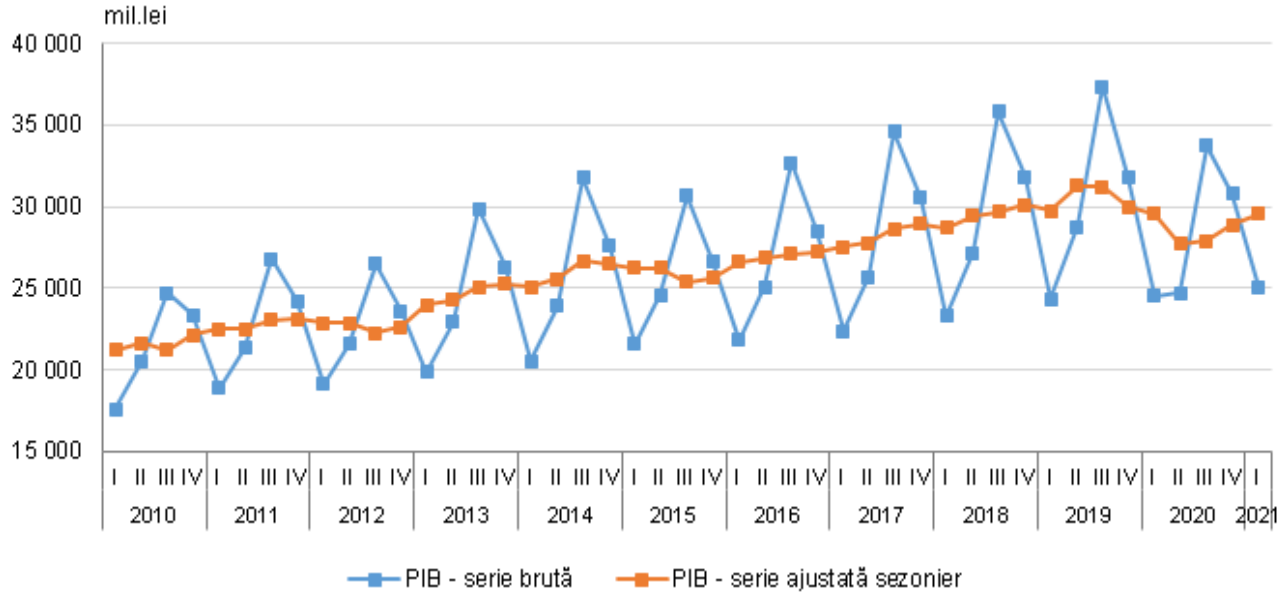
GDP: Categories of uses. In terms of utilization, GDP growth in the first quarter of 2021 compared to the I quarter of 2020 was mainly due to:

Gross fixed capital formation (+2.9%), whose volume increased by 14.2%, contributing by 23.4% to GDP formation;

Final consumption of households (contributing +2.4% to GDP change), whose volume increased by 2.8%, contributing 82.9% to GDP formation.

A negative contribution on the index of the physical volume of GDP had the net export of goods and services (contributing with -8.2% the change in GDP), consequence of the increase of the physical volume of imports of goods and services (+ 7.1%), correlated with a reduction in the volume of exports of goods and services (-12.3%), (Produsul Intern Brut, 2021). The evolution of quarterly GDP in 2010-2021, expressed in average prices in 2010 is presented in Figure 1.

Figure 1. Quarterly GDP dynamics in 2010-2021 (2010 prices): gross series (in blue) and seasonally adjusted series (in orange).



Source: NBS.www.statistica.md

Agriculture. The total Gross Added Value (GAV) per economy, with a share of 87.0% in GDP formation, contributed to the decrease of GDP by 6.0% in 2020 compared to 2019, the volume of GAV being decreasing by 6.9%.

The National Bureau of Statistics reports that global agricultural production in households of all categories (agricultural enterprises, farms (households) and households) in 2020, according to preliminary estimates, marked 72.9% compared to 2019. Decrease in production global agricultural production (by 27.1%) was determined by the decrease of vegetable production by 35.9% (which caused the reduction of the general index of global agricultural production by 26.1%) and animal production - by 3.8% (-1.0%).

Considerable decreases in the physical volume of agricultural production in 2020 compared to 2019 were recorded for the following crops: grain maize - by 63.4% (which generated a decrease in global agricultural production by 8.6%), sunflower - 39.9% (-4.7%), wheat - 50.5% (-4.3%), fruit, nuts and berries - 21.2% (-2.0%), grapes - 27.6% (-1.8%), vegetables - by 22.2% (-1.7). In 2020, the

share of vegetable production in total agricultural production was 64% (in 2019 - 73%), animal production returning 36% (in 2019 - 27%).

On January 1, 2021, compared to that date of last year, there was a decrease in the number of animals in households of all categories, except for the number of cows in agricultural enterprises which increased by 13.1% (Moldova - Actualizare Economică, 2021).

The following economic activities contributed to the decline in GDP:

- Agriculture, which contributed more than 1/3 to the decrease of GDP (2.7%) with a share of 9.5% to the formation of GDP and a decrease of GAV on the respective activities by 26.4%. Following the impact of the drought, the second consecutive year the share of agriculture in the structure of the economy is less than 10 percent;

- Trade, transport and storage, HoReCa contributed -2.1% to the decrease of GDP, with a share of 20.7% to the formation of GDP and a decrease of GAV on the respective activities by 9.6%. These three sectors have absorbed the pandemic shock the most, given that the sectors most affected are those involving population interaction and mobility;

- Industry contributed by -0.6% to the decrease of GDP, with a share of 14.0% to the formation of GDP and a decrease of GAV on the respective activities by 4.3%. One of the structural novelties of the Moldovan economy in the crisis of 2020 is the much more significant presence of some industrial activities that are part of some international value chains (Automotive and Textile Industry), the given activities being among the most affected.

The negative result in the industry is also explained by the impact of the drought, which has led to higher raw materials for the food and beverage industry. Net taxes on products, with a share of 13.0% in GDP formation, contributed to the decrease of GDP by -1.0%, their volume decreasing by 7.3%.

Construction and financial activities. The economic activities that had positive contributions on the index of the physical volume of GDP and attenuated from the economic decline were construction (they contributed + 0.3% to the change in GDP), with a share of 9.3% to the formation of GDP and an increase of GVA by 3.7%, as well as financial activities and insurance (contributed by + 0.2% to the change in GDP) with a share of 3.9% in the formation of GDP and an increase in GAV on those activities by 5.7%. The positive evolution in the construction sector is explained by the continuation of the upward trend in the residential construction sector, but also of the growing public investments in road infrastructure.

Income and uncertainty of future income. The analysis of the components of aggregate demand reveals that private consumption, which constitutes 81.2% of the economy, recorded a reduction in real terms of 7% compared to the previous year, conditioned by the decrease of incomes to a part of the population, but also by a more prudent behavior of the less secure population on future incomes. As a result, private consumption contributed 82% to last year's economic downturn.

Gross fixed capital formation, an indicator that summarizes the level of investments made in the economy, decreased by 2.1%, contributing by -0.5% to the change in GDP, while Net Exports contributed slightly to the attenuation of the economic downturn with a positive contribution to the formation of GDP of 0.1%, but also here the reduction of the trade deficit took place by the negative adjustment of both imports (8.9%) and exports (-15.5%), this phenomenon being notable in the Republic of Moldova and in previous crisis years.

Quarterly developments in 2020 show that the largest decline in GDP took place in the II quarter, which coincides with most of last year's lockdown, with the economy shrinking by 1 % from the same period from 2019. At the same time, in the IV quarter there is a decrease of 3.3%, which is due almost exclusively to the impact of the drought. The data show that if we exclude agriculture, the other sectors generated an increase of 1.1% in the IV quarter, which indicates a return to consumption amid the easing of pandemic restrictions during this period.

Trade and industry. Despite the restrictions, overall, domestic trade had virtually no suffering. On the contrary - the National Bureau of Statistics reported an increase in sales of 4.6% in 2020. In contrast, services decreased by more than 15%. The drop in demand, generated by the pandemic,

reduced the industry by 5.5%, but cross-border trade also suffered. The year 2020 ended with exports of 2 billion 485 million USD, compared to 2019, the reduction was 10.6%.

Exports, however, were discouraged by both the pandemic and the drought of last year, when many farmers were forced to sell their products at lower prices, just to get rid of stocks. Although imports fell by 7.6%, the trade deficit continued to widen to $ 5 billion 415 million. Car dealers, among others, say they are among the most affected of importers. From March to June, car shows were closed, which reduced their sales in 2020 by about a thousand cars.

Transport and tourism. It was a year in which most countries, including the Republic of Moldova, closed their borders to foreigners. As a result, in 2020, Moldovan airlines will carry only a quarter of the number of passengers it had in 2019 (-75.6%). Data from the National Bureau of Statistics (NBS) show that road transport decreased by 46% and rail transport by 38%. The fact that foreign nationals can now enter Moldova only for work purposes, has affected the owners of accommodation structures the most. In 2020, the turnover of hotels and pensions decreased by 76%.

Pandemic and poverty. Although, in absolute terms, the losses of multinational companies are in the order of billions, and their recovery requires significant investment, they are optimistic about the future - especially thanks to the assistance packages provided for the business environment.

In the Republic of Moldova, on the other hand, the volume of assistance for the business community is the lowest in the region. If neighboring countries have allocated about 5% of GDP to save the economy, the Chisinau government has provided only 1% of GDP. Moreover, out of the 320 million lei planned for subsidies for salaries or technical unemployment, only 19% were capitalized (Prohnițchi, 2021).

Official statistics show that the HoReCa sector needs the most support. At the end of last year, the number of employees in hotels and bars was a quarter (24.5%) lower than at the end of 2019. In general, however, the number of employees in private and state decreased by only 1.8%. Moreover, the average salary in the economy increased, last year by 10.8% (average gross salary - 8107 lei) in the real sector and only by 2% in the case of public employees.

The good part for the employed population is that, despite the crisis of the last year, wages have risen more than prices. According to the NBS, in 2020, the cost of living has remained virtually unchanged, if we ignore the insignificant inflation of 0.39%.

A possible lockdown, depending on the form and period, can also significantly influence the evolution of the economy. On the other hand, with the strong anticipated return from agriculture after the drought, but also starting from the low base of comparison last year, the premises could appear to keep the economy on a positive side, even if it will be in real terms. below the level of 2019. According to forecasts, GDP will reach the level of COVID-19 in 2022 (Lupușor, 2021).

Medium term forecasts and developments. The uncertainties surrounding the evolution of the pandemic and political developments will keep the economy below its potential. GDP is expected to return to 3.8 percent in 2021, assuming more favorable conditions, including due to the vaccination campaign. We expect the economy to gain momentum, supported by the recovery in disposable income, in part due to remittances, the positive fiscal momentum (rising wages and transfers), and monetary policy. Reduced global demand, combined with the recent drought, is expected to constrain exports. Robust imports, supported by a return to domestic demand, will slow down economic growth. It is expected that most sectors will recover, with agriculture leading this recovery after a bad year in 2020.

After a severe contraction, unprecedented after the global recession of 2009, Moldova will register a modest recovery. Economic growth is expected to continue in 2022 to 2021, with a slowdown in potential in 2023. All sectors will recover as consumer and investor confidence grow against more favorable external conditions and monetary policy and fiscal expansionists. The current account deficit is expected to deteriorate in 2021 as food exports decline. In the future, the current account will expand as the economy accelerates. Inflation is expected to remain below the NBM target corridor of 5 percent +/- 1.5 percent in 2021-22, with a resumption of growth as the recovery consolidates. In 2020, the poverty rate, measured at the level of 5.50 USD/day, is estimated to increase

by 3.6 percent to 14.2 percent. Based on the assumption of economic recovery in Moldova and its main countries of destination of emigrants, we estimate a decrease in the poverty rate to 12.3 percent in 2021 2021 (Madan, 2021).

In the medium term, were anticipate that fiscal deficits remain above historical levels. The fiscal measures introduced to reduce the impact of the pandemic are estimated to keep the fiscal deficit around 4 percent of GDP in 2021, higher than historical averages. But, less than planned by the state budget law, partly due to lower external funding and reduced absorption capacity. In the future, we believe that the fiscal position will be problematic, as businesses are in a difficult situation and households suffer from unfavorablelabor market conditions. As a result, public debt is expected to grow steadily, while remaining relatively low by international standards.

The outlook is marked by substantial negative risks, and the fragile recovery also depends on the success of the vaccination campaign. Internal risks are related to political instability, institutional weakness and political constraints in implementing judicial and structural reforms. Fragile economic conditions and low levels of productivity are exacerbated by the state's extensive footprint in the economy, shrinking fiscal space, low financial intermediation and governance challenges. The advancement of long-term structural reforms, against the background of economic recovery measures and political turmoil, is of paramount importance. The ability to reduce the impact of the crisis and support the economic recovery will depend essentially on external financing, in particular on the successful negotiation of a new IMF program. Also, in the future, Moldova will have to manage inequality of opportunity and accelerate job creation in the private sector. Finally, as the severe drought of 2020 has shown, the economy is very vulnerable to climate change.

CONCLUSIONS

Regardless of the severity of the economic turmoil, the biggest loss comes on the part of human capital. Although it is difficult to estimate the value of specialists who died due to infection with the Covid-19 virus, it is clear that the economy will need a long time to recover from the disability, which was still high due to emigration. The research of the National Bureau of Statistics (NBS) on "The influence of the COVID-19 pandemic on the household" in 2020 reveals that only a little over half of households had income from work, about 1/4 had income from remittances, and over 90% they received salaries, pensions, social benefits. At the same time, 17.0% mentioned the reduction or loss of income from work, 8.3% reported the reduction or loss of remittances from abroad and only 3.6% reported the withholding of salaries, pensions, social benefits.

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CORRELATION OF TECHNICAL-ECONOMIC INDICATORS AT COW MILK - CASE STUDIES

RODICA CHETROIU [1]

Abstract

The paper presents the average results for the period 2018-2020 of 54 case studies conducted in dairy farms located in different geographical regions of Romania, different landforms and of different sizes. In terms of farm size, it is between 5.0 - 568.3 dairy cows (6,002.3 - 682,261.4 SO), of the following categories: 3.7% semi-subsistence farms, 7. 4% small farms, 77.8% medium farms and 11.1% large farms. The breeds of dairy cows exploited in the farms under the case studies are Holstein, Bălțată cu negru românească, Bălțată românească, Brună, as well as their crossbreds with Romanian or with imported breeds. The average size of the farms taken into account was 73.44 heads, with an average production of 4,554.94 liters / head. The average value of the unit cost was 1.55 RON / l, and the average profit per liter of milk was 0.01 RON / l, with a minimum of -0.29 RON / l and a maximum of 0.73 RON / l. The average taxable income rate was 0.22%, with a minimum of -19.51% and a maximum of 27.25%. The average profitability threshold in physical units resulting from the analyzes in the case studies is 5,506.29 liters / head, and the average profitability threshold in value units is 8,024.83 RON / head. The best correlations between technical and economic indicators indicate a very good association between total expenditures and production value, between expenditures for the main production and production value, as well as a good association between average milk production and total production value.

Keywords: indicators, cows, milk, expenditures, correlations

JEL Classification: O12, Q12, Q13

INTRODUCTION

The economic efficiency of production activities is the result of the judicious use of material, human, financial resources, as well as organizational, managerial and marketing skills of the results (Petcu, 2003). These coordinates also apply to the activity of exploiting cows for milk production.

In order to determine the economic efficiency, it was performed the calculation of specific technical-economic indicators.The dairy farming systems differ in terms of technical-material basis, structure of the forage base, labor force, genetic value of the animals, the way of production valorization etc. (Maciuc V., 2015).

But the factor that decisively influences the orientations, on all levels, in the valorization of production, is represented by the consumers' requirements (Voicu I., Voicu D., Ghiță E., Dudu Ș., 2011).

MATERIAL AND METHODS

This paper is the result of research conducted in 54 case studies in cow farms located in different geographical regions of Romania, in plains, hills, mountains and of different sizes. The size of the farms is between 5.0 - 568.3 dairy cows (6,002.3 - 682,261.4 SO), falling into the following categories: 3.7% semi-subsistence farms, 7.4% small farms, 77, 8% medium farms and 11.1% large farms.

Based on data from 2018, 2019 and 2020, the average indicators of the economic efficiency of milk production were calculated, as well as the correlations between them, using the Pearson correlation coefficient between two quantitative variables, using the CORREL function, as well as the determination coefficient R^2. The illustration of the relationship between two parameters was made using the Scatter graph.

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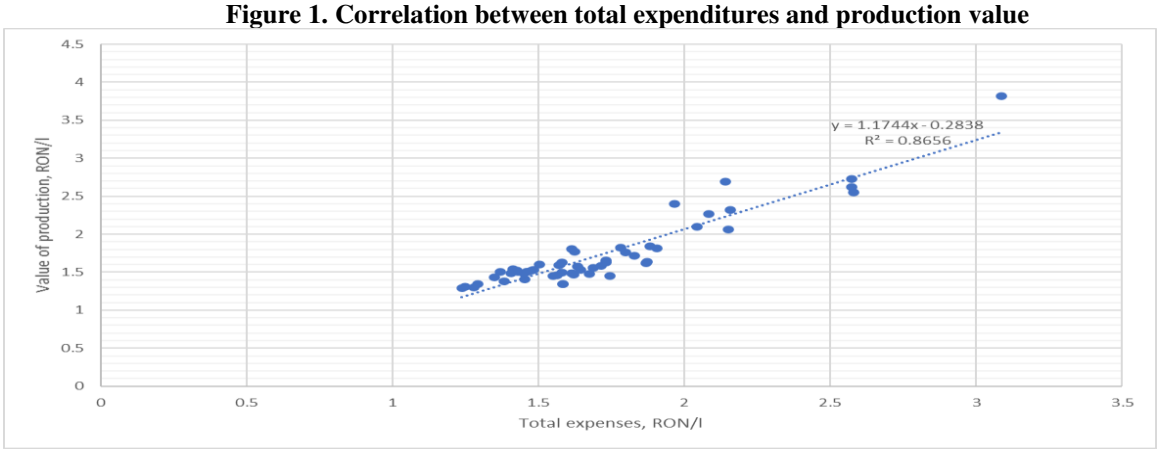
RESULTS AND DISCUSSIONS

The average size of the 54 farms taken into account was 73.44 dairy cows / farm, with an average production of 4,554.94 liters of milk / head (ICEADR, 2021). The average value of production was 1.73 RON/liter, respectively 7,880 RON/head, the total expenses being 1.71 RON/l, ie 7,788.9 RON/head. The average value of the unit cost was 1.55 RON/l, being between 1.13-2.94 RON/l. The average producer price for milk was 1.56 RON/l, between 1.1-3.67 RON/l. Average profit/average loss per product unit: 0.01 RON/l, with a minimum of -0.29 RON/l and a maximum of 0.73 RON/l. The average taxable income rate was 0.22%, with a minimum of -19.51% and a maximum of 27.25%. The average rate of net income without subsidies was -0.10%, with a minimum of -19.51% and a maximum of 24.53%. The average profitability threshold in physical units was 5506.29 l/head, and the value threshold was 8024.83 RON/head. The average rate of exploitation risk was 146.63%, and the security index was negative: -0.47, being between -6.85 and 0.67.

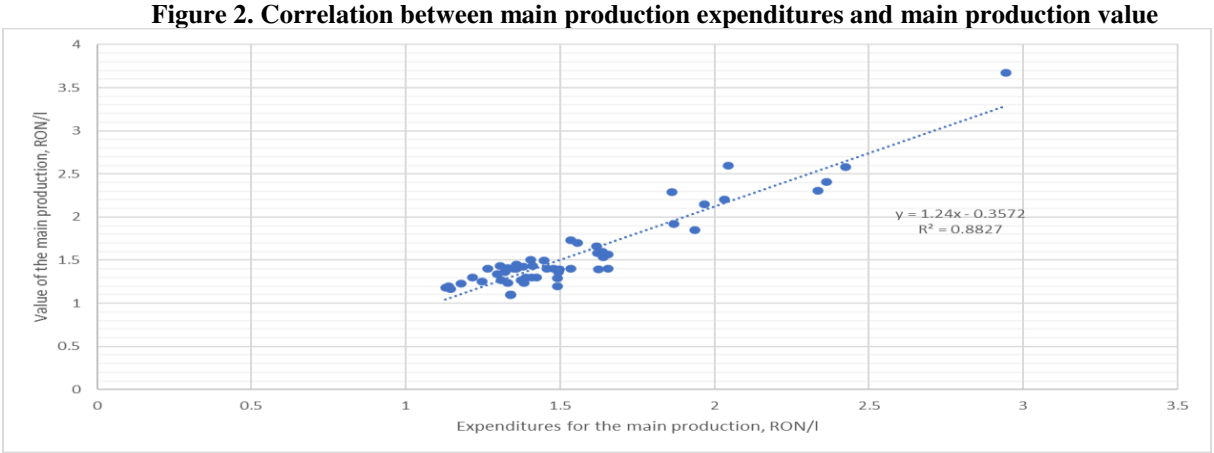
The correlation coefficient of 0.93 calculated between the total expenses and the value of production indicates a very good correlation between the two variables, and the determination coefficient R^2 shows that 86.56% of the value of production can be explained by the linear relationship with total expenses (Figure 1).

Figure 1. Correlation between total expenditures and production value



The correlation coefficient of 0.94 calculated between the expenditures for the main production and the value of main production indicates a very good correlation between the two variables, and the coefficient of determination R^2 shows that 88.27% of the value of main production can be explained by the linear relationship with main production expenditure (Figure 2).

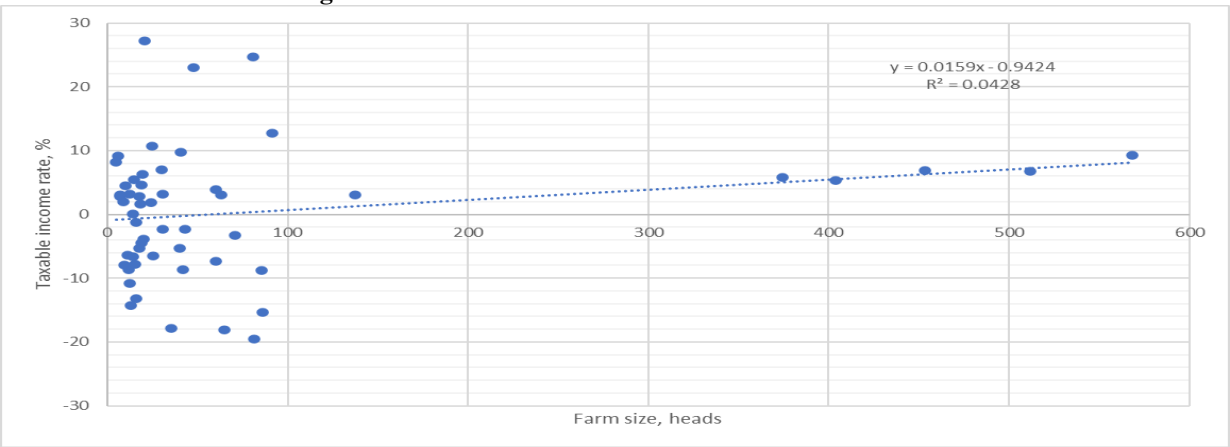
Figure 2. Correlation between main production expenditures and main production value



The correlation coefficient of 0.21 calculated between farm size and taxable income rate indicates a weak correlation between the two variables, and the determination coefficient R^2 shows

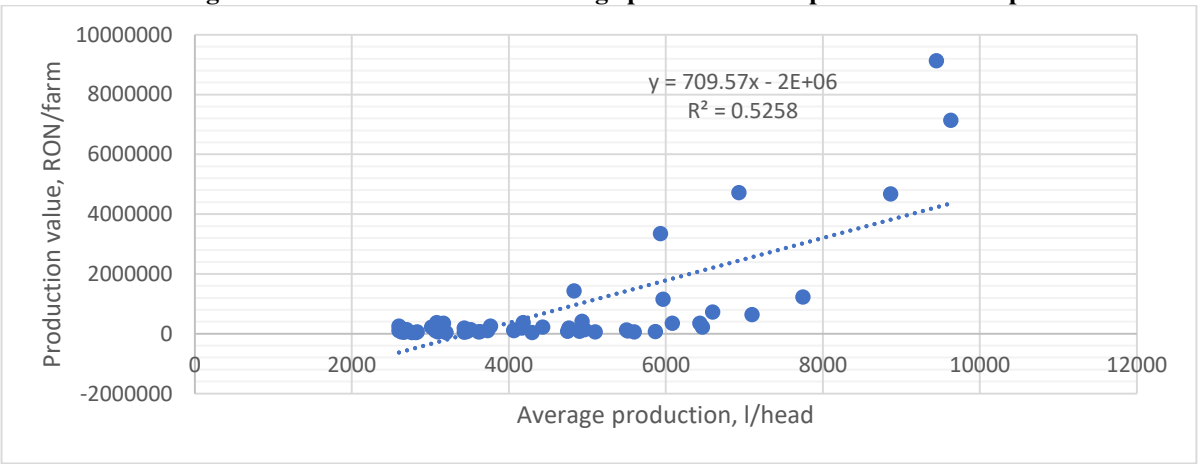
that only 4.28% of taxable income rate can be explained by the linear relationship with the farm size (Figure 3).

Figure 3. Correlation between farm size and taxable income rate



The correlation coefficient of 0.73 calculated between the average milk production and the value of total milk production indicates a good correlation between the two variables, and the determination coefficient R^2 shows that 52.58% of the value of total milk production can be explained by linear relationship with average milk production. This means that milk price, which participates in creating its value and occupies the remaining 47.42%, has a decisive importance on the economic results of the farm. Thus, the management and marketing strategies of the farm are very important and have to find the optimal solution for production valorization (Figure 4).

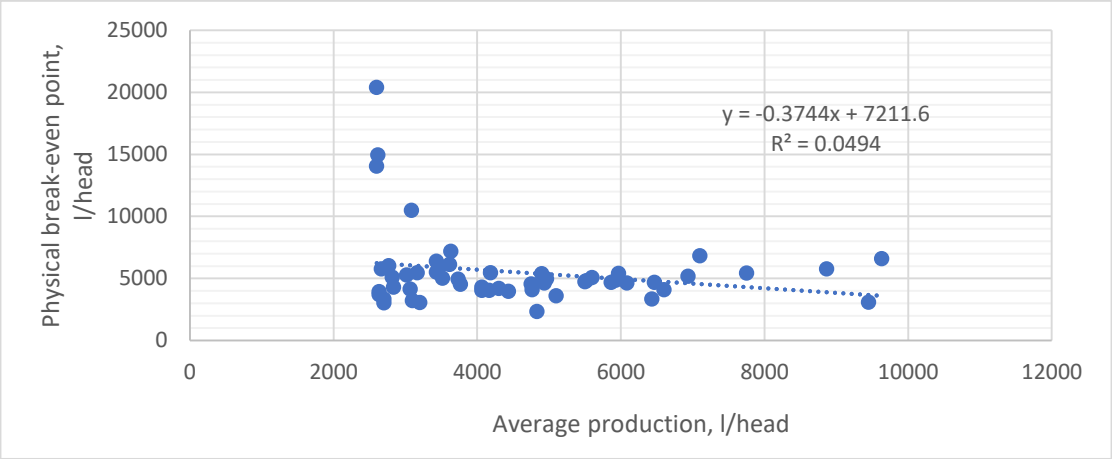
Figure 4. Correlation between average production and production value per farm



Source: ICEADR Calculations

The correlation coefficient of -0.22 calculated between the average production and the physical break-even point indicates a weak correlation between the two variables, and the determination coefficient R^2 shows that only 4.94% of the break-even point can be explained by the linear relationship with average production (Figure 5).

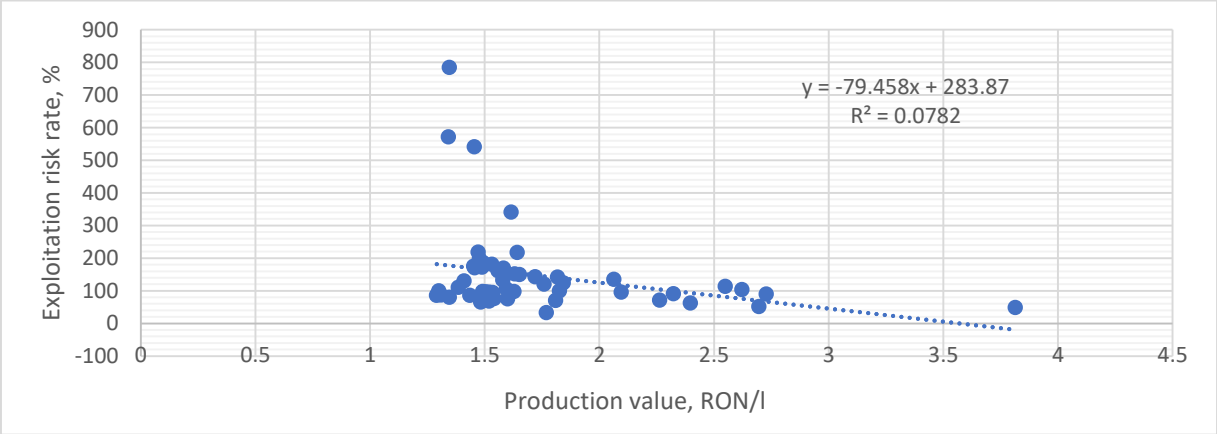
Figure 5. Correlation between average production and physical break-even point



The break-even point is influenced by the difference between the value of production and variable costs. This relationship includes, therefore, both the average production, the price, but also the variable expenses, and within them, the largest share is held by the feed expenses. Therefore, the optimization management of all these indicators is a determining factor in obtaining favorable economic results on the farm.

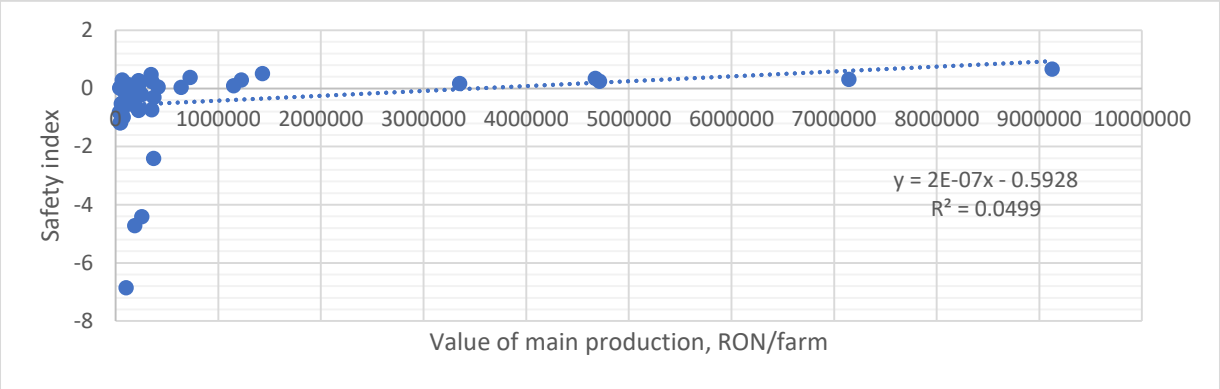
The correlation coefficient of -0.28 calculated between the value of production and the exploitation risk rate indicates an inverse relationship and an acceptable degree of correlation between the two variables, and the determination coefficient R^2 shows that 7.82% of the exploitation risk rate can be explained by the linear relationship with the value of production (Figure 6).

Figure 6. Correlation between the value of production and exploitation risk rate



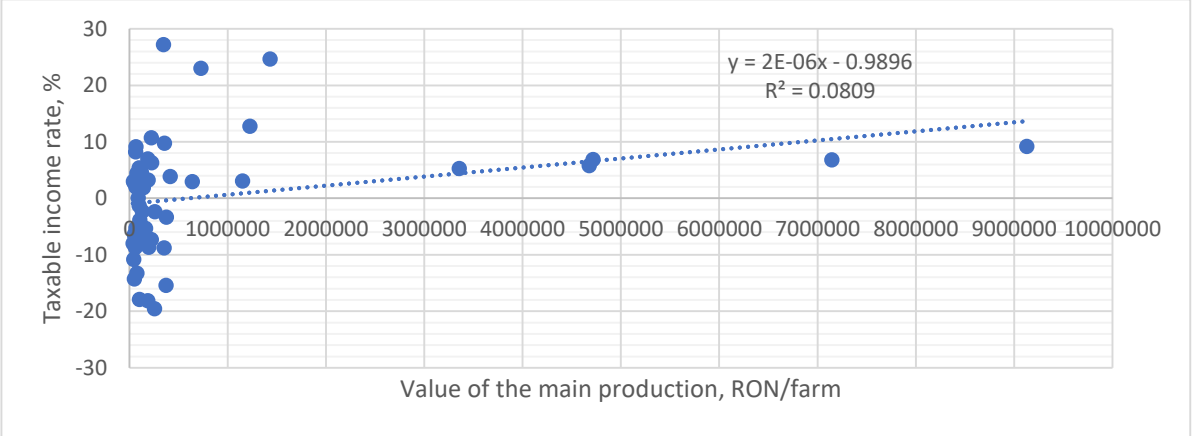
The correlation coefficient of 0.22 calculated between the value of the main output and the safety index indicates a weak correlation between the two variables, and the determination coefficient R^2 shows that only 4.99% of the security index can be explained by the linear relationship with the value main production (Figure 7).

Figure 7. Correlation between value of the main output and the safety index



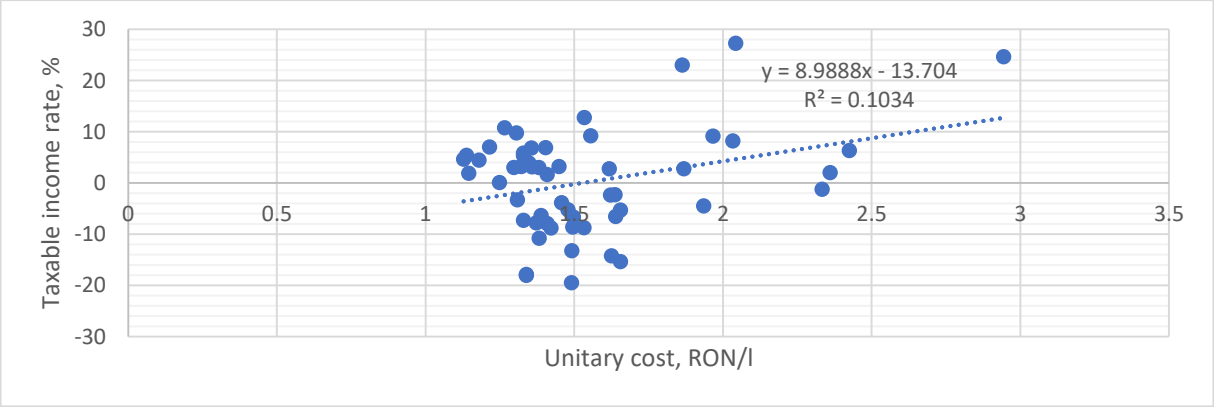
The correlation coefficient of 0.28 calculated between the value of main production and the taxable income rate indicates an acceptable correlation between the two variables, and the determination coefficient R^2 shows that 8.09% of the taxable income rate can be explained by the linear relationship with the value of the main production (Figure 8).

Figure 8. Correlation between the value of main production and the rate of taxable income



The correlation coefficient of 0.32 calculated between the unit cost and taxable income rate indicates an acceptable degree of correlation between the two variables, and the determination coefficient R^2 shows that 10.34% of the taxable income rate can be explained by the linear relationship with unitary cost (Figure 9).

Figure 9. Correlation between unitary cost and taxable income rate



CONCLUSIONS

The farmers work in a complex economic environment, which is constantly evolving and with which they are in permanent relations (Manole V., 2001).The highest correlations calculated in the present study are those between total expenditures and production value, indicating that the allocation of resources leads to an increase in the results of the activity results and, subsequently, of their value. Therefore, higher milk production involves higher costs, but the results are superior comparing with the low production levels. So, there is also a good correlation between the average milk production and the value of the total production, illustrated above.

The acceptable correlations are between the value of production and the rate of exploitation risk, respectively the rate of taxable income, which means that the size of the activity results determines the level of profitability and the degree of risk of the production activity carried out. Also, the level of unit costs directly influences the profitability of the farm. The average break-even point in physical units resulting from the analyzes in the case studies is 5,506.29 liters / head, and the average break-even point in value units is 8,024.83 RON / head.

It should be noted that the market situations are different, in the sense that there are some farms which, even if they obtain high average yields per head, still fail to obtain an advantageous price for milk (high yields require a high level of inputs and, consequently, higher costs) and then the results may be even worse than farms which, despite modest productions, obtain a satisfactory average price to cover their expenses and result in a certain level of profit. Therefore, the price obtained for the milk has a decisive influence on the economic efficiency of the farm.

ACKNOWLEDGEMENTS

This paper is part of the research carried out under the ADER Project 24.1.2 „Research on the economic efficiency of raising sheep, goats, dairy cows, cattle and buffalos" - Phase 3 „Economic efficiency of cattle and buffalo farms of different sizes, located in different geographical regions and forms of relief", funded by the Ministry of Agriculture and Rural Development.

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MILK MARKET - SITUATION AND PERSPECTIVE

GABRIELA-DALILA STOICA [1], DIANA MARIA ILIE (NECULA) [2]

Abstract

A very large number of people around the world consume milk and dairy products every day. Milk and dairy products are not only an essential source of nutrition being a source of calcium, but also a conjuncture and opportunity for both farmers and processors, traders and other members of the value chain. The raising of dairy cattle is a central point in the livestock sector in Romania, representing the main occupation in most rural areas and mountain areas. The paper presents the evolution of the main indicators regarding the herds, the milk production obtained and the milk consumption in Romania as well as a forecast of the milk production until 2030.

Keywords: milk market, milk production, forecast

JEL classification: Q10, Q12

INTRODUCTION

The last years have been characterized by a considerable increase in the demand for milk and dairy products in Romania due to the evolution of the dairy market, both at European and national level, as well as the change of preferences and orientation of consumers towards a healthier diet.

In Romania, milk is a basic product in human nutrition, consuming on average about 243 l/inhabitant/year, the main type of milk consumed being cow's milk. Romania ranks ninth among the countries of the European Union, in terms of the number of cattle, with a number of 1.88 million herds in 2020 and a total production of 42.6 million hectoliters of milk. The dairy sector is essential for a good overall development of the economy, as it contributes to creating links between agriculture and the food industry (Ladaru, 2020).

Raising animals, especially cattle, is a basic occupation of the rural population generating constant incomes and the stability of the local labor force. In many cases, for cattle farmers, milk is the only source of trade and maintenance.

Studies have been conducted on the milk market, for example Popescu A., in the paper entitled "Trends in milk market and milk crisis impact in Romania" claims that about 90-96% of total milk production that is consumed worldwide it is cow's milk. In addition, the same study states that the demand-supply ratio is unbalanced. The milk crisis affected Romania, the milk market facing problems related to the impossibility of ensuring the quantity of milk necessary for national consumption, this being ensured through imports.

MATERIAL AND METHOD

This study presents the analysis and evolution of the main indicators on the number of livestock (cattle, sheep and goats) including milk production obtained for each category of livestock, as well as the evolution of average annual milk consumption. In addition, statistical indicators such as standard deviation, coefficient of variation and growth rate were calculated.

The standard deviation is a statistical indicator that measures the dispersion of a data set in relation to its average, being defined by the formula: $\sigma = \sqrt{\frac{\sum(x-\bar{x})^2}{(n-1)}}$, where: x = sample mean; n = sample size;

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The coefficient of variation is a statistical indicator that measures the dispersion of data points in a series of data around the mean, using the formula:Cv = $\frac{\sigma}{\mu}$100, where:σ = population standard deviation;μ = population average;

Growth rate measures the percentage change in a value over a period of time, using the formula: $\bar{R} = (\bar{I}\ x\ 100) - 100$, where:$\bar{I}$ = the general average growth index.

At the end of the paper, a model of forecasting the total milk production was made, in order to show its trend. The estimation was performed using the SPSS program. Chronological series estimation was performed by using a model to predict future events based on known past events.

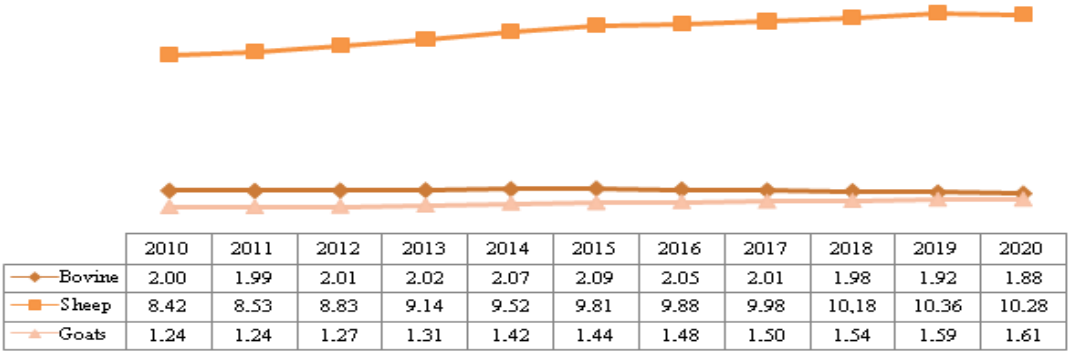
RESULTS AND DISCUSSIONS

The evolution of the main indicators regarding the herds of animals (cattle, sheep and goats), the milk production obtained and the average annual milk consumption in Romania were analyzed.

Cattle herds increased until 2015, when the maximum number of cattle of 2.09 million head was noted, and by 2020 cattle will fall sharply, below the threshold of 2 million (1, 92 million heads in 2019, respectively 1.88 million heads in 2020), representing a decrease of about 5.34% compared to the base year, 2010.

At national level, in the sheep and goat sector there is an increasing trend of herds throughout the analyzed period, so that in 2020 the sheep were 22.09% more than the first year analyzed while the goats were 29 , 83% more, registering an annual rate of 2.02% and 2.65% respectively.

Figure 1. The evolution of the number of animals, in Romania, in the period 2010-2020 (million heads)



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Bovine	2.00	1.99	2.01	2.02	2.07	2.09	2.05	2.01	1.98	1.92	1.88
Sheep	8.42	8.53	8.83	9.14	9.52	9.81	9.88	9.98	10.18	10.36	10.28
Goats	1.24	1.24	1.27	1.31	1.42	1.44	1.48	1.50	1.54	1.59	1.61

Source: processing based on data provided by the National Institute of Statistics, accessed on 16.04.2021

From the analysis of the statistical indicators calculated for the herds of animals, in the analyzed period the following resulted:

• the standard deviation for livestock was limited to 0.06 million head for cattle and 0.70 million head for sheep;

• the coefficient of variation for livestock ranged between 3.10% for cattle and 9.79% for goats, which indicates that the analyzed series has a high degree of homogeneity;

• in terms of growth rate, positive values were recorded for most animal species, except for cattle, which recorded a negative growth rate.

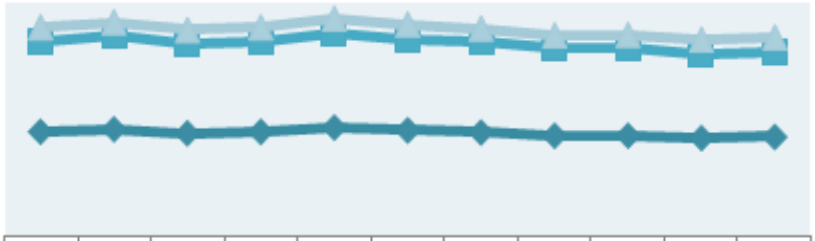
Table 1. The main technical indicators calculated for the main herds of animals in Romania, 2010-2020 (million heads)

Category	Min	Max	Average	Standard deviation	Variation Coeff. (%)	Growth rate (%)
Bovine	1,89	2,09	2,00	0,06	3,10	-0,65
Sheep	8,42	10,36	9,54	0,70	7,34	2,02
Goats	1,24	1,61	1,42	0,14	9,79	2,65
Total	**12,43**	**14,30**	**13,55**	**0,69**	**5,09**	**1,32**

Source: own calculations based on INSSE data

** Coefficient of variation: <10 = small; 10-20 = medium; > 20 = large.*

Figure 2. Milk production (excluding calf consumption) - total, in Romania, in the period 2010-2020 (million hectoliters)



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Milk production - sheep and goat	6.31	6.13	6.30	6.14	6.52	6.49	6.11	6.05	6.09	6.41	6.45
Milk production (excluding calf consumption) - cow and buffalo	38.49	39.75	37.87	38.65	40.10	38.89	38.39	37.03	37.03	35.71	36.15
Milk production (excluding calf consumption) - total	44.80	45.87	44.17	44.79	46.62	45.39	44.50	43.08	43.12	42.11	42.6

Source: processing based on data provided by the National Institute of Statistics, accessed on 16.04.2021

The total milk production in the country in the analyzed period registered a downward trend, overall, in 2020 an amount of 42.6 million hectoliters was obtained, which is 5% lower than in 2010 when they were obtained. 44.80 million hectoliters. Cow's and buffalo's milk represent 86% of the total milk production obtained, while sheep's and goat's milk have a share of 14%.

From the analysis of the calculated statistical indicators, in the analyzed period the following resulted:

• the standard deviation for the obtained production registered limits between 0.18 million hectoliters for sheep's and goat's milk and 1.40 million hectoliters for cow's and buffalo's milk;

• the coefficient of variation ranged between 2.80% for sheep and goat milk and 3.69% for cow and buffalo milk, which indicates that the variation of the characteristic is small, the analyzed data series is homogeneous, the average being representative.

• in terms of growth rate, there were positive values for the production of sheep's and goat's milk (0.23%) and negative values for the production of cow's and buffalo's milk (-0.63%).

Table 2. The main technical indicators calculated for total production of main livestock species 2010-2020 (mil. hectolitri)

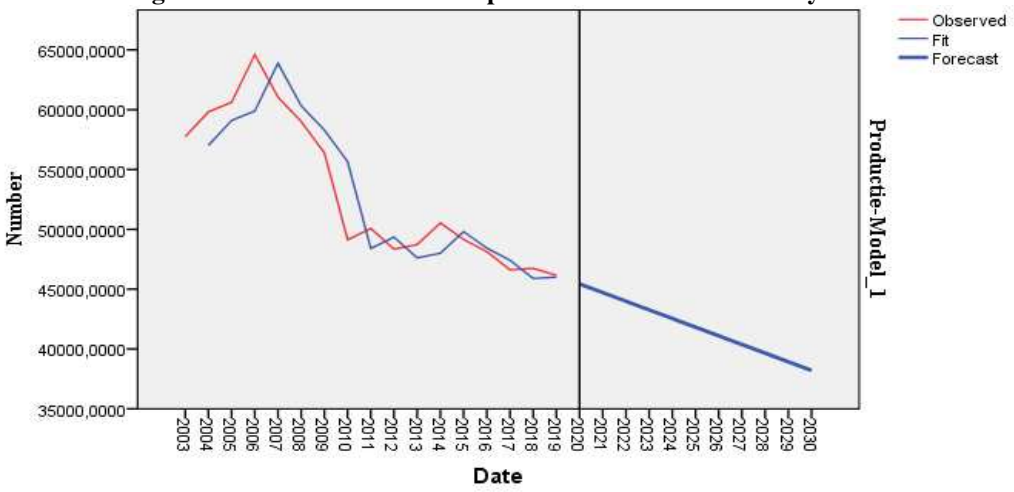
Categorie	Min	Max	Avergae	Standard deviation	Variation Coeff. (%)	Growth rate (%)
Milk production (ecluding calf consumption) cow and buffalo	35.71	40.10	38.00	1.40	3.69	-0.63
Milk production – sheep and goats	6.05	6.52	6.27	0.18	2.80	0.23
Milk production (ecluding calf consumption) - total	**42.11**	**46.62**	**44.28**	**1.42**	**3.20**	**-0.50**

Source: own calculations based on INSSE data

** Coefficient of variation: <10 = small; 10-20 = medium; > 20 = large.*

In 2003, approximately 44.8 million hectoliters of milk were produced. Therefore, observing the downward trend of total milk production, a model was created in which its evolution in the next period was predicted, until 2030.

Figure 3. Forecast of total milk production over the next 10 years



Source: processing based on INSSE, ITC data

While overall production needs to increase to meet growing demand, it is expected that there will be a decrease in total milk production. According to the model, in 2030 Romania could produce up to 38 million hectoliters, which would mean 20% less compared to 2003.

From the point of view of the analysis of milk consumption at national level, as a whole, it has an increasing trend, consuming on average approximately 243 l/inhabitant/year. In 2020, there was an increase of 6.36% compared to 2010, due to the change in consumer behavior of the population.

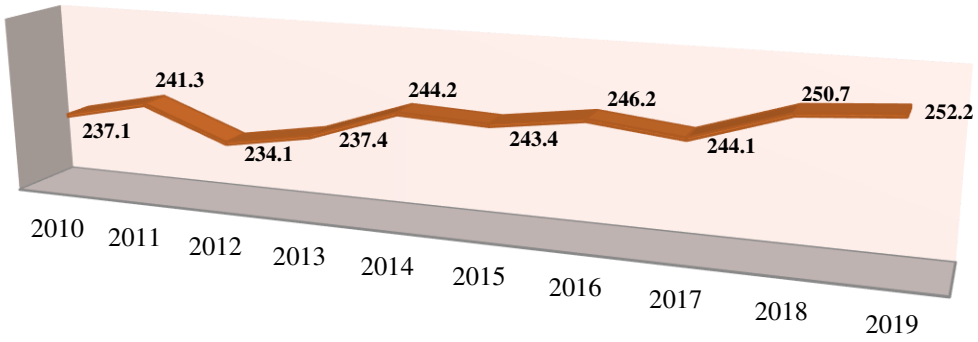
Table 3. Total milk production obtained, including the estimate by 2030

Production obtained (thousand hectoliters)	Year
44,832	2003
53,386	2004
53,852	2005
57,886	2006
54,991	2007
53,329	2008
51,270	2009
44,799	2010
45,872	2011
44,172	2012
44,786	2013
46,615	2014
45,385	2015
44,504	2016
43,082	2017
43,121	2018
42,113	2019
42,609	2020
44,714	2021
43,991	2022
43,267	2023

Production obtained (thousand hectoliters)	Year
42,544	2024
41,820	2025
41,097	2026
40,374	2027
39,650	2028
38,927	2029
38,203	2030

Source: own processing in SPSS, based on INSSE data

Figure 4. Analysis of the evolution of the average annual milk consumption per capita (liters)



Source: processing based on INSSE data

CONCLUSION

The analysis of the indicators shows that in 2020, the number of sheep is the highest, representing 75% of the total livestock *, while cattle and goats represent 14% and 12% of the total. Calculating the statistical indicators, it turned out that the standard deviation has values between 0.06 million heads and 0.70 million heads, the coefficient of variation is between 2.80% and 3.69% and the growth rate has positive values for the herds. of sheep and goats, with the exception of cattle, which recorded a negative growth rate.

The total milk production is on average 44.28 million hectoliters, the highest percentage being represented by cow's and buffalo's milk, 85% and only 15% represent the goat's and sheep's milk from the total production obtained. The standard deviation has values between 0.18 and 1.40 million hectoliters of milk, the coefficient of variation is between 2.80% and 3.69% and the growth rate records negative values only for cow's and buffalo's milk.

Milk production is expected to follow a downward trend in the coming years in 2030 and it is estimated that only 38 million hectoliters of milk will be produced, while overall production needs to increase to meet growing demand.

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CHARACTERISTICS OF DAIRY COW FARMS WITH POSITIVE ECONOMIC RESULTS

GABRIELA-DALILA STOICA [1]

Abstract

The paper presents the analysis of synthetic economic indicators from 2018-2020 for a number of 30 dairy farms in various areas of the country, which were the subject of case studies. The purpose of analyzing the indicators is to know the essence of the elements that contributed to obtaining positive economic results for the dairy farms analyzed. The average size of the analyzed farms is 104.16 heads, being between 5-568.33 heads. The average milk production per cow head was 5709.44 liters, with a minimum of 3100 l / head and a maximum of 9,633, 3 l / head. By capitalizing the milk productions obtained at an average price of 1.69 lei / l, registered for the analyzed farms, an average profit of 0.13 lei / liter was achieved, as well as a profit rate between 0 .09% and 27.25%. Although they registered positive economic results, at the level of all 30 economic entities, there was, on average, an exploitation risk rate of 82.8%. But the diversity of the products obtained, the capitalization of the fodder and their transformation into high quality animal products contribute to the development of the sector from a sustainable point of view.

Keywords: indicators, farms, milk, economic

JEL classification:Q10, Q12

INTRODUCTION

The paper is part of the research carried out within the ADER Project 24.1.2 - Stage 3: Economic efficiency of cattle and buffalo farms of different sizes, located in different geographical regions and landforms, funded by MADR.

GrigoraS M.A., in the paper "Research on trends in animal production in the last decade in Romania" claims that after Romania's accession to the European Union, agriculture has changed, especially the livestock sector, both in terms of structures and technologies applied , keeping up with the new challenges. Also in the same study it is assumed that the modernization and application of new technologies, diversification of production and application of efficient management could contribute to the development of agriculture. The livestock sector is facing significant changes in terms of the number of farms, the average size of farms, the diversification of production, the yields obtained, the yield, etc.

Cattle farming is a key branch of national and world agriculture, due to the values of production obtained as well as the diversity of products obtained. In the paper "Handbook of good practices in cattle breeding", Maciuc V., Leonte C. and Radu-Rusu R., argue that cattle provide about 95% of the total amount of milk consumed globally.

In this context, this paper aimed at analyzing the synthesis indicators of farms from case studies necessary to achieve stages 3 of the ADER 24.1.2 project, which contributed to the knowledge of the elements of obtaining positive economic results for dairy farms.

MATERIAL AND METHOD

The data used to conduct the study are part of a series of 30 case studies conducted on dairy farms, located in different development regions and different forms of relief. Thus, these data were analyzed using the quantitative and qualitative method, by calculating and analyzing the main indicators of economic efficiency. Statistical indicators such as: minimum, maximum and average were also calculated.

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The arithmetic mean or mean value of a series of values is the ratio of the sum of the values of the series to their number.

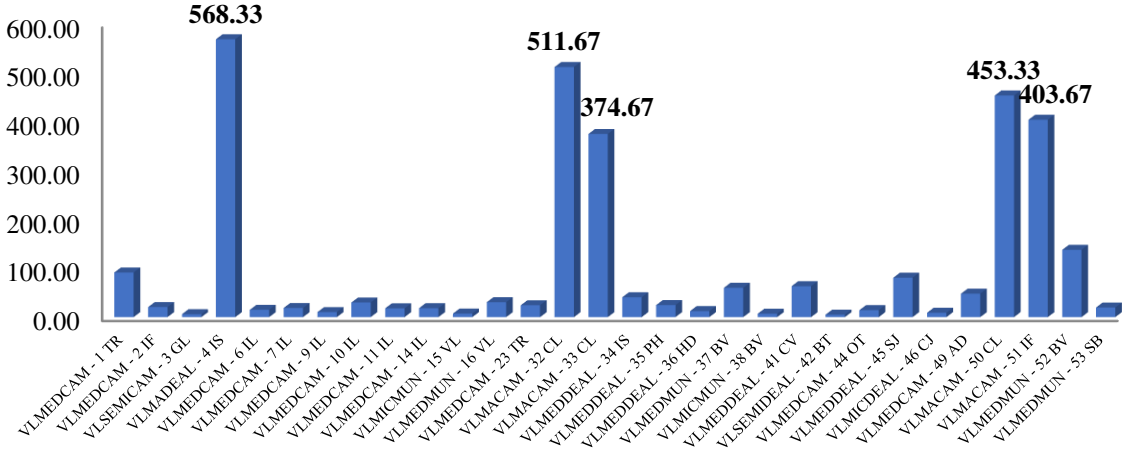
$$\overline{X} = \frac{x_1 + x_2 + \ldots\ldots\ldots x_n}{n} = m$$

For the calculation of the technical-economic indicators (minimum, maximum and arithmetic mean), the established relations from the specialized economic literature were used.

RESULTS AND DISCUSSIONS

The main synthesis indicators of the farms from the case studies necessary for the realization of stage 3 of the ADER 24.1.2 project were analyzed. Therefore, at the level of the 30 analyzed farms that obtained positive economic results, from the point of view of the size of dairy farms, it was found that on the average of the period there were 104.16 heads, respectively between 568.33 heads in Iași county area and 5 heads in the western part of Moldova, in Botoșani county. It is also observed that the farms in Călărași also have a considerable number of dairy cows. At the opposite pole, there are farms in Botosani, Galati and Brasov with a number of numbers between 5 and 7.33 heads. (Figure 1.)

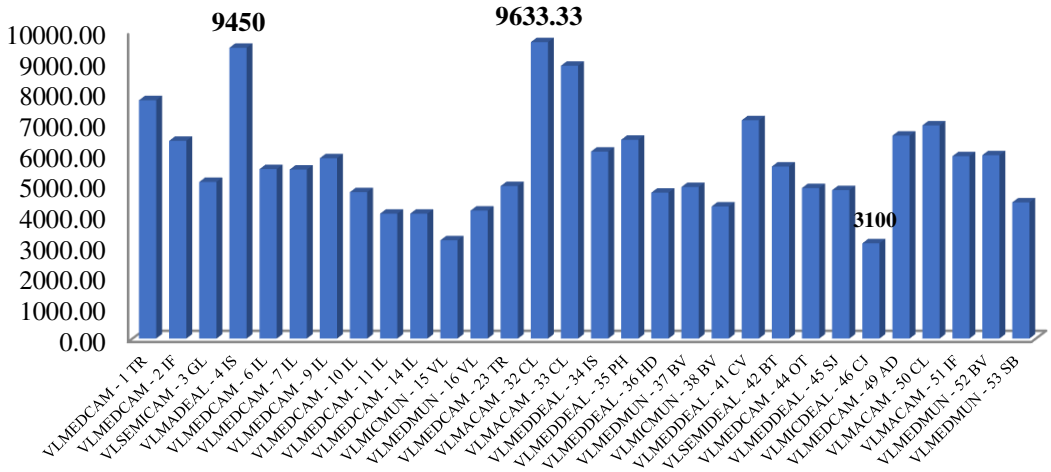
Figure 1. Size of farms in the case studies analyzed (number)



In general, individual milk production is influenced by a number of factors, such as cow breed, age, body shape, etc. Thus, the average milk production per animal, in the case of the analyzed farms, was 5709.44 liters.

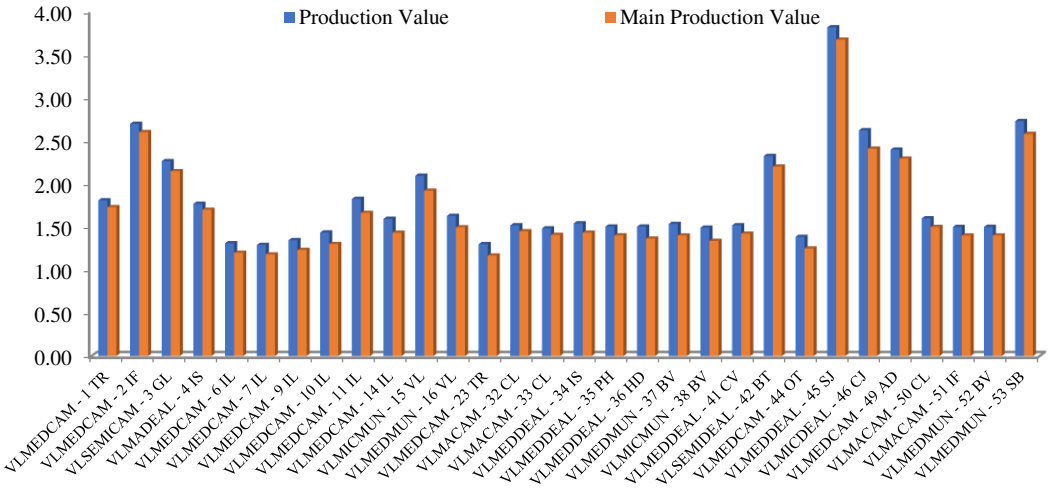
The most productive cows are found in Călărași County, where the maximum value of the period of 9633.3 liters / head of animal was registered, while the minimum milk / animal head productions were obtained in Cluj and Vâlcea counties, these being 3100 liters / animal head respectively 3200 l / animal head. (Figure 2)

Figure 2. Average milk production per head of animals on the farms analyzed (l / head per animal)



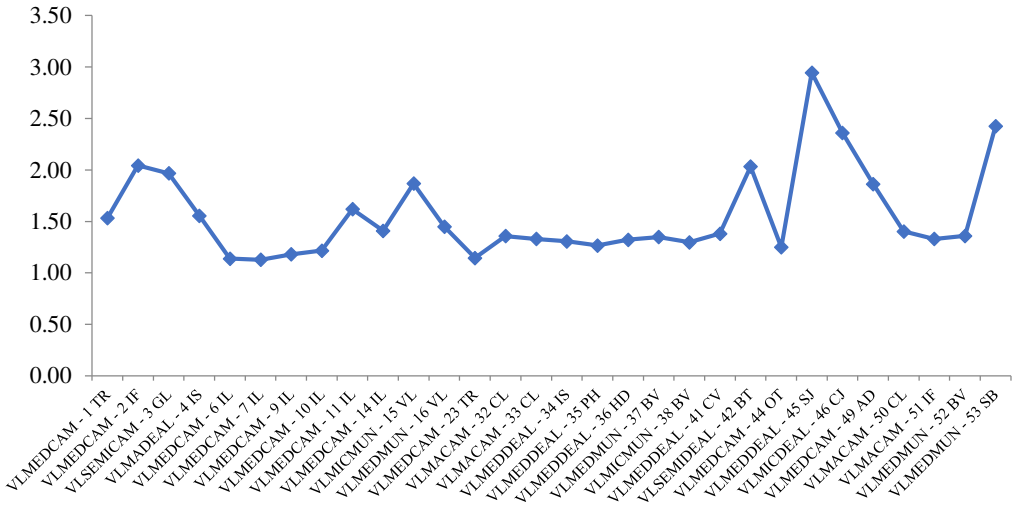
The value of production is the value expression of the volume of animal products obtained on the farms analyzed. Therefore, on average, the value of production is 1.81 lei / liter, registering minimum values within a farm in Ialomița County, 1.29 lei / liter and maximum values within a farm in Sălaj County, 3, 81 lei / liter, while the value of the main production has limits between 1.17 lei / liter and 3.81 lei / liter (Figure. 3).

Figure 3. The value of the product (lei / l)



There were significant differences between farm expenditure, so that, on average, expenditure on main production represents around 92.7% of total resources consumed. The highest expenses are registered in the northwest of the country, in Sălaj county, in the hill area, these being 3.09 lei / liter and the lowest expenses being 1.24 lei / liter registered in Ialomița county (Figure 4).

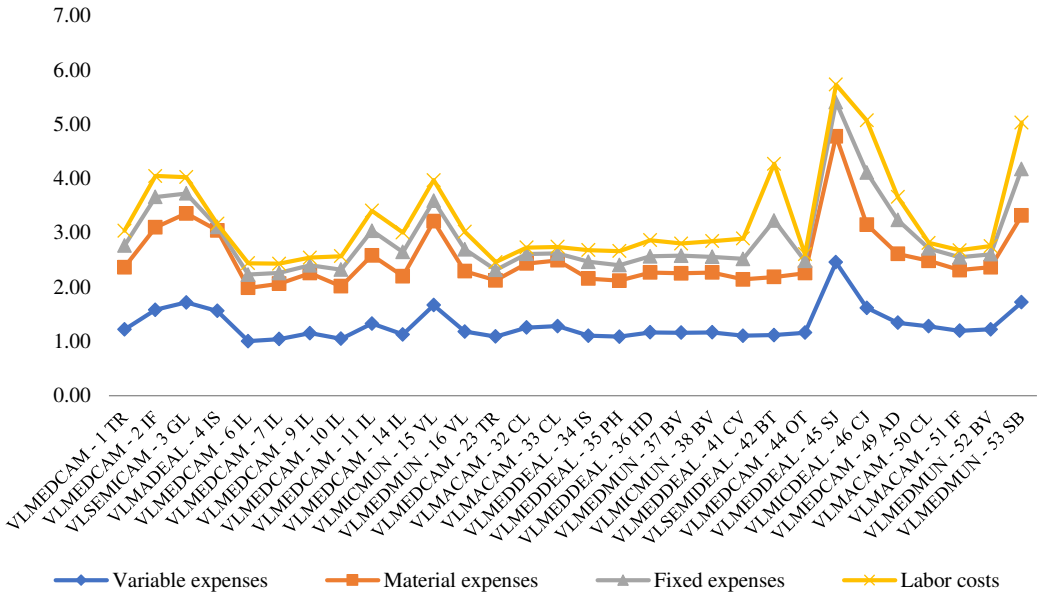
Figure 4. Expenditure on main production (lei / l)



Material costs account for 93% to 98% of total variable costs for the farms analyzed. On average, the variable expenses amount to 1.30 lei / liter while the material expenses are 1.24 lei / liter, with variations from 0.97 lei / l and 2.32 lei / l. (Figure 5)

From the structure of fixed expenses, the expenses with permanent labor are noticed, these rising on average to the value of 0.31 lei / l, representing approximately 82% of the total fixed expenses. Fixed expenses per unit of product decrease with increasing volume of activity and increase simultaneously with reduced activity. (Figure 5)

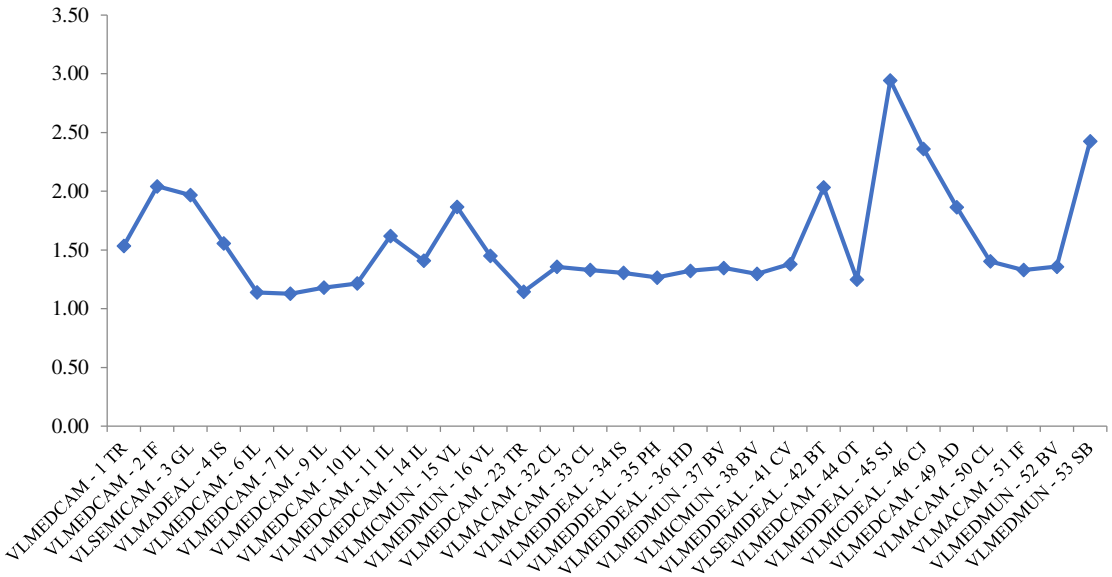
Figure 5. Categories of expenses (lei / l)



The unit cost, in this situation, is on average 1.56 lei / l while the capitalization of a liter of milk is made with an average price of 1.69 lei / liter which determines a profit of 0.13 lei / l . (Figure 6)

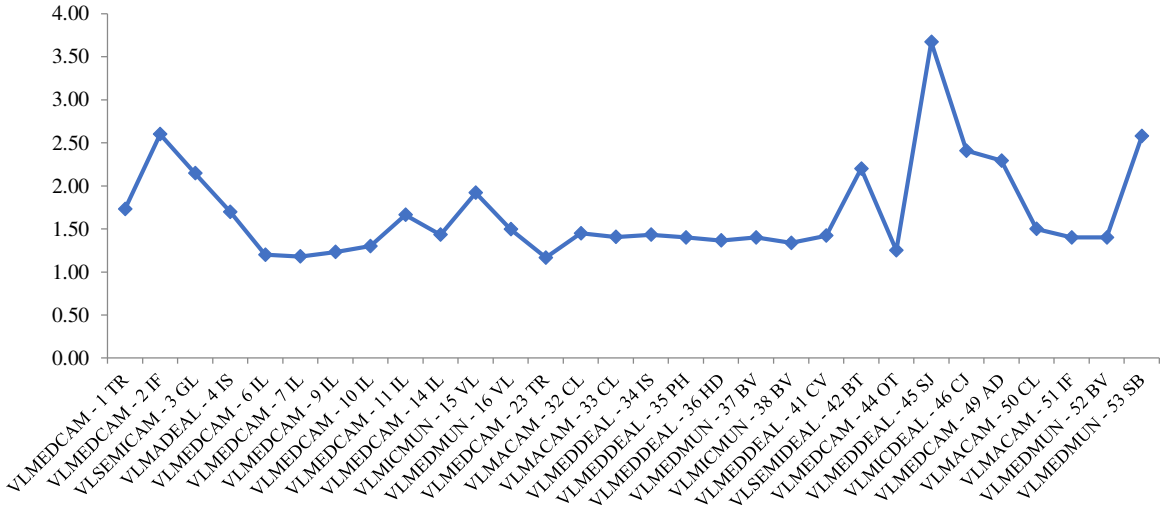
Higher unit cost values generally correspond to lower average milk production, or with lower production and a lower number of herds.

Figure 6. Unit cost (lei/l)



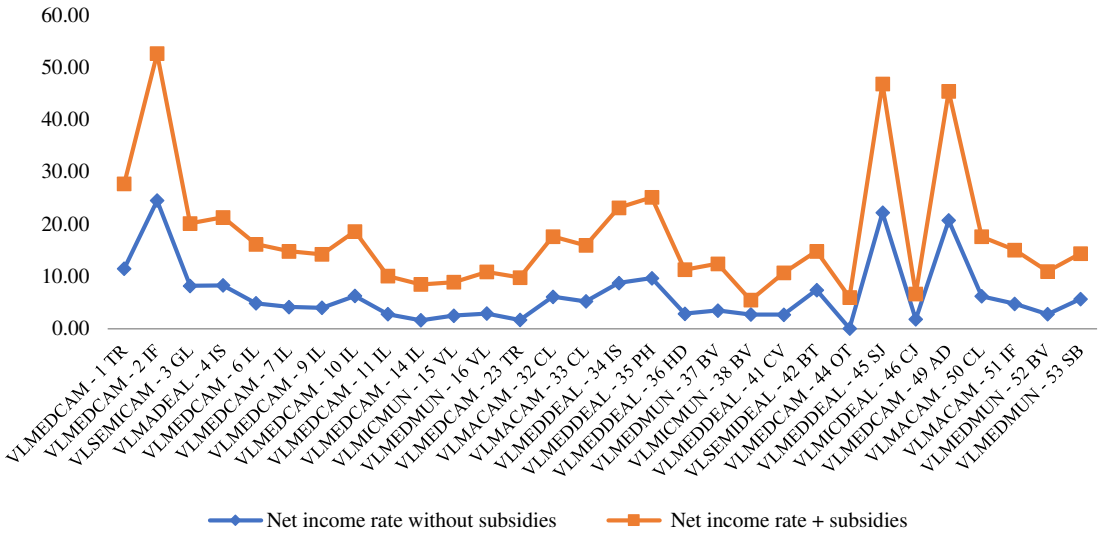
The highest profit registered is 0.73 lei / l within a farm in Sălaj County, with a cost per unit of product of 2.94 lei and a milk recovery price of 3.67 lei / l. The highest values of the capitalization price are registered in the farms in the hill and mountain area with small exceptions in the plain area. (Figure 7)

Figure 7. Capitalization price (lei / l)



By capitalizing the milk productions obtained at a capitalization price, on average of 1.69 lei/ l, registered for the analyzed farms, a profit of 0.13 lei / liter is achieved, as well as a profit rate between 0.09 % and 27.25%.

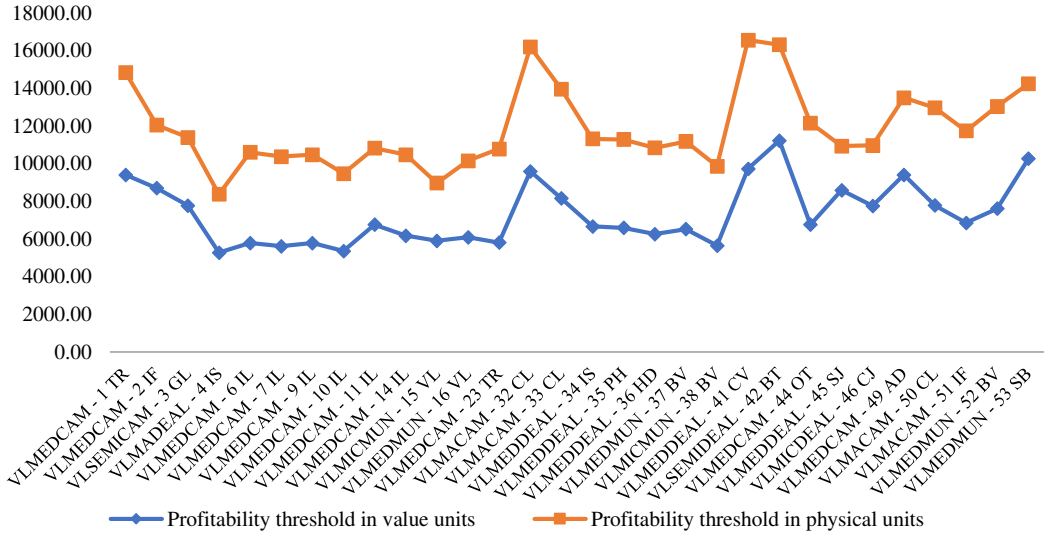
Figure 8. Net income rate (%)



The situation is changing as subsidies are also taken into account. Thus, by granting subsidies, an average net income rate of 11.22% is obtained, with approximately 71.29% higher compared to the income rate without the subsidies granted. (Figure 8)

The break-even point is the volume of activity for which the expenses incurred are equal to the income obtained from the capitalization of production. Thus, in the case of the 30 farms analyzed, the profitability threshold is, on average, 7320.82 lei expressed in value units and 4533.40 liters expressed in physical units. (Figure 9)

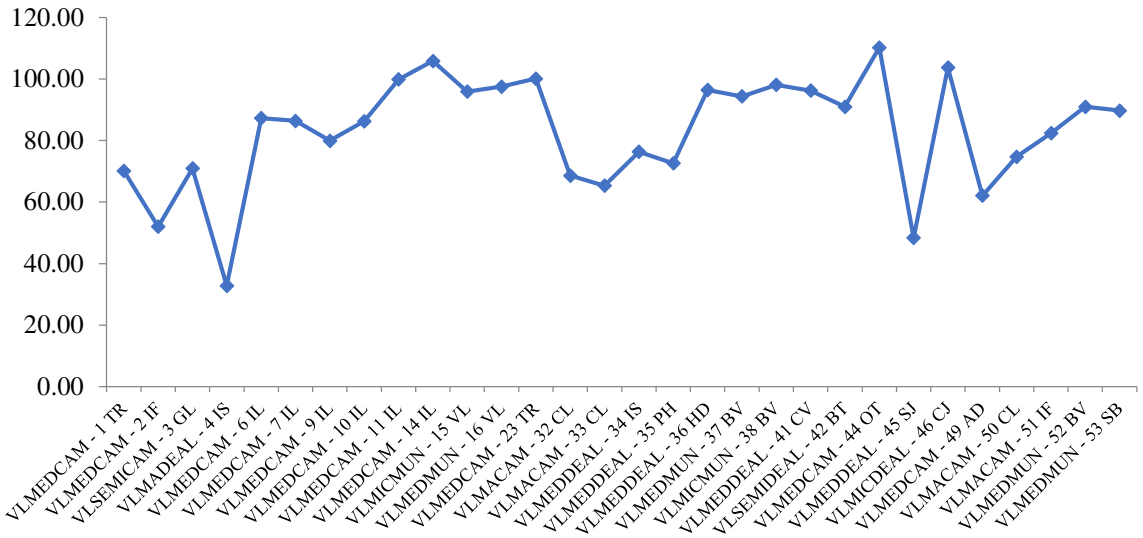
Figure 9. Profitability threshold



At the level of all 30 economic entities, an average risk of exploitation risk of 82.8% was registered. Exploitation risk is the ability of farms to adapt to changes that occur in the shortest possible time and at the lowest cost. The impossibility of adapting to these changes can lead to a decrease in profit. Thus, the most risky farm, from this point of view, is found in Olt County, with a rate of 110.25%, while the lowest and therefore most favorable level was registered in Iasi County

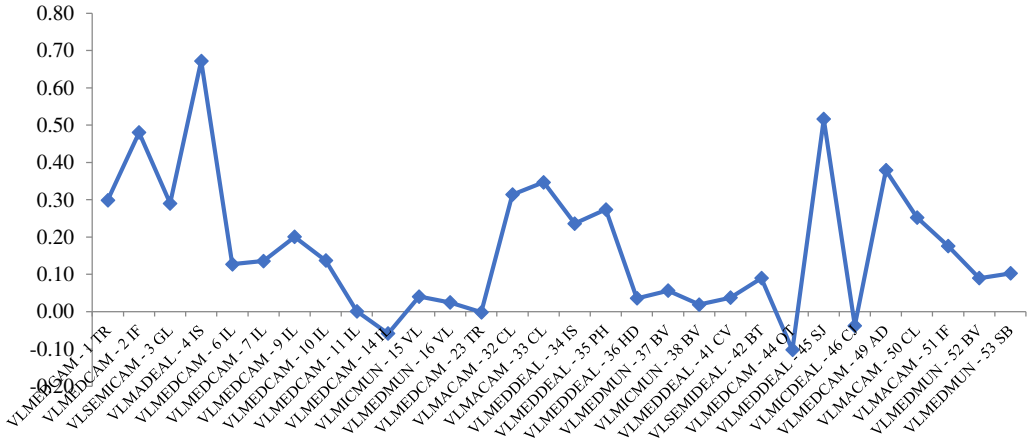
within farms which recorded a risk value of 32.81%. In general, the rate of exploitation risk is high on farms with smaller herds and lower yields. (Figure 10)

Figure 10. Exploitation risk rate (%)



The security index had values between -0.10 and 0.67. The most risky company, from this point of view is found in Olt County, given that the security index has the lowest level of -10%, and the most favorable farm is in Iasi County, with a security index of 67 %. Negative results were recorded in 6.7% of farms, especially in the hilly area. (Figure 11).

Figure 11. Security index



CONCLUSION

Analyzing the average of the indicators calculated for the analyzed farms, it is found that the highest average production is found in the plain area (9633 l / head) while the highest value of production is found in the hill area (3.81 lei / l). Regarding the expenses incurred, the highest total expenses including those with the main production are in the hill area (3.08 lei / l). The highest value of the unit cost is also registered in the hill area (2.94 lei / l) as well as the highest capitalization price of milk (3.67 lei / l). The net income rate registers the highest value in the plain area (24.83%). The

profitability threshold expressed in value units has the highest values in the hill and mountain area (11,213.83 lei respectively 10,256.59 lei).

In conclusion, it is observed that the most profitable farms, from the point of view of the calculated indicators, are the farms in the hill area (also registering the highest profit (0.73 lei / l)) and the plain. The farms with the lowest profit are those that generally have a small number of herds, but which have a relatively high average production, with few cases where the farm has a large number of herds and a high average production.

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CHARACTERISTICS OF DAIRY COW FARMS WITH NEGATIVE ECONOMIC RESULTS

RUXANDRA – EUGENIA POP[1]

Abstract

Following the research carried out within the ADER 2412 project, entitled Research on the economic efficiency of raising sheep, goats, dairy and beef cattle and buffaloes, quantitative data were collected, analyzing the activity of livestock farms located in different counties in Romania , regarding different characteristics: farm size, level of milk production obtained, yields recorded at the farm level, degree of productivity, level of expenditure and income, break-even point. Based on the centralized data, a series of economic and financial indicators were calculated to determine the feasibility of the livestock farm, depending on the county in which it operates, such as: income rate (with or without access to subsidies) , profit rate, exploitation risk rate, security index. In this paper, the emphasis is on the prototype of farms where negative economic results are recorded, in the sense that the factors that determined their identification are identified, thus outlining a series of recommendations to achieve and increase economic effectiveness and efficiency. at farm level.

Keywords: dairy cows, exploitation system, economic indicators, financial indicators, efficiency, effectiveness

JEL Classification: Q10, Q12

INTRODUCTION

ADER 2412 project, entitled *Research on the economic efficiency of raising sheep, goats, dairy and beef cattle and buffaloes*, aims at economic development on farms, respecting the principles of food security of the population, by increasing the supply of food products , in this case cow's milk. This can be achieved by substantiating support plans from public funds by the competent institutions. In order for the competent institutions to do this, information with a high degree of accuracy is needed, directly from the target audience, in this case, agricultural producers, owners of dairy farms. It is necessary for this information to provide an overview of the main reasons why the livestock farm is vulnerable, as well as the economic difficulties that have arisen at its level. In order to generate this set of information, the ADER 2412 project centralized data on economic indicators that reflect efficiency, recorded at the level of agricultural holdings. Based on them, a comparative analysis was performed between the case studies within the project, depending on different micro-environmental factors of the farm, such as: size, degree of mechanization and automation, location and use of labor. Also, different financial-economic indicators were calculated to demonstrate the feasibility of farms in the case study: labor productivity, in value and physical expression, profit or loss per unit of product, taxable income rate and income rate net, the rate of income obtained from the granting of subsidies, the break-even point, expressed in physical and value terms, the rate of exploitation risk (%) and the security index (Is).

The farms where data were centralized are placed in the territory so that the results are suggestive at national level (Ialomița, Vâlcea, Teleorman, Prahova, Gorj, Botoșani, Maramureș, Alba, Sălaj and Galați), taking under analysis all landforms, mountain, hill and plain areas.

MATERIALS AND METHODS

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To carry out this paper, the following materials and working methods were used:

• ***Collection of data from different dairy farms***, with negative economic results, on farm characteristics (size, geographical area, average production, total production, total production value and average production value, total, fixed and average expenditure level, unit cost and capitalization price, labor productivity in value and physical expression);

• Based on the collected information mentioned above, ***specific mathematical formulas*** were used to calculate the following economic and financial indicators (table 1), in order to evaluate the performance recorded at the farm level:

Table 1. Delimitation of the financial indicators used in the present research

Nr. crt.	Indicator type	Definition / meaning	Formula	Source
1	**Profit / unit of product**	Surplus of revenues made over the costs of production and distribution of goods obtained	Pr = (business figure - total costs) / size of production	Gavrilă I., Ghiță P., Nițescu D., Popescu C., Manual Economie, Ed Economică, 2000.
2	**Income rate**	It expresses the degree of profitability of the farm, it can be related to the technical capital used, the turnover or the total production costs.	Rv = ((receipts - total expenses) / total expenses) * 100	Gavrilă I., Ghiță P., Nițescu D., Popescu C., Manual Economie, Ed Economică, 2000.
3	**Profitability threshold**	The break-even point is the level of activity or turnover that a farm must achieve in order to fully cover its fixed and variable expenses. Once the break-even point is reached, no loss or profit is made at the farm level.	**Interpretation:** **Turnover** = break-even point: **zero result;** Turnover> profitability threshold **profit;** Turnover <break-even point: **loss.**	Muntean G., Prag de rentabilitate, disponibil la http://gheomuntean.ro/
4	**Exploitation risk rate**	is determined by the inability of the company to adapt in time and at the lowest cost to changes in the environment in which it operates		Buglea A.,Analiză financiară – concepte și studiu de caz, Ed. Mirton, Timișoara, 2005,
5	**Security index**	It expresses in percentage form how much the volume of sales can decrease so that the farm reaches the value corresponding to the break-even point.	Security margin * / Business figure	Muntean G., Prag de rentabilitate, disponibil la http://gheomuntean.ro/

*Security margin (MS) = turnover - profit

Source: economic publications and manuals, mentioned next to each indicator

- ***Qualitative analysis,*** carried out by disseminating the specialized literature in order to identify the determining factors in obtaining negative and / or positive economic results, at the level of zootechnical exploitation.

RESULTS AND DISCUSSION

In order to outline the profile of livestock farms, data were collected, by telephone, directly from farmers owning dairy farms, on the following characteristics of farms: size, geographical area, average production, total production, total production value and the value of averageproduction, the level of total, fixed and average expenses, unit cost and capitalization price, labor productivity in value and physical expression.Thus, based on data collected directly from farmers and based on case studies conducted at the level of identified farms, numbering 24, we can conclude:

1. Farm size (number of heads): the size of livestock farms is larger in hilly and plain areas, and smaller in mountain areas. The farms with a higher number of animals are found on the territory of Sălaj and Teleorman counties.

2. Average production (l / head) and total production (l / farm): on the territory of the counties with larger farms in terms of the number of heads there are higher total milk productions (Sălaj and Teleorman). Regarding the average milk production obtained, there is a higher yield in the plain areas, there is an approximate difference of 1100 l / head, between the maximum yield recorded (Galați, plain) and the minimum yield recorded (Botoșani, hill).

3. Value of production (lei / l) and value of main production (lei / l): higher production values are recorded in the counties in the mountain area (Maramureș and Alba), and a lower value of it in the plain and hill counties (Teleorman and Botoșani). On farms with fewer heads and lower production, the value of milk production increases, as a medium to high price strategy is applied at the management level in order to reach the break-even point. At the level of farms with a higher level of milk production, a low price strategy can be practiced.

4. Expenditures: *total, for the main production, variable, material, fixed, with labor:*a higher level of total expenditures is identified in Maramureș, Alba and Sălaj counties, in mountain areas, respectively hill, and a lower level of expenditures in the plain and hill areas, respectively, in Ilfov and Botoșani counties. There is a link between a higher level of total production and a higher level of total expenditure. There is also a higher level of labor costs in mountain areas and a lower level in hilly or plain areas.

5. Unit cost and capitalization price: in all the analyzed counties, there is a level of unit production cost higher than the capitalization price, the biggest differences being registered on the territory of counties like Sălaj, Botoșani, Teleorman and Ilfov, from here resulting in negative economic results. Normally, the capitalization price is influenced by the cost of production, being necessary that the price level is at least at the level of the cost, even exceeding it, in order to be possible to obtain a positive financial result, respectively profit.

In turn, the cost of production is influenced by a number of factors, such as:

a) *general factors*, such as: natural conditions, farm location, perishable nature of production;

b) *technical-organizational factors*, such as: the size of the holding, the technical endowment, the type of production organization;

c) *conjunctural factors*, such as: the economic cycle, the economic and social policy of the state, unforeseen natural phenomena, disturbing socio-political phenomena.

6. Labor productivity in physical and value expression: higher labor productivity, in value expression, in Sălaj, Teleorman and Botoșani counties, a hierarchy that is also found in the characteristic size of livestock farms. Thus, farms with a higher number of herds register a higher productivity in terms of value. In terms of physical productivity, it reaches higher values in counties such as Gorj, Maramureș and Alba, counties on whose territory the highest level of labor costs was recorded, in the counties analyzed.

As specified in the methods and materials section, for each farm, a ***set of financial and economic indicators*** was calculated in order to assess the economic performance of the analyzed farms (Table 2).

Table 2. Financial indicators resulting from the present research

Indicator / County	Profit or loss per unit of product	Rate of net taxable income	Rate of net income without subsidies	rate of net income with subsidies	Profitability threshold in value units (lei)	Profitability thereshold in physical units (l)	Exploitation risk rate	Security index (Is)
IL (plain)1	-0.12	-8.78	-8.78	-3.62	7092.28	5466.55	172.63	-0.73
IL (plain)2	-0.04	-3.31	-3.31	2.28	6912.72	5459.67	130.51	-0.31
IL (plain)3	-0.20	-13.21	-13.21	-8.31	9324.19	7200.70	198.18	-0.98

IL (plain)4	-0.13	-8.72	-8.72	-3.94	8587.46	6135.92	169.66	-0.70
VL mountain 1	-0.11	-6.56	-5.90	-1.44	7717.18	5036.30	143.21	-0.43
VL mountain 2	-0.06	-3.84	-3.46	1.56	6964.24	4968.12	133.07	-0.33
VL mountain 3	-0.11	-7.94	-7.94	-7.94	6624.75	5107.27	181.32	-0.81
VL mountain 4	-0.11	-7.80	-7.02	-1.69	7494.43	5920.37	170.78	-0.71
TR plain 1	-0.10	-7.28	-7.28	-1.78	6511.02	5280.00	175.03	-0.75
TR plain 2	-0.29	-19.51	-19.51	-19.51	16875.18	14062.65	540.87	-4.41
TR plain 3	-0.13	-8.64	-7.78	-2.89	7552.39	5529.16	161.04	-0.61
PH hill 1	-0.09	-6.35	-5.72	-0.46	8314.16	6390.73	186.14	-0.86
PH hill 2	-0.08	-5.26	-5.26	-5.26	5522.51	3941.09	149.66	-0.50
PH hill3	-0.09	-5.33	-4.79	-4.79	5843.25	3728.73	141.60	-0.42
PH mountain 4	-0.15	-10.79	-10.79	-10.79	7433.58	6029.62	217.94	-1.18
GJ mountain 1	-0.10	-6.66	-6.66	-6.66	6018.36	4305.90	151.97	-0.52
GJ mountain 2	-0.23	-14.24	-14.24	-14.24	8070.89	5791.14	217.17	-1.17
GJ mountain 3	-0.04	-2.33	-2.09	-2.09	5363.40	3354.40	124.24	-0.24
BT hill1	-0.24	-18.08	-18.08	-18.08	16404.00	14956.76	571.60	-4.72
BT hill2	-0.24	-17.89	-17.89	-17.89	22429.82	20401.52	784.67	-6.85
MM mountain	-0.03	-1.26	-1.26	-1.26	7051.38	3059.25	113.31	-0.13
AB mountain	-0.09	-4.47	-4.47	-0.70	7682.30	4155.34	135.50	-0.36
SJ hill	-0.25	-15.38	-15.38	-10.97	14723.67	10507.57	340.79	-2.41
GL plain	-0.04	-2.37	-2.37	2.13	7202.90	4548.72	120.76	-0.21

Source: ADER 2412 project data processingResearch on the economic efficiency of raising sheep, goats, dairy and beef cattle and buffaloes

Thus, following the calculations made, the following are mentioned, regarding:

1. Profit or loss per unit of product: The largest deficits are found in counties such as: Sălaj, Botoșani and Teleorman, the counties on whose territory the highest fixed or labor costs are recorded. Basically, the level of expenses exceeds the income obtained for a unit of product, thus resulting in economic losses and, at the same time, an unproductive activity. Also, on the territory of these counties, a larger farm size was observed, in terms of the number of heads, compared to the other farms.

2. Rate of net taxable income, rate of net income without subsidies, rate of net income with subsidies: there is a rate of net taxable income with higher negative values in Teleorman, Botoșani and Sălaj counties, as well as a rate of net income without subsidies higher small also within these counties. Regarding the net income rate, to which are added the subsidies, Galati county is the only county among those analyzed on the territory of which a positive income rate is registered, in the rest of the counties even with the help of subsidies the income rate remains negative, with values higher in Alba, Maramureș and Vâlcea county.

3. Profitability threshold in value units (lei) and physical units (l): In order to reach the profitability threshold at the level of the livestock farm, in Botoșani, Sălaj and Teleorman counties it is necessary to reach higher values in terms of value level and quantitatively, following the sale of milk production. The lowest thresholds were registered on the territory of Gorj, Prahova and Maramureș county.

4. Exploitation risk rate and security index: the counties with the highest exploitation rate are Botoșani, Teleorman and Prahova, these being also the counties with the highest level of expenditures or with the highest exploitation size.

Following those analyzed in the first part of this paper, we can classify characteristics of the farm's micro-environment, which can influence the economic results obtained, grouped in table 3 below:

Table3: Causal factors in the registration of negative economic results, at the level of the zootechnical exploitation

Nr. crt.	Factor type	Explanation / Cause	Solution
1	**Size of the holding**	Although normally a larger holding in terms of the number of animals should reflect a higher degree of its development, this does not necessarily correspond to a positive economic result, as long as the expenses necessary for the maintenance of the holding exceed the level of income obtained, the yield / animal in terms of milk production not being optimal.	Implementation at the level of the zootechnical farm techniques and tools, fixed, innovative means, with an advantageous cost / benefit ratio, which would improve the efficiency of milk / cow production, according to the requirements and mission identified at the level of the zootechnical farm.
2	**Average production and total milk production**	There is a higher level of total production on holdings with a higher number of animals, but the same cannot be said for the average production obtained. Achieving a higher level of milk production does not necessarily lead to ways to capitalize on optimal milk production, there are situations where facing a quantitative surplus in milk production, managers are forced to sell at a price that it is below the capitalization price, thus leading to a negative economic result.	Use of modern techniques for the exploitation of dairy cows, in order to obtain higher yields / animal, at competitive production costs.
3	**Production value and total production value**	It is noted, according to the principles of economics, that at the level of the livestock farm, where there is a higher supply in terms of quantity, it is possible to capitalize on a lower price compared to farms with a lower supply. from a quantitative point of view.	Adapting the supply to the existing demand on the market and using the capitalization price as an adjustment element on the agri-food chain.
4	**Level of expenditure** (total expenditure, expenditure on main production, variable expenditure, material expenditure, fixed expenditure, labor expenditure)	Of the total expenditure, it can be seen that the largest share is spent on the main production. The higher the level of cow's milk production in this case, the higher the level of expenditure incurred. Also, a higher level of labor costs is observed, in counties with holdings with a higher number of heads, not with a higher level of production.	It is recommended to automate the milking activities of cows, by purchasing special milking installations, being able to benefit from such advantages as: physical effort of the labor force considerably diminished; favorable conditions in terms of hygiene and comfort standards; Facilitating the maintenance of the vacuum at a constant level; finally, increasing the number of cows / farms and decreasing the costs related to the production process.

Source: interpretation of the results obtained in the present research

CONCLUSIONS

In conclusion, following those analyzed in the present material, but also following the other activities carried out within the ADER 2412 project (analysis of economic indicators for cattle farms; Dairy cow exploitation systems), the following can be stated:

1. A larger size of the livestock farm in terms of the number of heads does not always lead to high yields of production, and ultimately to high incomes or the break-even point. A well-developed dairy cow exploitation system, from the perspective of logistics and exploitation strategies, adapted to a high number of heads belonging to specialized breeds on milk or meat production, as the case may be, corresponds rather to obtaining qualifiers such as effectiveness, efficiency, competitiveness.

2. A high level of total milk production is not always synonymous with profit if it is not capitalized at a price that exceeds unit production costs and does not ensure demand and supply regulation;

3. From the point of view of the product strategy, at the production stage, one of the main objectives should be to focus on obtaining high yields / animal, and on obtaining high average yields, thus respecting fundamental economic principles, such as efficiency or effectiveness;

4. Elements such as production and price should be determined according to the existing demand on the market and its fluctuations, the degree of elasticity of demand.

5. Unit production costs should be reduced by making specific investments so that they do not exceed the capitalization price under any circumstances.

6. Under no circumstances, at the managerial level of the holding, the climatic, pedological and environmental factors must be neglected in the decision-making and strategic process. By following these coordinates and applying the decisions and strategies accordingly, indicators such as the security index or the rate of exploitation risk will be able to be in optimal parameters

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ANALYSIS OF THE ROMANIAN BEEF MARKET

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Abstract

The paper presents the existing situation on the beef market in Romania, compared to the situation encountered in the European Union and implicitly the position that our country occupies in this regard. The study was conducted for the period 2015-2020 and reflects the fact that Romania is not among the main cattle breeders and beef producers in the European Union. Moreover, there were registered decreases for the analyzed period for most of the indicators studied: for the number of cattle the decrease was 8.67%, slaughtered cattle - 36.64%, beef production - 27.61%, and in the category of cattle meat value exports - over 30%. Indicators fow which increases in values were observed: average purchase prices for live animals, for most Development Regions, and imports of fresh or chilled beef.

Keywords: beef production, bovine effectives, bovines slaughtered, exports, imports

JEL classification: Q10

INTRODUCTION

It is known that cattle breeding is a traditional activity of Romanian farmers, especially for those in the hilly and mountainous areas, where there are large areas of pastures.

According to experts, this activity is appreciated due to the variety of products obtained, the low energy consumption and the diversity of feed used in animal feed, including part of the resulting secondary production in the vegetable sector.

Another benefit brought by cattle breeding is the guarantee of stability for labor force in the areas where it is practiced, areas where there are human resources available (MADR, 2021).

Through NRDP 2014-2020, cattle breeding benefited from non-reimbursable funds due to the support provided to the livestock sector, for the establishment or modernization of farms, endowment with equipment and installations, primary production, conditioning and marketing, etc. Also, for a better distribution of funds at national level, there were special sessions for the submission of projects in the mountain area (AFIR, 2021).

The investments amounted to over 119 million Euros, granted for 150 livestock farms for beef cattle and were accessed through sub-measures 4.1 «Investments in agricultural holdings», 6.1 «Support for the installation of young farmers» and 6.3 «Support for the development of small farms». Most of the funding was within sub-measure 4.1 - 96 projects with a value of over 117 million Euros. In addition, funds were also provided for mixed farms - vegetable and livestock, beekeeping, as well as for other categories of animals, in total the livestock sector benefiting from 606 million Euros. (Industria cărnii/ Meet industry, 2021).

In this favorable context for the development of the livestock sector in general, the paper aims to present the existing situation on the Romanian beef market.

MATERIALSAND METHODS

In order to better outline the existing situation on the Romanian beef market, a series of indicators were analyzed, such as: the number of live and slaughtered cattle, the production of beef, in the EU and Romania; average annual consumption per inhabitant of beef, in Romania; average purchase prices for live cattles, by country and by Development Regions; value imports and exports

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of beef in Romania. The period under review was 2015-2020. In the paper the statistical data were processed using index, share and comparison methods.

The information that led to the current study was taken from the official websites of statistical institutions, such as: Eurostat, NIS and ITC. At the same time, a variety of specialized materials were consulted.

RESULTS AND DISSCUSION

In addition to the unique taste, consumers' preference for beef is based on scientific studies, which show that it is rich in protein (18-20%), minerals and vitamins, especially type B. Beef has an average energy value of about 2,000 kcal / kg. Another advantage is that it is low in saturated fat and cholesterol compared to other types of meat (Acatincăi, 2004; Cofas and Soare, 2013; Soare and others, 2012).

According to the information published by Ziarul Financiar, Romania holds 0.2% of the world's livestock, respectively 2% of the EU's livestock. While worldwide there are 62.7 cattle heads per 100 ha, in the EU 48.8 cattle heads / 100 ha, in Romania there are only 22.2 cattle heads / 100 ha (Niţu, 2020).

Table 1 shows the evolution of bovine effectives in the period 2015-2020 in the European Union and we can see a decrease of 14.2% between the values recorded for 2020 compared to 2015. The main cattle breeders in 2020 were France, with 17,789.25 thousand heads, Germany - 11,301.86 thousand heads and Spain - 6,636.43 thousand heads.

Table 1. The evolution of live bovine effectives in the European Union (thousand heads)

Specification	2015	2016	2017	2018	2019	2020	2020/2015 %
European Union - 28 - 28 countries (2015-2019) - 27 countries (from 2020)	89,118.79	89,503.54	88,796.94	87,450.10	86,620.16	76,462.18	85.80
Belgium	2,503.26	2,501.35	2,385.99	2,398.09	2,373.10	2,335.44	93.30
Bulgaria	561.04	570.14	552.92	542.12	527.19	588.91	104.97
Czechia	1,366.33	1,339.60	1,366.36	1,365.24	1,367.05	1,340.04	98.08
Denmark	1,566.00	1,554.00	1,558.00	1,530.00	1,500.00	1,500.00	95.79
Germany	12,635.46	12,466.59	12,281.20	11,949.09	11,639.53	11,301.86	89.45
Estonia	256.20	248.20	250.90	251.90	254.00	253.30	98.87
Ireland	6,422.23	6,613.43	6,673.59	6,593.49	6,559.65	6,529.44	101.67
Greece	582.00	554.00	556.00	542.00	530.00	539.00	92.61
Spain	6,182.91	6,317.64	6,465.75	6,510.59	6,600.33	6,636.43	107.34
France	19,386.52	19,373.38	18,953.58	18,613.04	18,172.97	17,789.25	91.76
Croatia	441.00	444.00	451.00	414.00	420.00	423.00	95.92
Italy	6,155.81	6,314.89	6,349.81	6,311.16	6,377.23	6,400.04	103.97
Cyprus	58.86	63.14	67.03	70.82	73.97	77.50	131.67
Latvia	419.08	412.31	405.82	395.33	395.32	398.99	95.21
Lithuania	722.60	694.80	676.90	653.50	634.60	629.50	87.12
Luxembourg	200.64	202.41	198.07	194.39	192.10	190.69	95.04
Hungary	821.00	852.00	870.00	885.00	909.00	933.00	113.64
Malta	15.02	14.36	14.18	14.12	14.00	14.01	93.28
Netherlands	4,315.00	4,294.00	4,030.00	3,690.00	3,721.00	3,691.00	85.54
Austria	1,957.61	1,954.39	1,943.48	1,912.81	1,879.52	1,855.43	94.78
Poland	5,762.50	5,970.20	6,035.70	6,183.30	6,261.60	6,278.90	108.96
Portugal	1,605.86	1,635.01	1,670.02	1,632.42	1,674.97	1,691.32	105.32
Romania	*2,092.40*	*2,049.70*	*2,011.10*	*1,977.20*	*1,923.30*	*1,910.90*	*91.33*
Slovenia	484.19	488.60	479.61	476.81	483.07	485.61	100.29
Slovakia	457.46	446.11	439.83	438.86	432.25	442.29	96.68
Finland	903.41	887.25	874.52	859.38	840.74	835.38	92.47
Sweden	1,428.40	1,436.05	1,448.59	1,435.45	1,404.67	1,390.96	97.38
United Kingdom	9,816.00	9,806.00	9,787.00	9,610.00	9,459.00	-	-

Source: Eurostat, 2021; own calculations

Romania is far from the first ranked countries, with a herd of 1,910.90 thousand heads in 2020, registering a significant decrease of 8.67%, compared to 2015. These values have placed our country on the 9th place in the top of cattle breeders in the European Union.

Another important indicator which directly influences the bovine meat market is the bovines slaughtered in abattoirs. The evolution of bovine effectives slaughtered in the period 2015-2020 in European Union is presented in Table 2.

In 2020 compared to 2015, in the European Union is a decrease of slaughtered cattle in slaughterhouses. This decrease was of 10.9%.

The decrease in the number of bovines slaughtered in abattoirs in the European Union is due, on the one hand to the decrease in bovine effectives, and on the other hand, to adverse weather conditions, especially drought, which has manifested in recent years.

The states with the most cattle slaughtered in 2020 were: France - 4,486.48 thousand heads, Germany - 3,263.00 thousand heads and Italy - 2,694.34 thousand heads.

Table 2. The evolution of bovines slaughtered in the European Union (thousand heads)

Specification	2015	2016	2017	2018	2019	2020	2020/2015
							%
European Union - 28	25,716.90	26,565.79	26,464.42	26,742.35	26,239.49	22,912.58	89.10
- 28 countries (2013-2019)							
- 27 countries (from 2020)							
Belgium	872.55	911.37	920.14	888.10	837.89	782.65	89.70
Bulgaria	25.18	0.00	35.07	34.23	26.65	30.35	120.53
Czechia	231.20	241.79	227.43	236.57	238.83	234.53	101.44
Denmark	460.70	495.80	467.00	490.50	464.20	448.10	97.27
Germany	3,519.00	3,607.00	3,505.00	3,416.00	3,387.00	3,263.00	92.73
Estonia	38.90	37.62	35.23	34.95	34.27	35.15	90.36
Ireland	1,664.87	1,744.19	1,851.56	1,896.04	1,852.51	1,881.89	113.04
Greece	174.75	167.46	181.25	166.16	144.34	144.48	82.68
Spain	2,333.90	2,373.85	2,391.00	2,462.56	2,510.77	2,422.41	103.79
France	4,664.98	4,679.41	4,625.61	4,625.96	4,545.97	4,486.48	96.17
Croatia	182.40	190.20	182.60	180.40	183.20	169.65	93.01
Italy	2,711.67	2,845.55	2,651.40	2,768.19	2,729.60	2,694.34	99.36
Cyprus	14.93	16.34	16.58	16.86	17.25	15.32	102.61
Latvia	86.38	87.83	80.30	76.08	70.09	67.00	77.56
Lithuania	175.74	166.76	155.83	154.50	156.96	149.68	85.17
Luxembourg	24.69	25.61	44677	26.85	27.95	27.67	112.07
Hungary	102.50	108.34	105.61	112.08	112.08	105.70	103.12
Malta	27820	42461	44808	34394	25628	44838	109.04
Netherlands	1,956.89	2,096.46	2,157.96	2,242.75	2,123.27	2,088.56	106.73
Austria	695.17	686.53	678.26	694.23	680.53	644.65	92.73
Poland	1,676.80	1,779.13	1,931.16	1,942.40	1,853.90	1,851.22	110.40
Portugal	363.18	379.60	377.12	383.67	369.26	393.31	108.30
Romania	*208.18*	*269.23*	*274.88*	*233.14*	*196.04*	*131.91*	*63.36*
Slovenia	112.04	116.95	120.12	115.76	116.30	118.12	105.43
Slovakia	31.32	31.37	29.27	30.44	28.74	26.20	83.65
Finland	278.96	280.93	274.29	274.75	269.27	261.69	93.81
Sweden	466.72	411.02	406.03	425.63	432.77	434.45	93.09
United Kingdom	2,639.56	2,779.88	2,753.61	2,809.62	2,826.18	-	-

Source: Eurostat, 2021; own calculations

In this category, Romania ranked 18th in the year 2020, with 131.91 thousand heads, decreasing by 36.64% compared to 2015. Cattle slaughtered in the same year accounted for 6.90% of the country's bovine effectives.

It should be mentioned that the largest number of slaughtered heads, 274.88thousand, was registered in 2017.

In Table 3 is presented the evolution of slaughtered bovine meat in the producing countries from the European Union. From the data presented, it easily stands that on top of the ranking of beef producing countries are: France, Germany and Italy.

In the European Union in the period 2015-2020 is observed that the production of slaughtered meat varied from year to year. The lowest value was recorded in 2020 (6,822.30 thousand tons) and the highest in 2018 (7,931.69 thousand tons). The decrease in 2020 was of 10.06%.

Table 3. The evolution of beef production in the European Union (thousand tons)

Specification	2015	2016	2017	2018	2019	2020	2020/2015 %
European Union - 28 countries (2013-2019) - 27 countries (from 2020)	7,585.17	7,800.02	7,802.83	7,931.69	7,822.38	6,822.30	89.94
Belgium	267.88	278.36	281.54	277.31	263.75	254.51	95.01
Bulgaria	5.29	6.66	7.44	7.22	5.48	6.24	117.96
Czechia	68.29	71.93	67.72	71.58	72.89	72.52	106.19
Denmark	120.60	129.40	124.00	129.20	124.60	121.20	100.50
Germany	1,124.00	1,148.00	1,124.00	1,102.00	1,106.00	1,090.00	96.98
Estonia	9.62	9.43	9.00	8.56	8.57	8.89	92.41
Ireland	564.14	588.36	617.02	622.54	619.80	633.38	112.27
Greece	41.92	40.17	44.11	39.63	33.46	34.73	82.85
Spain	626.10	637.01	643.86	669.01	695.17	677.74	108.25
France	1,452.77	1,464.15	1,442.18	1,460.00	1,428.46	1,434.59	98.75
Croatia	42.26	44.43	42.20	43.78	45.43	43.37	102.63
Italy	788.28	809.66	756.42	809.22	779.82	732.28	92.90
Cyprus	5.74	7.04	8.31	5.28	5.61	4.64	80.84
Latvia	17.36	17.70	16.75	15.87	14.78	14.52	83.64
Lithuania	44.13	42.29	40.88	40.28	42.46	41.73	94.56
Luxembourg	9.08	9.42	9.54	9.87	10.17	10.25	112.89
Hungary	26.39	28.07	27.21	29.15	29.73	28.07	106.37
Malta	1.03	1.15	1.12	1.07	1.03	1.14	110.68
Netherlands	382.52	416.06	438.87	459.21	424.30	432.84	113.15
Austria	228.75	227.44	226.09	233.46	229.61	218.36	95.46
Poland	471.01	501.46	558.58	564.72	560.45	559.38	118.76
Portugal	88.62	91.10	91.09	93.79	92.03	97.78	110.34
Romania	*44.47*	*57.53*	*59.14*	*49.92*	*43.54*	*32.19*	*72.39*
Slovenia	33.58	35.66	35.79	34.87	35.74	36.50	108.70
Slovakia	8.40	8.29	7.79	8.11	8.27	7.93	94.40
Finland	85.76	86.37	85.39	86.48	87.18	86.53	100.90
Sweden	143.98	131.25	132.07	136.87	139.67	141.00	97.93
United Kingdom	883.21	911.66	904.73	922.70	914.39	-	-

Source: Eurostat, 2021; own calculations

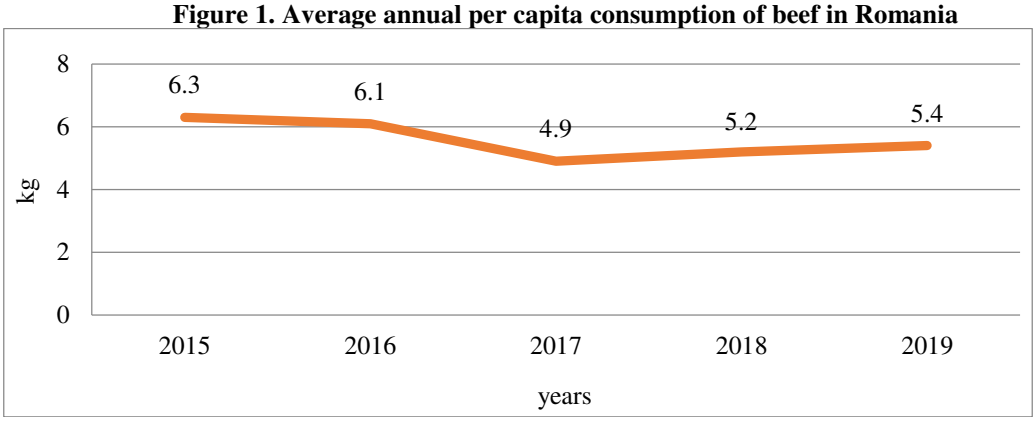
For Romania, the situation was as follows: the highest beef production was obtained in 2017 - 59.14 thousand tons, and the lowest in 2020, 32.19 thousand tons. This value represented a decrease of 27.61% compared to 2015 and placed Romania on the 19th place in the European Union in terms of beef production.

Currently, meat consumption per capita is an indicator for measuring sustainable development at the local level in the European Union (Indicatorii dezvoltării durabile, 2021).

In the European Union beef consumption per capita is different from country to country. According to official statistics, these countries consume a larger amount of beef per inhabitant compared to the European average: France; Denmark; Sweden; Italy, Ireland; Netherlands; Belgium; Austria and Finland (Agri benchmark, 2021)

Regarding the average annual consumption per inhabitant of beef, in Romania (Figure 1), the decrease was 14.29%, ie from 6.3 kg in 2015 to 5.4 kg in 2019.

Figure 1. Average annual per capita consumption of beef in Romania



Source: NIS, 2021

Average purchase prices for live cattles, by Development Regions, increased in most Regions during the period under review, with the exception of the Western Region, where the decrease was of 26.83% (Table 4).

Table 4. Average purchase prices for live cattles, by Development Regions (lei / kg live)

Specification	2015	2016	2017	2018	2019	2020	2020/2015 %
North-West Region	6.28	6.42	6.14	6.79	7.28	7.56	120.38
Center Region	6.85	6.3	6.47	7.4	7.52	8.2	119.71
North-East Region	5.5	4.87	7.28	7.53	8.43	8.51	154.73
South-East Region	5.1	4.08	4.68	5.65	6.09	6.33	124.12
South - Muntenia Region	5.36	4.87	5.34	6.35	6.62	6.83	127.43
South-West Oltenia Region	5,39	5.47	5.22	6.22	5.63	8.02	148.79
West Region	5.33	3.9	3.9	3.9	3.9	3.9	73.17

Source: NIS, 2021; own calculations

The largest increase in prices was noted for the North-East Region, of 54.73%. Also here was registered the highest average purchase price, in 2020, of 8.51 lei / kg live. The lowest price was in the West Region, of 3.9 lei.

Tables 5 and 6 show the situation of value imports and exports of beef, in 2 categories *Fresh or chilled* and *Frozen*. The data provided by ITC show that Romania does not enter the top 50 importers or exporters of beef.

Domestic beef production was supplemented by imports. Their value in the category *Fresh or chilled* (Table 5) increased in the period 2016-2020 by 113.95%, while the value of imports for beef *Frozen* decreased by 36.25%.

Table 5. Value imports of beef for Romania (US Dollar thousand)

Specification	2016	2017	2018	2019	2020	2020/2016 %
Fresh or chilled	12,471	25,012	29,150	26,198	26,682	213.95
Frozen	64,067	28,133	38,630	41,280	40,842	63.75

Source: ITC, 2021; own calculations

In direct proportion to the decrease in beef production, value exports also decreased (Table 6) for both categories of beef. The largest decrease was registered for the category *Fresh or chilled*, of 37.36%.

Table 6. Value exports of beef for Romania (US Dollar thousand)

Specification	2016	2017	2018	2019	2020	2020/2016 %
Fresh or chilled	23,751	43,867	35,941	23,950	14,901	62.64
Frozen	5,262	3,555	3,135	2,808	3,331	63.30

Source: ITC, 2021; own calculations

It is necessary to specify that the increase of world meat production is closely correlated with the growth of the global population (Stanciu, 2014) and the evolution of the beef market is based on a number of factors, among which we mention: meat quality; prices of beef products; packaging and presentation of products; consumer income, marketing actions of producers, distributors and retailers, etc. (Chiran et al., 2002).

In order to obtain quality products that are to the liking of increasingly demanding consumers, the aim is to improve production technologies for animal feed and animal husbandry technologies.

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CONCLUSIONS

Following the research on beef market in Romania, resulted the following:

- bovine herds have achieved insignificant reductions in 2020 (8.67%) compared to 2015;
- the number of bovines slaughtered in abattoirs decreased in 2020 compared to 2015 with 36.64%;
- the production of beef in Romania, has reduced from 44.47 thousand tons (2015) to (32.19 thousand tons);
- The average annual consumption per inhabitant of beef in Romania has reduced from 6.3 kg (2015) to 85.4 kg (2019);
- In the North-East Region, the highest average purchase price for cattle meat in live weight was registered, in 2020, as well as the highest price increase, of 54.73% for the period 2015-2020;
- the valoric imports and exports for beef have fluctuated from year to year;
- in the analyzed period the value imports of beef were higher than the value exports.

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THE EVOLUTION OF EGG PRODUCTION AND CONSUMPTION AT THE LEVEL OF ROMANIA IN THE PERIOD 2016-2020

ANDREEA-DANIELA GIUCĂ [1]*, DIANA MARIA ILIE [2]

Abstract

Poultry farming is one of the most dynamic agricultural sectors in Romania. Currently, the production activity in the poultry sector registers a downward trend at national and European level, however, Romania is among the main member countries of the European Union producing eggs for consumption, this being influenced by the growing demand for these products. In recent years, there has been an increase in sales of packaged eggs, which are supported by the growing number of producers operating in the industrial system, thus highlighting a highly fragmented market. However, domestic production of eggs for the market cannot meet the needs of consumers, so the presence of imported eggs is necessary. This paper analyzes the evolution of egg production and consumption at the national level, in the period 2016-2020. Thus, based on statistical data, indicators such as: average, standard deviation, coefficient of variation and annual growth rate were calculated and analyzed, thus highlighting the evolutionary trends that took place during this period and the main factors that influenced domestic production. and egg consumption.

Keywords: production, consumption, eggs, poultry sector, food security

JEL classification: Q13

INTRODUCTION

The Romanian poultry sector has similar results to those of major European producers. Among the products obtained from domestic birds, the egg is one of the most nutritious foods, due to its high nutritional and biological value, being a balanced source of protein and fat.

The poultry sector in Romania is a safe and very important one, the manufactured products being appreciated for export, but unfortunately it is not sufficiently appreciated on the Romanian market. In Romania, approximately 80% of poultry farms operate in a fully integrated system, which means that they own the entire production chain, from grain cultivation, production, reproduction, slaughter, processing and distribution. (Şcerbacov E., 2019)

At EU-28 level, the total number of laying hens is over 350 million heads, of which 53% are raised in enriched cages, and the largest exporter of eggs in Romania is Poland, the country with the highest number of hens. grown in cages in the European Union. Poland annually exports to Romania about 150 million eggs, ie 15% of the production of eggs in cages in Romania. (Şumanschii A., BizguI., Modvala S., 2010)

MATERIALS AND METHODS

The research is based on statistical data provided by the National Institute of Statistics in the period 2016-2020. During the research, the following indicators were calculated and analyzed:

- Arithmetic mean calculated as the ratio between the sum of the values in the data series and the number of years taken into account:

$$m = \frac{x_1 + x_2 + \cdots + x_n}{n}$$

- The standard deviation that tells us how much the values are dispersed compared to the average

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$$\partial = \sqrt{\frac{\sum(xi - \overline{x})^2}{n-1}}$$

in which:

∂ = standard deviation;

xi = data series values over a number of years;

n = number of years considered.

- Coefficient of variation:

$$C = \frac{\partial}{\overline{X}} * 100$$

Between 0-10% - higher degree of homogeneity of the series;
Between 10-20% - medium variation;
Over 20% - big variation.

- The annual growth rate shows us the annual growth of the analyzed phenomenon:

$$r = \sqrt[n-1]{\prod\left(\frac{p\,n}{p\,n-1}\right) - 1}$$

r = average annual growth rate;

∏pn / pn-1 = chained growth indicators.

The research method used consisted in the quantitative and qualitative analysis of the data to highlight the evolution of the analyzed indicators. The statistical research process cost the following stages: data collection and recording, data processing, analysis and interpretation of results.(Ceapoiu N., 1968)

RESULTS AND DISCUSSIONS

There are over 350 million laying hens in the European Union, which produce almost 6.7 million tonnes of eggs annually. According to UPCR data, Romania is among the first countries in the EU in terms of the low number of hens raised in cages, respectively 4.79 million heads, which represents 14.7% of the total of 32.5 million existing laying birds in our country. (European Commission, Egg Sector)

At the level of the European Union, in 2019, France had the largest production of eggs, 13,100 million pieces, followed by Spain (12,871.18 million pieces), and Poland (10,291 million pieces), Romania registering a production of 4,887.40 million pieces.

In Romania, at the level of the period 2016-2020, there was a downward trend in egg production in Romania in 2020, highlighting a decrease of 12% compared to production recorded in 2016. During this period, production recorded values between 5,428 million pieces in 2020 and 6,182 million pieces in 2016, obtaining an average of the period equal to 5,777 million pieces. By development regions, the highest egg production was recorded in the South-Muntenia, North-East and South-East regions.

Table 1. Evolution of egg production by development regions, in the period 2016-2020 (millions of pieces)

Specification	The region	Years					Minimum	Maximum	Average	Standard deviation	Coefficientul of variation (%)	Annual growth rate (%)
		2016	2017	2018	2019	2020						
	Northwest	718	637	639	610	620	610	718	644.8	42.66	6.62	-3.60
	Center	565	562	567	510	561	510	567	553	24.16	4.37	-0.18
	North East	1,035	1,029	982	893	841	841	1,035	956	85.79	8.97	-5.06

Specification	The region	Years					Minimum	Maximum	Average	Standard deviation	Coefficientul of variation (%)	Annual growth rate (%)
		2016	2017	2018	2019	2020						
EGG PRODUCTION	South East	1,161	1,151	883	865	779	779	1,161	967.8	176.28	18.21	-9.49
	South Muntenia	1,374	1,313	1,410	1,413	1,349	1,313	1,413	1,371.8	42.25	3.08	-0.46
	Bucharest Ilfov	58	58	45	48	47	45	58	51.2	6.3	12.31	-5.12
	South West Oltenia	770	720	718	740	766	718	770	742.8	24.6	3.31	-0.13
	West	501	526	468	487	465	465	526	489.4	25.17	5.14	-1.85
	Total	**6,182**	**5,996**	**5,713**	**5,564**	**5,428**	**5,428**	**6,182**	**5,776.60**	**309.54**	**5.36**	**-3.20**

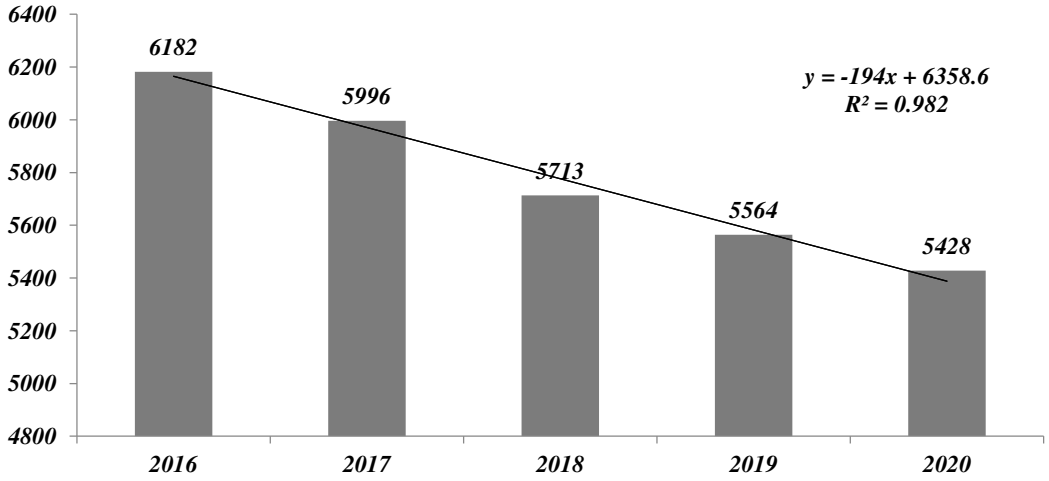
Source: www.insse.ro, accessed on 23.08.2021

In the South Muntenia region, egg production ranged between 1,313 million pieces in 2017 and 1,413 in 2019, obtaining an average period of 1,372 million pieces, and in the North-East the production varied between 841 million pieces in 2020 and 1,035 million pieces in 2016, achieving an average of the analyzed period of 956 million pieces.

On the other hand, the Bucharest-Ilfov region was registered with the lowest production of eggs for consumption, with a production between 45 million pieces in 2018 and 58 million pieces in 2016 and 2017, respectively, and with an average of the period equal to 51 million pieces. (Table 1)

The coefficient of variation for egg production ranged between 3.31% in the South-West-Oltenia region and 18.21% in the South-East region. The calculated coefficients of variation had low values, below 10%, for the regions: North-West, Center, North-East, South-Muntenia, South-West-Oltenia and West, which means the homogeneity of the data series. For the other regions, respectively South-East and Bucharest-Ilfov, the coefficient of variation registered average values, falling below the threshold of 20%, which means a medium variation of the data series. At the country level, the coefficient of variation was 5.36%, expressing a homogeneous series of data. Regarding the annual growth rate recorded for egg production, it was highlighted that negative values were recorded for all regions, the growth rate being between -0.13% in the South-West-Oltenia region and -9.49% in South-East, thus highlighting decreases in egg production in the regions of the country. (Table 1)

Figure 1. Evolution of egg production in Romania, in the period 2016-2020 (millions of pieces)



Source: data processed on www.insse.ro, accessed on 23.08.2021

According to the trend equation y = -194x + 6,358, egg production decreased on average annually, during the analyzed period, by approx. -194 million pieces. (Figure 1)

Table 2. Average annual per capita consumption of eggs in Romania, at the level of the period 2015-2019 (pieces / inhabitant)

Specification	*Years*					*Minimum*	*Maximum*	*Average*	*Standard deviation*	*Coefficientul of variation (%)*	*Annual growth rate (%)*
	2015	*2016*	*2017*	*2018*	*2019*						
Egg	262	267	255	236	241	236	267	252.2	13.33	5.29	-2.07

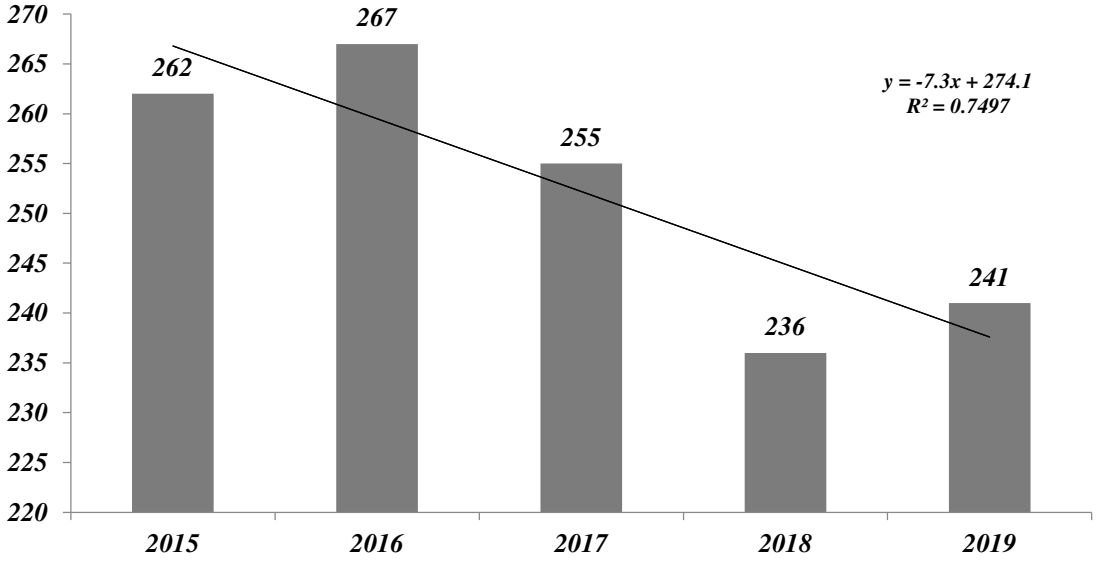
Source: www.insse.ro, accessed on 12.04.2021

According to the data presented by UPCR, a Romanian eats, on average, 240 - 250 eggs per year, which represents a consumption of 20 to 22 eggs in a typical month, but during the period when Easter is celebrated, consumption per capita grows to about 30 eggs. Romanians buy between 170 and 180 million eggs during the Easter holidays, 50% more than in an ordinary month (Roaliment, 2019)

During the analyzed period, the consumption of eggs registered a downward trend, with variations between 236 pieces / inhabitant in 2018 and 267 pieces / inhabitant in 2016, obtaining an average of the period of 252 pieces / inhabitant. At the level of 2018 (236 pieces / inhabitant) there was a decrease in consumption by about 10% compared to the consumption recorded in 2015 (262 pieces / inhabitant), and in 2019 (241 pieces / inhabitant), the consumption of eggs was recorded a decrease of 8% compared to the one registered in 2015 and by 2% compared to 2018.

Analyzing the statistical indicators calculated for the average annual consumption of eggs in the period 2015-2019, we noticed a low value of the coefficient of variation of 5.29%, which indicates the homogeneity of the data series. The annual growth rate was -2.07%, its negative value indicating decreases in consumption in the analyzed time interval. (Table 2)

Figure 2. Evolution of the average annual consumption per inhabitant for eggs in the period 2015-2019 (pieces / inhabitant)



Source: data processed on www.insse.ro, accessed on 12.04.2021

Calculating the trend equation y = -7.3x + 274.1, it is found that on average annually, the average consumption of eggs per capita increased by 7.3 pieces. Also, it is observed the existence of a strong link between the two variables (Correlation ratioRx / y = 0.749) the variation of egg consumption per capita being explained in proportion of 75% by the time factor, the rest being the influence of other factors not included in the model (Figure no.2).

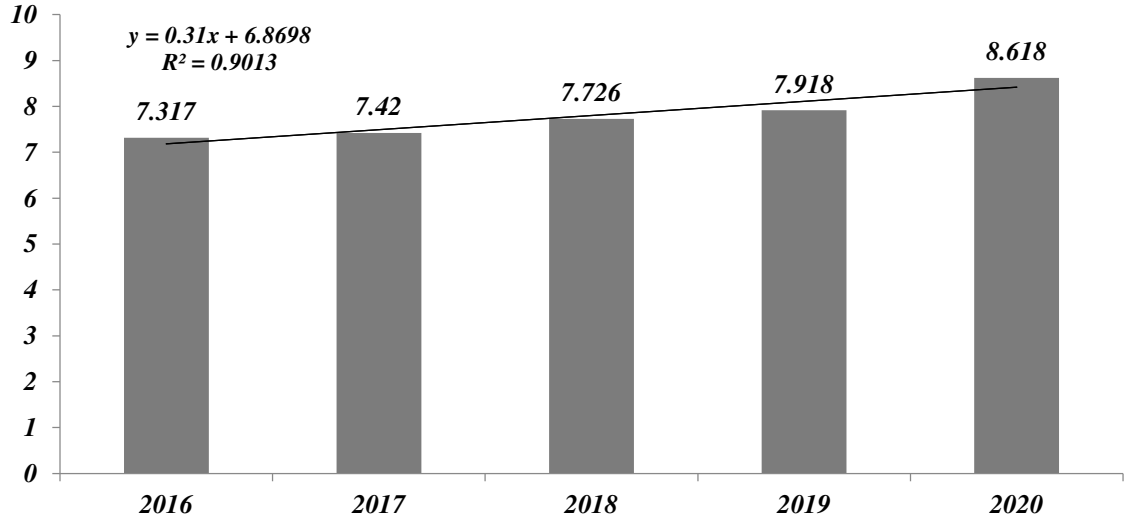
Table 4. Quantities of eggs bought by a household in the period 2016-2020 (pieces) - monthly averages per person

Specification	*YEARS*					*Minimum*	*Maximum*	*Average*	*Standard deviation*	*Coefficientul of variation (%)*	*Annual growth rate (%)*
	2016	*2017*	*2018*	*2019*	*2020*						
Egg	7.317	7.42	7.726	7.918	8.618	7.317	8.618	7.80	0.52	6.62	4.18

Source: data processing on www.insse.ro, accessed on 12.04.2021

Following the analysis of the quantities of eggs bought by a household, an upward trend was noticed. At the level of 2020 (8,618 pieces) registering an increase of approximately 18% compared to the reference year 2016 (7,317 pieces). Analyzing the statistical indicators calculated for the quantities of eggs bought by a household in the period 2016-2020, there were variations in the quantities purchased between 7,317 and 8,618 pieces, the average period equal to 7.80 pieces, and the standard deviation being 0, 52. Regarding the coefficient of variation, a small value of 6.62% was noticed, the edition of the period being significant. The annual growth rate was 4.18%, its positive value indicating increases in the quantities of eggs purchased in a household during the analyzed period (Table 3).

Figure 3. Evolution of the quantities of eggs purchased by a household in the period 2016-2020 (number) monthly averages per person



Source: data processed on www.insse.ro, accessed on 12.04.2021

According to the trend equation y = 0.31x + 6.869, the average quantity of eggs purchased by a household increased on average annually, during the analyzed period, by approximately 0.31 pieces. (Figure 3).

CONCLUSIONS

At the level of the period 2016-2020, the production of eggs for consumption had a trend, registering significant decreases of the registered values, in 2020 there was a decrease of 12% compared to the production achieved in 2016. At the same time with the production decreased average annual consumption per capita in 2019, egg consumption decreasing by 2% compared to consumption in 2018, this decrease being influenced by the trend of consumers towards a healthy and balanced lifestyle, however the egg market during this period it was a relatively balanced one.

Analyzing the average quantities of eggs purchased by a household, an increase of about 40% was observed in the analyzed period, thus noticing an increase in sales for eggs, the increase being

supported by the increasingly significant number of producers. However, domestic market production of eggs cannot meet the needs of urban consumers, plus a few rural consumers, which makes the presence of imported eggs necessary. The value of imported eggs is higher than exports, thus resulting in a deficient trade balance, highlighting Romania's dependence on egg imports, Poland (10,285 thousand euros), Hungary (7,212 thousand euros) and Bulgaria (4,594 thousand euros) being the main countries from which Romania imported eggs in 2020.

Romania is one of the countries affected by the epidemiological situation in the world, due to the presence of COVID-19 virus, which has a major negative impact on all economic sectors of the country, the agricultural sector and the food industry, being also affected by the implementation of measures restricting the movement and social distance imposed by the government. Due to the exceptional circumstances created by the COVID-19 pandemic, companies of all types have faced a severe lack of liquidity. This has been true in the short and medium term and has severely affected the economic situation of many companies with possible consequences even in the long term, jeopardizing the continuation of their business. In this context, the poultry sector has encountered difficulties in not being able to market products of animal origin, thus incurring significant economic losses.

Currently, the most important problems of the poultry sector, regarding the egg market, are related to the production from the stock, the lack of support measures at European and national level, the deficient extension of the trade to the large third markets, the dependence on external purchases of chickens. day, the invasion of eggs from other Member States and the lack of a coherent production-import-trade balance policy.

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STUDY ON THE IMPACT OF SARS-COV 2 ON THE PIG MARKET AT NATIONAL LEVEL

DIANA CREȚU [1]

Abstract

Pandemic caused by the new coronavirus has affected both farmers and the country's economy. In this study will be analyzed aspects such as: the balance of pork made in Romania (slaughter, average weight at slaughter, total production, consumption) price, pig herds, import and export. Pork is one of the most popular foods with content rich in protein, being considered a "heavy" meat with slow metabolism. It is also rich in vitamins and minerals, such as iron, magnesium, phosphorus, potassium and zinc, as well as a number of B, B6, B12 vitamins, nicotinic acid, thiamine, riboflavin. Pork contains both saturated and unsaturated fats, the muscle being framed in lean meat, and the neck and ribs in fatty meat. During the winter holidays, pork is consumed more often by the Romans and is used to prepare traditional dishes. The research method used in the study is statistical processing and economic analysis of existing data on specialized sites such as the National Institute of Statistics (INS), Eurostat, FAO, Ministry of Agriculture and Rural Development (MADR) and other specialized materials.

Keywords: evolution, prices, pandemic, pork

JEL Classification: Q11;Q13;L11.

INTRODUCTION

The meat industry is one of the most important sectors in the food sector, ranking 4th in terms of fresh food production. If before the pandemic, the meat industry was afloat, from a financial point of view there were no problems and consumer confidence in the products on the market was high now things have changed considerably. For more than a year the pandemic caused by the new Coronavirus it has affected all sectors of the food sector, including the meat industry. Due to the pandemic year, the meat industry suffered heavy losses due to the closure of HoReCa due to labor difficulties and its migration to other states. negative effects on this market. In this article I set out to analyze statistically the current situation of the pork market.

MATHERIAL AND METHOD

The research method used in the study is statistical processing and economic analysis of data. The research was based on statistical data provided by INS, EUROSTAT, MADR, but also books, magazines, scientific papers on the balance of pork in Romania (slaughter, average slaughter weight, total production, consumption) price, pig herds, import and export.

RESULTS AND DISCUSSION

In Romania, according to the press releases provided by INSSE (table 1) regarding the animals slaughtered in the period 2017-2021 in July, we can see that in 2021 compared to 2017, the slaughters also increased the weight in the carcass (table 2).

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Table 1. Animals slaughtered în July (%)

Animals slaughtered	2017	2018	2019	2020	2021
Swine - total	101,5	98,7	99,2	102,5	102,8
of which: in specialized industrial units (slaughterhouses)	105,1	101,7	96,4	103,8	111,6

Source:INSSE

Table 2. Carcass weight in July (%)

Carcass weight	2017	2018	2019	2020	2021
Swine - total	98,5	96,4	99,8	104,0	100,0
of which: in specialized industrial units (slaughterhouses)	105,9	100,4	95,5	105,0	109,4

Source:INSSE

In the case of pigs, the carcass weight represents the weight of the body of the slaughtered animal, whole or divided in equal parts along the spinal cord, after bleeding, without internal organs, hair, hooves, tongue, bone and diaphragm.

Table 3. Average weight of animals slaughtered in the carcass in July(kg)

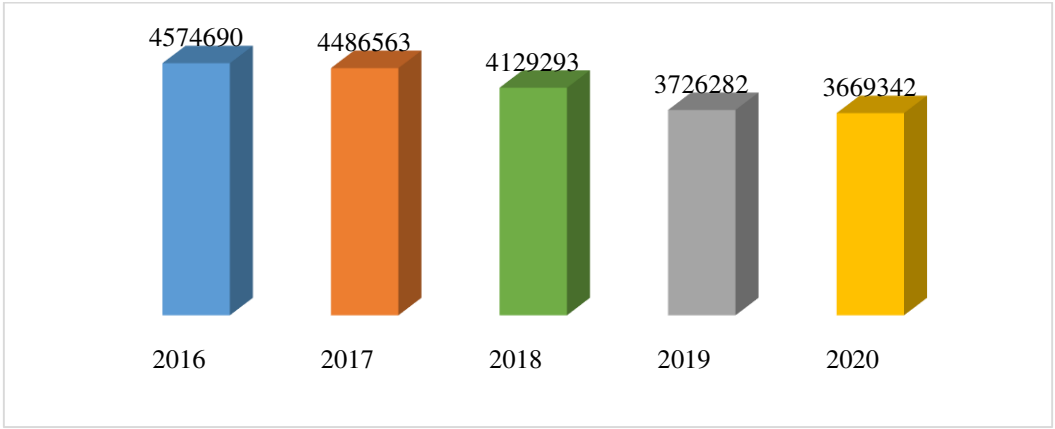
Average weight in the housing	2017	2018	2019	2020	2021
Swine - total	85,3	85,0	85,5	87,8	89,2
of which: in specialized industrial units (slaughterhouses)	82,1	84,3	85,0	87,9	87,5

Source:INSSE

Figure 1. Evolution of the average carcass weight of slaughtered animals (kg)

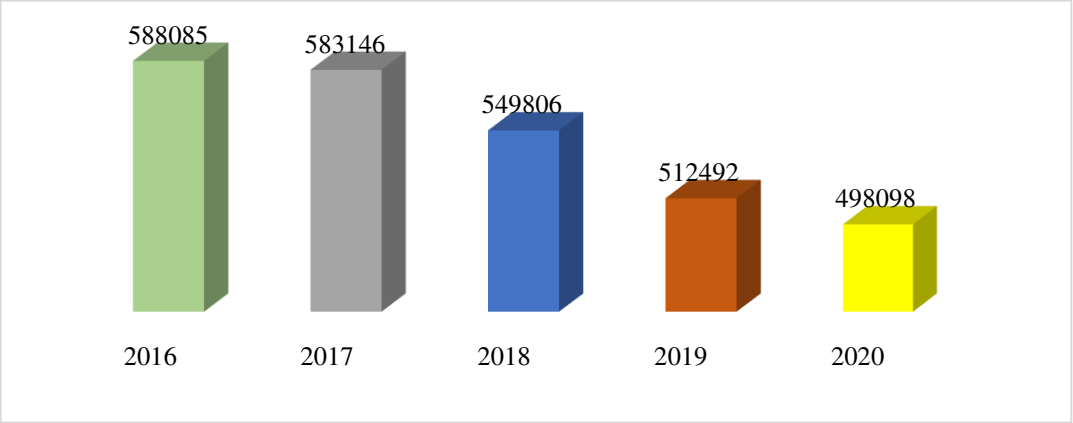
Average carcass weight: represents the ratio between the carcass weight and the number of animals slaughtered. From the Table 3 respectively the Figure 1 we can observe the fact that the average weight in the carcass increased in 2021 compared to 2017.

Figure 2. Herds of pigs (heads)



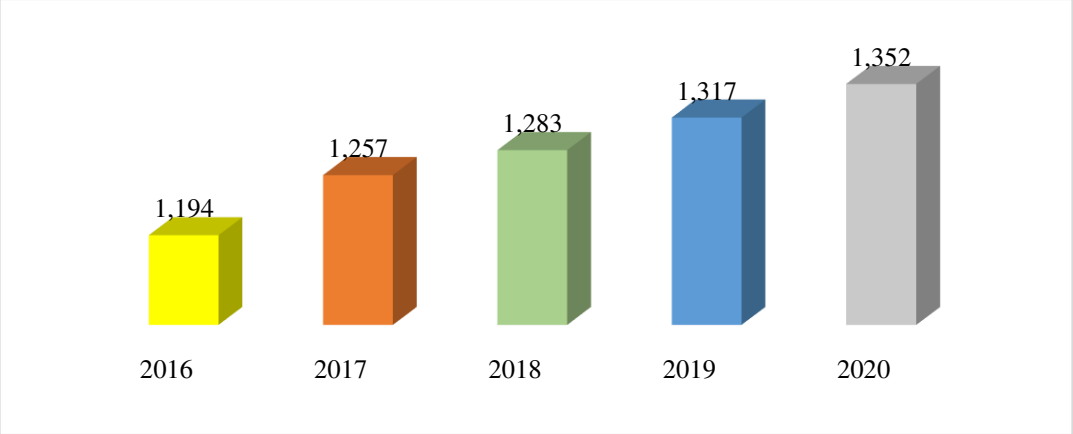
The Figure 2 shows the number of pigs in the period 2016-2020, which had a constant decrease according to the National Institute of Statistics. In 2020, compared to 2016, the number of pigs decreased dramatically. The possible causes of this increase may be due to the African swine fever but also the slaughter in large numbers with small replacement of the herd.

Figure 3. Fresh weight of animals for slaughter for consumption (pigs)



According to statistical data, the live weight of animals intended for slaughter for consumption (pigs) had a constant decrease from 2016 to 2020. If in 2016 a value of 588085 tons was recorded in 2020, it decreased to 498098 tons.

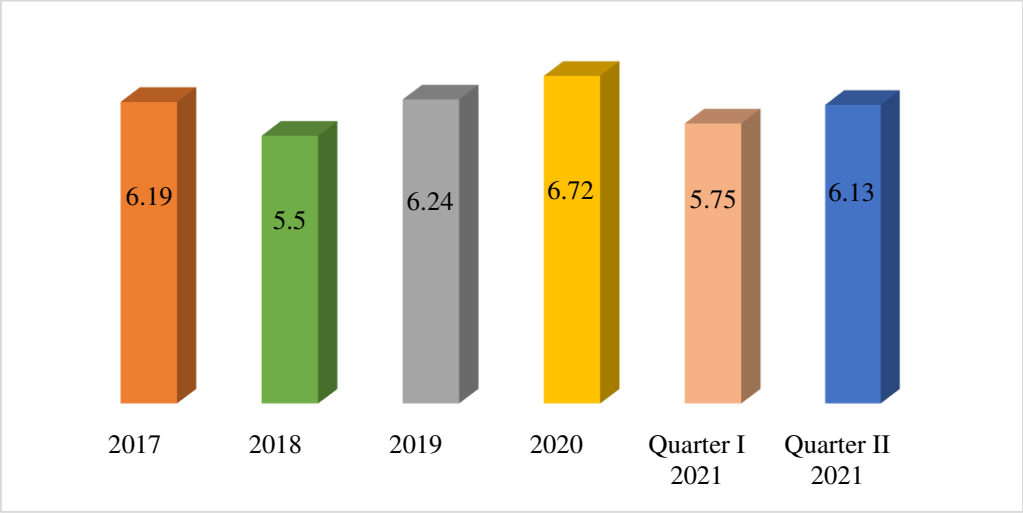
Figure 4. Average monthly consumption of pork meat per person



Source:INSSE

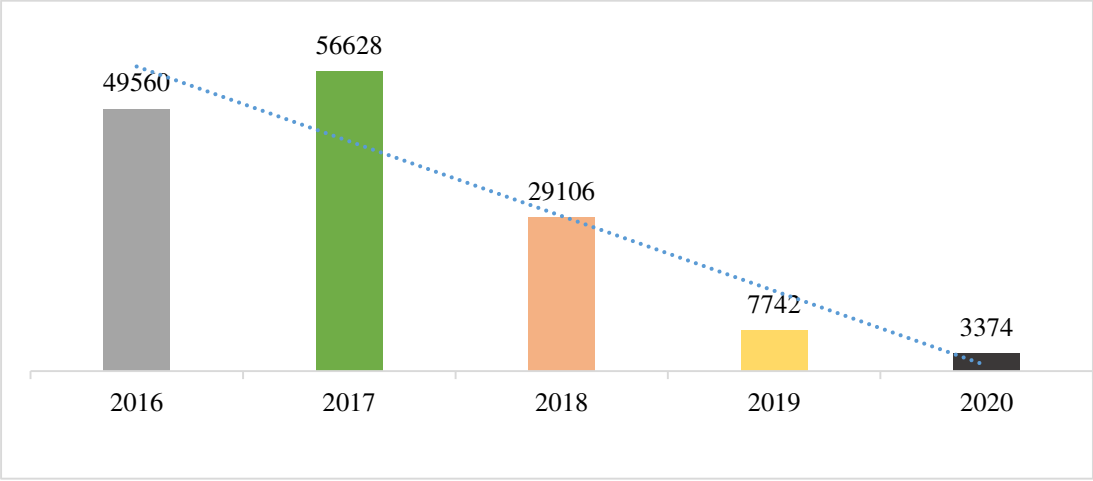
Figure 4 shows the average monthly consumption of pork in the period 2016-2020. As can be seen in the graph, consumption has increased steadily from 2016 to 2020. One of the causes of this increase could be due to the increase net salary which means a larger budget in the consumer's pocket to be able to ensure the minimum food.

Figure 5. Dynamics of average prices for pigmeat (lei / kg)



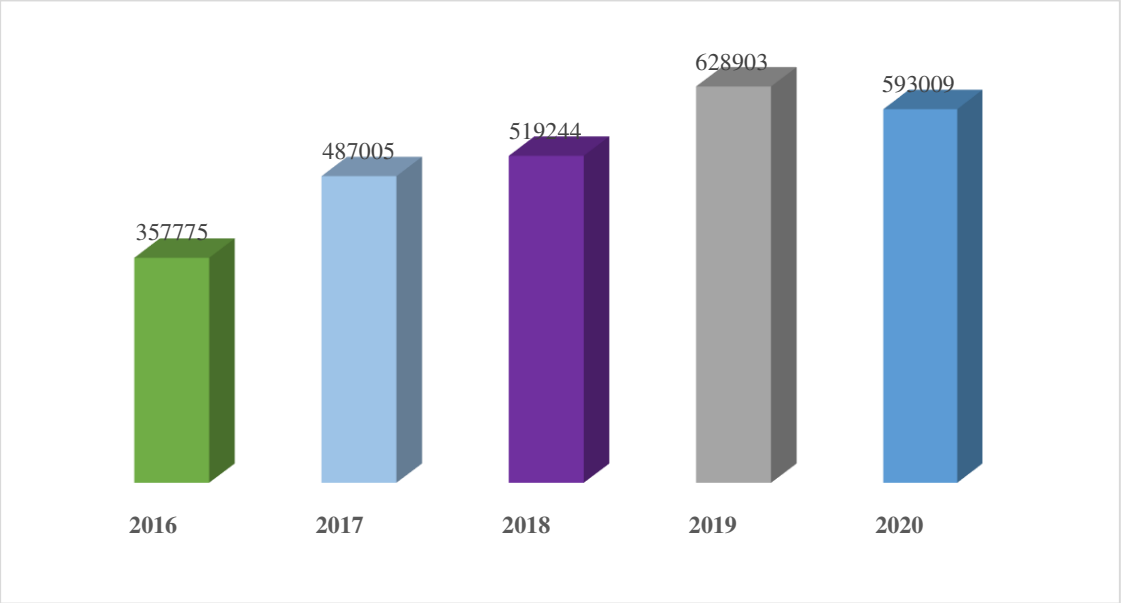
According to statistical data recorded by the National Institute of Statistics on average prices for pork in 2017 and mid-2021, we see a decrease in the second quarter of 2021, compared to 2017, where there was a price of 6.19 lei / kg live. The highest value was recorded in 2020 with an average price of 6.72 lei / kg live and the lowest value was recorded in 2018 with an average price of 5, 50 lei / kg live. A cause of this situation could be the coronavirus pandemic but also the swine fever that negatively influenced sales, which caused prices to fall.

Figure 6. Export value for pigmeat, fresh, chilled or frozen (thousands of euros)



According to the Figure 6 regarding the value of exports to the pig species, we notice that since 2017 it has registered a constant decrease. If in 2017 an export value of 56628 thousand euros was registered, in 2020 it registered a value of only 3374 thousand euros. This decrease is due to the fact that Romania is affected by a drastic decrease in staff, which makes it unable to ensure self-consumption for the population.

Figure 7. Import value for fresh, chilled or frozen pigmeat (thousands of euros)



In Figure no.7 the value of imports increased considerably in 2020 compared to 2016 where a value of 357775 thousand euros was registered being the lowest value recorded in the analyzed period..The highest value of imports was 628903 thousand euros in 2019. The causes of this increase is the lack of pigs in Romania, which has a trade deficit in terms of pork.

CONCLUSIONS

In Romania, pork meat can be considered a traditional product, being consumed more during the winter holidays for the preparation of traditional Romanian products.

Due to the pandemic caused by the new Coronavirus, many industries have suffered here, including the pork industry that I chose to analyze its market.

From the existing statistical data on the specialized sites, books, brochures, profile materials can conclude that the meat sector in Romania is severely affected by the Covid-19 pandemic.

Once the number of pigs decreased due to African swine fever and the mass slaughter, this sector was degraded in all respects.

The pandemic caused by the new coronavirus was another additional reason to increase the value of imports, lower exports, increased demand, lack of labor, increased consumption but also lower average prices due to the fact that we have meat imported from European countries.

The disruption caused by the new virus is unique and cannot be compared with other economic crises in recent years. The uncertainty caused by the duration of this pandemic, the depth and lack of prescriptions ready "from economic textbooks" requires a robust analysis of the scenario. But there is a consensus that the impact of COVID-19 is present on both the demand and supply of the economy. We could also distinguish between real shocks, financial shocks, as well as expectations in the economic analysis of this shock.

We draw conclusions based on data on the spread of the pandemic and its mortality, economic activity, as well as the measures taken by the government - restrictions imposed and support provided. The data are also compared with those of the averages across the region to measure how well the country has behaved in terms of limiting its spread and supporting its citizens.

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THE DEVELOPMENT OF VITICULTURE THROUGH THE PRISM OF THE GREEN ECONOMY REQUIREMENTS

ALEXANDROV EUGENIU[1], BOTNARI VASILE[2], GAINA BORIS[3]

Abstract

The primary imperative of the sustainable development of the wine sector is to obtain high production, with low consumption of resources, in conditions of increased economic efficiency and the use of technological links that contribute to reducing energy consumption. High quality wine derivatives can be provided, taking into account three main factors: genotype (variety), location of the plantation (soil and climatic conditions) and applied technology (cultivation and processing). Intraspecific genotypes have a wide capacity for use, but at the same time do not ensure overcoming the barrier of climate change. That is why, taking into account the functionality of genotypes and the use of technical algorithms and interspecific hybridization methods, more plastic rhizogenic interspecific genotypes should be created in terms of their adaptation to climate change, with beneficial repercussions on the sustainable development of the wine sector. As a result of the crossover of V.vinifera L. with M.rotundifolia Michx. interspecific vine genotypes have been obtained and identified that allow the expansion in the northern area of the vine cultivation area on its own roots, while reducing the number of chemical treatments, which will contribute to obtaining products ecological and environmental protection. Rhizogenic interspecific genotypes possess an early period of grape maturation can be multiplied by pruning, without grafting, thus obtaining rhizogenic propagating material that contributes to reducing the costs of setting up vineyards. They were approved as table grape varieties: "Malena", "Nistreana" and "Algumax" and grape varieties for fresh consumption and processing: "Augustina", "Alexandrina" and "Amethyst". By creating plantations, it will contribute to the extension of the area to the northern limit of vine cultivation.

Keywords: area, genotype, green economy, viticulture.

JEL classification: Q01, Q57

INTRODUCTION

The principles of the economic development of the society, in the past focused on the inefficient and irrational use and capitalization of natural resources with an irreversible impact on the environment. The process of socio-human development did not take into account the amount of natural resources and the state of the environment. Therefore, the biggest challenge for society is to integrate environmental sustainability into the context of economic development. The development of society through the prism of the green economy means the restoration and maintenance of a sustainable, long-term balance between economic development and the integrity of the natural environment, in forms understood and accepted by society. The problems of environmental protection and economic development need to be solved in a correlated way, for the good of the whole contemporary society and of the future generations.The transition to a green economy will create major economic opportunities, finally stimulating the implementation of innovative technologies with minimal risk to the environment (Environmental Strategy for 2014-2023 and Action Plan for its implementation, 2014). The basic fields of agricultural development, such as viticulture, fruit growing, etc., require the use of human, financial, natural resources with a major risk on the environment. Based on the principles of the green economy, it is necessary to create plant genotypes that have an increased energy utilization coefficient (direct, indirect and passive assets), being accompanied by cultivation technologies with minimal impact on the environment.One criterion by which the performance of an agricultural ecosystem can be determined is the economic-energy efficiency. As a result of the cultivation technology, a certain amount of energy is consumed, which is expressed by: labor, fuel, fertilizers, fungicides, herbicides, insecticides, financial means, etc. as well as the solar energy necessary for photosynthetic activity, which is ultimately transformed into biochemical energy expressed through crop harvesting (Dejeu et al., 1991). The calculation of the

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energy coefficient allows the determination of the most efficient plant genotypes, thus reducing the energy consumption and increasing the energy-economic value of the derived products obtained. In order to ensure a stable and quality harvest in conditions of increased economic and energy efficiency, it is necessary to take into account the technological stages of cultivation, as they require considerable human and economic resources, they are used in the production of seedlings, plantations, plant protection, irrigation, tillage, etc.

MATERIAL AND METHOD

The interspecific rhizogenic vine genotypes with table grapes: "*Malena*", "*Nistreana*" and "*Algumax*", as well as with grapes for fresh consumption and processing: "*Augustina*", "*Alexandrina* "and"*Amethyst* " (Alexandrov et al., 2020; Catalog of plant varieties of the Republic of Moldova, 2020). The respective genotypes are planted in the experimental vine sector of the institute. The management technique (formation / modeling) of the plants determines the habitus of the hub, in that case the unilateral horizontal cord system was used, bilateral single-storey, with one or two stems and the height of 80 cm, with the vertical management of the shoots. Planting scheme: between rows - 3.0 m, and in a row, from plant to plant - 1.5 m. Type of support - vertical trellis with upright shoots (vertical), height of the support (pillar) - 2, 0 m with three levels of conduction (first level - one wire, the second and third level - two parallel wires, at a distance corresponding to the thickness of the pole) (Alexandrov et al., 2020; Dobrei et al., 2011).

RESULTS AND DISCUSSION

Based on the results of the monitoring of environmental factors, it was found that climate change is gaining momentum globally. The generator of these changes was and is the technical-economic progress of the society, taking into account the principles of sustainable development. It is necessary to promote a green economy policy by motivating, stimulating through various aspects (economic and financial, technologies, products, etc.) those who as a result of economic activity cause an impact on the environment. The involvement of economic agents is required in order to carry out a sustainable activity, both from an economic point of view and the impact on the environment and be minimal. Otherwise, without promoting these policies, the expected results will be minimal and the state of natural resources and the environment will continue to deteriorate.

In the process of creating new vine genotypes, it is necessary to pay special attention to the functional-technological features, such as: - cultivation technology; - performance / productivity (in relation to the vegetation period and the pedoclimatic area); - the balance between growth and fruiting; - phytoanatomobiochemical and physiological character; - resistance to diseases and pests; - the relevance of resistance to low temperatures; - ripening of grapes; - chemical composition of berry juice and derived products; - the attractive appearance of the grapes; - crunchiness and consistency of the leg; - aroma and taste; - resistance to cracking of the bacilli; - transport and storage capacity; - the direction of use of the grapes; - recovery of waste as a result of grape processing. Based on the functionality of the genotype, in the future it will be ensured the existence of balanced, sustainable and diversified agroecosystems, which will guarantee the rational use of natural resources and a beneficial environment for the development of society (Alexandrov E., 2020).

The cultivation of vines, in accordance with the principles of sustainable development, includes on the one hand the reduction of costs for the procurement and use of chemicals needed to control diseases and pests, and on the other hand the minimization of the negative impact on the environment. The derived products obtained are of a high quality.

Climate change requires the creation of plant varieties that ensure performance under different production conditions. The current requirements of the wine sector impose the need to create new varieties with stable productivity potential, high quality of grapes and wine products. As a result of crossing the genotypes of *V. vinifera* L. (2n = 38) x *M. rotundifolia* Michx. (2n = 40) were obtained

and approved interspecific rhizogenic vine genotypes with table grapes: "*Malena*", "*Nistreană*" and "*Algumax*" and with grapes for fresh consumption and processing: "Augustina" , "*Alexandrina*", "*Sarmis*", and "*Amethyst*", which allow the expansion of the northern area of cultivation of vines on their own roots and reduce the number of chemical treatments, which will contribute to obtaining organic products and protecting the environment. .

These genotypes can be multiplied by the pruning method. The obtained plants are rhizogenic and allow the exclusion of some practical stages from the technological process, which contributes to the reduction of financial resources for the production of propagating material and the cultivation of vines. Grafting is a rather complex, risky and expensive technological process that requires special technical and practical knowledge, which consists in obtaining the plant by joining two different plant segments both genetically and morphoanatomophysiologically. This is nothing more than a symbiosis of the two partners (Dobrei et al., 2011).

Rhizogenic vine plants have a longer service life compared to plants obtained through the grafting process. As a result of the technology of obtaining the rhizogenic vine planting material, the stages related to the preparation of the ropes for grafting (grafting and rootstock), storage, grafting, stratification, rooting can be omitted.

The procedure for founding the vineyard is a complex process of research and analysis, aesthetic and technical creation, planning and technical-economic calculation, implementation and maintenance. In essence, real premises are created for the implementation of new varieties with increased resistance to biotic and abiotic factors of the environment, and based on new cultivation technologies are made the high demands of the green agro-industrial economy. Currently, wine products with increased hygiene, "bio", ecological, bidonamic can be really obtained and marketed successfully only by developing viticulture with new, interspecific, rhizogenic varieties.

CONCLUSIONS

1. The implementation of rhizogenic interspecific vine genotypes will contribute to the creation of biological vineyards.
2. Currently, the production of "organic" wine products and their marketing is possible only on the basis of the cultivation of new interspecific rhizogenic varieties, which have high resistance to diseases, pests, critical temperature fluctuations.
3. The green wine economy with its agrobiological stability, allows to increase the economic efficiency and guarantees an increased hygienic degree of grapes, juices, concentrates, wines of different types and distillates.

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BENEFITS OF SUBSIDIES TO FARMS THAT HAVE DELIVERED FRUIT FOR PROCESSING

VIORICA GAVRILĂ [1]

Abstract

The objectives of subsidies for agriculture target economic, social and environmental aspects, and the value added from processing contribute to food security and income gaining, being an important method to improve livelihoods. This paper aims to identify the progress made in the fruit sector as a result of financial support through various subsidizing forms, mainly through coupled support for fruit for processing. Having in view the fact that the structure of fruit plantations in Romania reveals that more than half are aged plantations, under decline, with low productive potential, and fruit processing is at a low level, it is necessary to continue to support production intended for processing, possibly with more substantial amounts, to compensate the losses caused by the quality of fruit from less productive plantations and to boost the fruit processing sector.

Keywords: farms, fruits, processing

JEL Classification: Q12, Q 18

INTRODUCTION

For the period 2014-2020, the CAP maintained the two pillars. The total CAP budget was about 410 billion EUR, with 310 billion EUR allocated to direct payments and market measures (EAGF), and 100 billion EUR to investments in rural development (EAFRD). The Common Market Organization in the fruit and vegetable sector aims to provide financial support for the establishment of association forms in this sector.

Under Pillar I, the direct support system comprises seven multipurpose payments, of which three are mandatory and the rest voluntary. The first three are the following: 1) "basic area payment" - SAPS, in which the payment is exclusively based on the eligible hectares declared by farmers; 2) payment for "greening", by which farmers are conditioned to adopt or maintain agricultural practices beneficial for the environment and climate; 3) an additional payment for young farmers. The voluntary payments consist of: 1) "redistributive payment" by which farmers can receive an extra payment for the first hectares of agricultural land; 2) additional income support in the areas with natural constraints; 3) a simplified voluntary scheme for "small farmers" and 4) coupled support for production. Producer organizations are also financed from EAGF (Pillar I). There is a low degree of organization of fruit and vegetable farmers. According to MARD data, in the year 2020, there were 23 recognized producer organizations in the fruit and vegetable sector.

Under Pillar II, the fruit farming sector benefitted from a special program aiming to reduce structural constraints in this sector (advanced age of orchards and the prevalence of the classical fruit farming system) and to develop the processing sector.

MATERIAL AND METHOD

By consulting the specialized bibliography, the consumption trends on the global market and on the Romanian market were identified.Given the economic importance of agricultural activity through its contribution to the supply of foodstuffs, the study is a cross-sectional research that identified the relationships between subsidies to farms that received coupled support for fruit and the achievement of the objectives targeted by the coupled support. In the analysis of the fruit sector evolution, annual time series were used for the following indicators: area, production, yields, prices

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and the coefficient of variation (CV %) for measuring volatility. Fruit consumption was analyzed in fresh fruit equivalent. A comparative analysis of the evolution of fruit processed production was made, taking into consideration the most important producers in the EU.

For the evaluation of coupled support, out of the total number of SAPS eligible and subsidized farms, the farms holding fruit orchards with total SAPS area, including the orchard, were selected in the first instance. From these, we extracted the farms that received coupled support for fruit for processing. Within this group, the contribution of coupled support to fruit production for processing was evaluated.

The statistical information come from the Eurostat database, NIS data base – Food Balance Sheets and from APIA. The fruits considered for the study were those that received coupled support, namely apples, apricots, cherries and sour cherries and plums.

RESULTS AND DISCUSSIONS

Areas, yields, production

Romania ranks 7thin the EU by the area under orchards and 6thin terms of fruit production.

In the last decade, the areas under orchards in Romania decreased by more than nine thousand hectares. Among the species of interest for our study, the greatest decrease in physical terms was noticed in apple orchards, and in percentage in stone fruit orchards (Table 1). Fruit production and yields show annual fluctuations (Tables 2 and 3).

Table 1. Evolution of area under orchards (1000 ha)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2019/ 2010	2019/ 2010
Total	145.0	140.25	142.4	147.8	141.3	139.0	138.1	139.6	137.96	135.7	-9.32	-6%
Apples	56.37	52.72	55.37	60.28	56.13	55.88	55.53	55.6	53.94	52.74	-3.63	-6%
Apricots	2.62	2.55	2.5	2.84	2.98	2.62	2.2	2.11	1.97	2.04	-0.58	-22%
Cherry	6.93	6.85	6.83	7.08	6.45	6.31	6.13	6.02	7.06	6.09	-0.84	-12%
Plums	69.29	68.2	68.48	68.01	66.55	65.67	65.11	66.68	65.91	65.58	-3.71	-5%

Source: Eurostat: [apro_cpsh1]

Table 2. Production evolution (1000 t)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2019/ 2010	2019/ 2010
Total	1,370	1,432	1,083	1,244	1,247	1,171	1,187	1,001	1,754	1,432	61.9	5%
Apples	544	611	454	503	502	465	457	340	635	493	-51.1	-9%
Apricots	22	32	28	27	42	30	29	33	34	29	7.12	32%
Cherry	68	79	68	77	80	72	71	55	87	73	5.63	8%
Plums	616	564	413	501	484	486	502	434	830	693	76.97	13%

Source: Eurostat: [apro_cpsh1]

Compared to other analyzed member states, Romania has the lowest yields in apple orchards, ranging from 6271 kg/ha in the year 2017 to 11768 kg/ha in 2018;compared to France, the country with the highest yields, Romania's yields are lower by 70%, and represent half of Poland's yields, country on the penultimate place according to this indicator. In apricots instead, in the last two years Romania had the best yields compared to the other countries. Yields in the cherry orchards in Romania rank first, while in the plum orchards yields are modest, by the average of the period Romania ranking 7thin the ten investigated countries.

Table 3. Evolution of average yields – tons/ha

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2019/ 2010	2019/ 2010
Apples	9.8	11.8	8.4	8.5	9.1	8.5	8.4	6.3	11.8	9.3	-0.47	-5%
Apricots	9.1	13.2	11.6	10.0	14.6	11.8	14.0	16.0	17.5	14.4	5.33	59%
Cherries	10.1	11.9	10.3	11.4	12.8	12.0	12.1	9.7	11.4	11.9	1.71	17%
Plums	9.0	8.4	6.2	7.5	7.4	7.6	7.9	6.7	12.6	10.6	1.54	17%

Source:http://www.fao.org/faostat/en/#data/QC

In general, yields have the greatest influence on production variability, which indicatesthe great influence of weather factors as well as the lack of consistent investments to mitigate their effects (Table 4).

Table 4. Average values, standard deviation and coefficient of variation for areas, production and yields

	Area			Production			Yield		
	2010-2019 average	Standard deviation	CV %	2010-2019 average	Standard deviation	CV %	2010-2019 average	Standard deviation	CV %
Apples	140.7	3.6	2.6	1.292.3	215.4	16.7	9,191	1,646	17.9
Apricots	55.5	2.2	3.9	500.4	84.0	16.8	13,233	2,626	19.8
Cherries	2.4	0.3	14.2	30.7	5.3	17.2	11,366	996	8.8
Plums	66.9	1.4	2.2	552.3	128.5	23.3	8,387	1,919	22.9

Source: author's own calculations

The major impediments in the fruit sector are the advanced age of orchards and the prevalence of the classical fruit farming system. In the year 2013, depending on the productive potential, 52% were plantations under decline, 42% plantations on bearing and 6% young plantations; by the farming system, 68% were classical plantations, 30% intensive plantations and 2% superintensive plantations (Sumedrea D., et. al, 2014).

In the present period, the low storage capacity limits the availability of fruit over time, both for the large retailers and for processors. According to MARD, in the year 2018, the storage capacity for fruit and vegetables was 190.77 thousand tons.

Consumption

The consumption of fruit and vegetables plays a vital role in ensuring a diversified and nutritious diet. OMS recommends a minimum consumption of fruit and vegetables of 400 g /person/day[1]. Assessing the global trends, a study conducted in 2019 suggests that even under optimistic socio-economic scenarios, the future supply will be insufficient to reach the levels recommended in many countries. Consequently, a systematic public policy will be needed to address the constraints to the production and consumption of fruit and vegetables (Mason-D'Croz, D. et al., 2019).

In Romania, fruit consumption is on an upward trend. In the year 2010, one person consumed on average 143.6 g/day of fruit *(in fresh fruit equivalent)*, and in 2019 the consumption reached 247.0 g/zi. The greatest increase in consumption was noticed in peaches, by 231%, followed by meridional and exotic fruit, by 96%. For apples, plums and various indigenous fruits, the increase in consumption ranged from 62% to 65%, while the consumption of cherries increased by 25%.

Under the background of the increase in the consumption of fruits specific to the temperate climate and also in the consumption of southern and exotic fruits (*in fresh fruit equivalent*) the Romanian imports have doubled, while exports are decreasing. The share of exports in usable production was 8.6 % in 2010 and 4.6% in 2019. The degree of self-supply was down from 81% to 67%.

According to the European Fruit Juice Association (AIJN), in Romania there is not a strong tradition in the consumption of fruit juice and nectar, as most consumers do not consider that fruit juice is a substitute for fresh fruit in diet. The increase on the fruit juice market is mainly determined by the supply of premium juices rather than by the supply of concentrated juice. Increasing disposable income encourages consumption, and premium cold-pressed juices that offer additional functional benefits are an emerging trend. Nectar consumption increased in 2017, but faster progress is limited by the lack of producers' investments in innovation.

Globally, the consumption of fruit juices and nectar was equivalent to 36.2 billion liters in 2018.The largest consumption area is the EU-28 with 9.1 billion liters, followed by North America with 8.6 billion liters.

Prices

In Romania, the average price of apples was 58.8 euros/100 kg in the period 2010-2019 and price volatility was low. For apricots, prices ranged from 87.55 euros/100 kg in 2017 to 109.58euros/100 kg in 2018, and price volatility was also low (CV 8%). Although the productivity of cherry and sour cherry orchards in Romania increased, this is not reflected in the decrease of selling prices, which indicates an increasing demand. With an average price of 54.6 euros/100 kg, the plum market in Romania is relatively stable, with a coefficient of variation of 9.2% (Table 5).

Table 5. Evolution of prices – price per 100 kg

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Mean	Standard deviation	CV %
Apples	51.3	61.8	60.1	63.1	61.9	60.1	59.5	60.6	57.8	51.8	58.8	4.1	7.0
Apricots	104.22	107.1	99.12	95.04	93.39	108.2	107.6	87.55	110	91.46	100.3	8.0	8.0
Cherries	134.6	134.9	167.5	147.3	158.9	140.8	161.7	162	137	185.2	153.0	16.8	11.0
Sour cherries	115.4	113	148.7	125.6	120.2	112.3	119.8	131.8	113	165	126.5	17.6	13.9
Plums	50.3	54.7	58.1	53	56.3	53.3	47.9	64.1	48.8	59	54.6	5.0	9.2

Source: Eurostat [apri_ap_crpouta]

Comparing prices in Romania with those from other important fruit producing countries, it results that in all other EU member states prices have annual variations of less or greater amplitude. The highest price volatility is found on the markets with the lowest average prices. With the highest prices, the Romanian fruit market is the least volatile.

Evolution of processed fruit production

In the year 2019, Germany, Poland, United Kingdom, France and Spain were the top producers in the EU-28. Romania ranked 17thin EU-28, with a production value of 6344 thousand euros in 2019, accounting for 0.4% of EU-28 production, although Romania has significant resources of raw products. It is worth mentioning that the smallest production was recorded in the year 2015, and the trend increased afterwards (Table 6), this being probably the cumulated effect of the coupled support for apples and of investments in the processing sector. The coupled support attenuated production decline, but it could not recover the gaps: average production in 2014-2019 was lower by 36% than the 2010-2013 average.

Table 6. Statistics on the production of manufactured products – apple juice (1000 euro)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
EU-28	1234103	1461751	1577767	1537681	1462533	1412848	1552443	1505736	1641312	1523522
Romania	8349	9308	10697	9033	5727	4090	6152	5610	7932	6344
Romania/EU	0.7%	0.6%	0.7%	0.6%	0.4%	0.3%	0.4%	0.4%	0.5%	0.4%

Source:https://ec.europa.eu/eurostat/web/prodcom/data/excel-files-nace-rev.2, PRODCOM code 10321600

In the production of fruit jams, marmalades and jellies, the top producers are France, Germany, UK and Belgium; Romania produces 0.3% of the EU-28 value. In the year 2013, Romania's production was lower by half compared tothat of 2010 (Table 7). Like in the case of apple juice, the coupled support attenuated production decline, yet it could not attenuate the losses: the average production in 2014-2019 was by 33% lower than the 2010-2013 average.

Table 7. Statistics on the production of manufactured products – fruit jams, marmalades, jellies, fruit or nut purees and pastes, as cooked preparations, except for citrus, homogenized preparations (1000 euro)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
EU-28	2415166	3016661	3377224	3502866	3440604	3532080	3619387	3660000	3488669	3305000
Romania	13129	17008	20278	9860	9533	11793	10314	10106	9336	9600
Romania/EU	0.5%	0.6%	0.6%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%

Source:https://ec.europa.eu/eurostat/web/prodcom/data/excel-files-nace-rev.2, PRODCOM code 10392290

The trends on the global market reveal that in the fruit processing industry, there is a strong focus on waste reduction, by the valorization of resulting by-products, in order to provide the food and pharmaceutical industry with valuable extracts.

The concept of recovery of different compounds from this waste opens new ways for the development of "green" industries, which have a tremendous potential, mainly where there is plenty of fruit waste. The emphasis on frontier sciences has already attracted interest in developing and optimizing new ecological methods for the efficient use of biomass, for closing the chain by returning nutrients and organic matter to soil, when all other useful products have been recovered (Fierascu, R. C. et al, 2020).

Coupled support for fruit

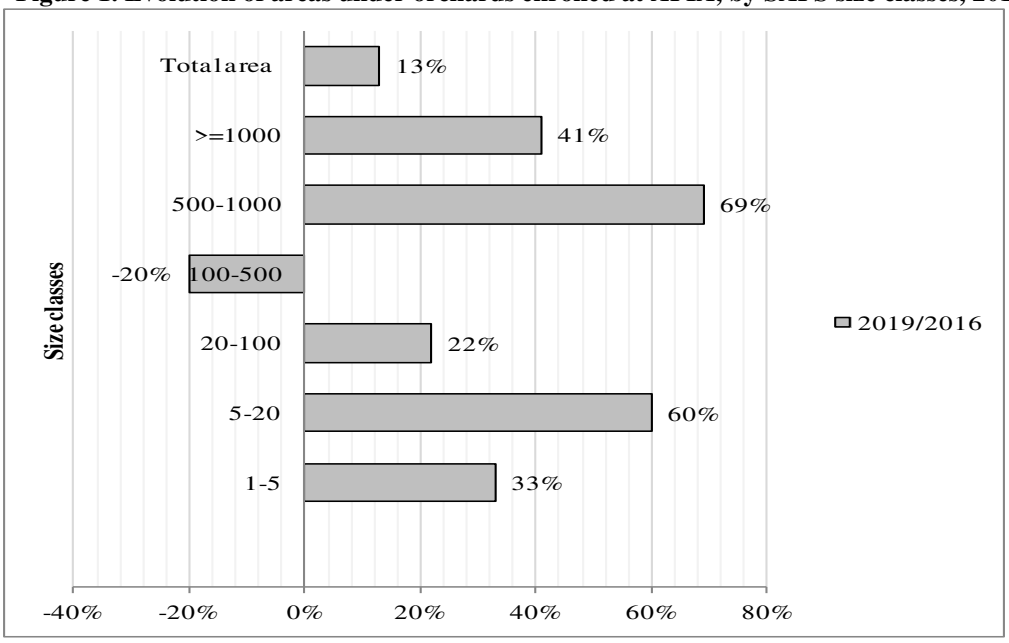
Although within the CAP the link between receiving income support payments and the production of specific products has been phased out (decoupled), for some sectors in difficulty, the EU member states could continue to combine a limited amount of income support for certainsectors in difficulty or products. In Romania, according to the legislation into effect, the coupled support for fruit for processing to obtain non-alcoholic food products is granted to active farmers who comply with the following conditions:

a) operate plum, apple, cherry and sour cherry and apricot orchards

b) make proof of marketing a minimum production/ha, on contract basis with a processing unit registered for food safety, according to the provisions of ANSVSA Order no. 111/2008, which it presents to APIA together with the fiscal invoice or sheet/sheets from the marketing book of agricultural products, in the case of natural persons, until December 31 of the application year. The minimum marketed production for different types of fruits was established at: 7.8 tons/ha for apples, 4.7 tons/ha for apricots, 4.4 tons/ha for cherries and 5.6 tons/ha for plums.

c) the processing units that operate areas under orchards must prove the marketing of their own production provided under letter b), until December 31 of the application year, through internal accounting documents.

Figure 1. Evolution of areas under orchards enrolled at APIA, by SAPS size classes, 2019/2016



Source: APIA

In the year 2016, the area under orchards registered at APIA was 2675 hectares. In 2019, the area increased by 13%, to reach 3023 hectares, accounting for 2.4% of total orchards.

In physical terms, the greatest increase was noticed in the medium-sized farms from the size class 20-100 hectares, by 187 hectares; in percentage terms, the greatest increase was in the large-sized farms, from the size class 500-1000 hectares (69%)(Figure 1). The area represents 2.1% of the total area of apple, apricot, cherry and sour cherry and plum orchards.

The coupled support to the fruit sector in Romania had the following economic objectives: providing raw material for the processing units, equilibrating the trade balance by boosting the supply of local fruits, diversifying the product range, developing efficient services for taking over, processing and marketing of production with controlled quality, at the level of European standards. One of the social objectives targeted to maintain the areas under orchards for processing, and the environmental objectives targeted to reduce the erosion risk in the hilly areas, specific to fruit farming practice in our country.

The coupled support to fruit in the programming period 2015-2020 totalled 2917.5 thousand euros, accounting for 0.027% of the national ceiling established by (EU) Regulation no. 1307/2013 of the European Parliament and Council of December 17, 2013. The largest amount was allocated to plums, i.e. 1167 thousand euros (40.0%); apples rank 2nd, with an allocated amount of 972.5 thousand euros (33.3%); for cherries and sour cherries and for apricots the allocated amounts are similar, i.e. 389 thousand euros for each group (13.3%).

In the years 2015 and 2016, the coupled support was allocated by types of fruits with different values/ha, and since 2017, under the voluntary coupled support schemes for fruit they have been unified, with undifferentiated amounts per hectare. The coupled support paid to farmers for fruits for processing ranged from 348 thousand euros in 2018 to 474 thousand euros in 2019 (Table 6).

Table 6. Total amounts paid as coupled support for fruit for processing, euros

	2015	2016	2017	2018	2019
Fruit (cumulated) – euros, of which:	451,309.22	434,697.63	455,066.1	347,769.9	474,427.4
Plums for processing	180,000.00	172,942.39	0.00	0.00	0.00
Apples for processing	161,604.92	143,936.55	0.00	0.00	0.00
Cherries and sour cherries for processing	49,704.30	56,658.11	0.00	0.00	0.00
Apricots for processing	60,000.00	61,160.58	0.00	0.00	0.00

Source: APIA

In the year 2019, 115 farms received coupled support, out of which 11 farms were enrolled in the small farmer scheme. The area approved for coupled support amounted to 1829.42 hectares under orchards (that is 1.4% of total area or 61 % of area under orchards enrolled at APIA).

Table 7. Distribution of coupled support for fruit by farm size classes, 2019

	1-5	5-20	20 - 100	100 - 500	500 - 1000	> 1000 ha	Total
Number of beneficiaries	23	39	32	11	5	5	115
% of total beneficiaries	20	34	28	10	4	4	100
Area, ha	38.3	227	657.1	407.1	337.5	162.5	1829.42
% of total area	2	12	36	22	18	9	100

Source: APIA

The highest percentage (36%) of the area approved for coupled support payment for fruit belongs to farms from the size class 20-100 hectares, and the number of beneficiaries account for 28% of total. The small farms, with an area of 1-5 hectares represented 20% of the total number of beneficiaries, but only 2% of the area approved for payment.

The average area/farm was 139.8 SAPS hectares, out of which the area under orchards was 15.9 hectares or 11.4% of SAPS area.

Out of the total amount of subsidies to farms that received coupled support for fruit, of more than 3.75 million euros, the largest part (42.6%) was represented by SAPS payments, almost one quarter (24.5%) was represented by payments for greening, and the coupled support for fruit represented 12.6% of the total amount. Other forms of support have low shares, for instance the support to areas with significant natural constraints accounted for 4.5%, TNA 1- Transitional National Aid for crops on arable land 3.7%, etc.

Relating the total amount paid as coupled support to the total number of beneficiary hectares, it results that the coupled support value for one hectare of orchard amounted to 259.33 euros. To calculate the impact of coupled support in the value of fruit production/ha, in the table below we used as indicators the minimum production/ha established by Order 619/2015 and the prices published in Eurostat database. The coupled support was paid for raw fruit for processing in different percentages according to the type of fruits, ranging from 3.4% for cherries and sour cherries to 7.8% for plums. The difference results from the level of price and implicitly from the value of production for one hectare. In the situation when the average yield was higher, the coupled support represents a lower percentage.

Table 8. Impact of coupled support in the value of production /ha intended for processing, 2019

	Apples	Apricots	Cherries and sour cherries	Plums
Coupled support per hectare	259.33	259.33	259.33	259.33
Minimum production per hectare – kg	7800	4700	4400	5600
Price per kg – euro	0.518	0.9146	1.751	0.59
Value of production per hecare – euro	4040.4	4298.6	7704.4	3304
% VCS in the value of production/ha	6.4%	6.0%	3.4%	7.8%

Source: author's own calculations

In the case when the entire area under orchards enrolled at APIA had benefitted from coupled support, the value per hectare would have been only 157 euros/ha, which would have led to a 39% lower support to fruit production for processing.

Assuming that in the next years the market conditions do not change (prices remain constant), the rate of increase of areas enrolled at APIA is maintained and the eligible areas continue to represent 60.5 % of the area registered at APIA, the areas eligible for coupled support would reach 2067 ha in 2022 and 2335 ha in 2025. To maintain at least the same value per hectare, the total allocations should increase to 535955 eurosin 2022 and to 605629 eurosin 2025.

In order to increase processed production, there are two possibilities: either a stronger increase of areas benefitting from coupled support while maintaining the value of 260 euros/ha, or maintaining the growth rate of areas but with a higher value per hectare to make the delivery of raw material to processing more attractive.

CONCLUSIONS

Fruit processing is an important economic activity in the EU. Although Romania has important resources of raw material for processing, the processed production is extremely small.

Only a non-significant percentage of the areas under orchards were registered in APIA database, and the fact that only 60.5% of the total area under orchards enrolled at APIA benefitted from coupled support for fruit shows that this was not attractive enough to direct production to the processing industry.

Normally, the preferences of agri-food industry and of agriculture in terms of prices are quite opposite: industry wants lower prices for its raw material and agriculture higher prices for its products. Thus, the high fruit prices represent a significant constraint for the Romanian processors. From this point of view, the decision to grant coupled support for fruit is fully justified. The tension between the agro-processing industry and agriculture in terms of prices will not disappear, but certain categories of policies may improve the profitability of both sectors at the same time.

The coupled support for fruit reached one of the important economic objectives, i.e. to ensure a minimum quantity of raw material for processing. However, until 2019, the processed production has not reached a level similar to that from 2010-2013, which leads us to the conclusion that this form of support should be continued with more consistent allocations, given that the post-2020 CAP largely maintains the sectoral programs and allows member states to prepare specific interventions for the main agricultural sectors in their strategic plans.

Having in view the structural constraints on fruit production, in addition to maintaining coupled support for fruit for processing, it is necessary to continue the Fruit Sub-Program under Pillar II, primarily to meet domestic consumption needs and also to capitalize on opportunities offered by global market trends. The future investment portfolio should focus, in addition to the reconversion of aged orchards, on providing storage facilities, boosting association to increase fruit production, encouraging vertically integrated production to reduce the negative impact of high prices of raw materials for processing.At the same time, the processing component should be accompanied by the development of technologies and practices for waste reduction / recovery.

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MOLDOVA'S TRADE WITH AGRI-FOOD PRODUCTSON INTERNATIONAL MARKETS

LILIANA CIMPOIEȘ[1]

Abstract

This paper examines the transformations that occurred in Moldova'sforeign trade on international markets, with focus on agricultural and food commodities. The research includes the analysis of Moldova's foreign trade activity with agricultural and food commodities, the changes that occurred in their structure, territorial distribution dynamics and competitiveness. The data used examines the trade flows within the last decade, regarding the agricultural and food trade products. The methodology is based on the analysis of trade indicators results as Relative Trade Advantages (RTA) and Grubel-Lloyd (GL) index. From the obtained results, most Moldova's trade flows had been of inter-industry type. Regarding RTA index results, we delimitate trade advantages in the case of six agri-food commodities. High magnitudes of intra-industry trade, according to the average GL indices results have certain commodities as: live animals, sugar, meat, dairy produce, animal or vegetable fats and oils, residues, preparations of vegetables, fruit, nuts, preparations of cereals, beverages.

Keywords: agri-food commodities, inter-industry trade, intra-industry trade

JEL Classification: Q17, F10

INTRODUCTION

Foreign trade benefits countries, when production inside a country is more expensive in terms of prices due to demand and supply (technology available). Differences in prices might occur due to demand which is determined by consumer preferences and their income level. Nevertheless, those are not the main factors that affect international trade rather than differences in technology.

Traditional trade theory starts with Adam Smith ideas regarding differences in prices and international trade due to absolute advantages in costs of production between countries. David Ricardo, mentions not absolute but relative advantages required for foreign trade. Differences in relative advantages and costs of production are related to country's specialization due to a different technological level but also because of the endowment with factors of production. This idea was supported by the economists Hecksher and Ohlin. The Hecksher Ohlintheory assumes that countries are endowed differently in factors of production, some are endowed more in capital or more in labor. All these theories assume that countries import or export certain commodity. Nevertheless, it excludes analysis of simultaneous trade flows within the same group of commodities. This refers to inter-industry trade, that is significant in analyzing trade between countries, not related with relative advantages or differences in technology, but scale effects related to imperfect competition and product differentiation. Inter-industry trade allows a country to focus on producing less commodities but higher amount of output with increased productivity and lower costs. Simultaneous export and import trade flows of the same commodity are analyzed within intra-industry trade. Intra-industry trade determines commodities turnover among countries. It is based on scale effects which leads to imperfect competition and product differentiation. Intra-industry trade allows a country to focus on producing only certain "fewer" commodities but in larger quantities with increased productivity and minimized cost of production.

For many Eastern European countries, the transition process implied important changes for the agri-food trade. Different researchers examined changes that occurred in terms of different aspects of inter and intra-industry trade (Luka O et al., 2004, Levkovich I et al., 2007).

The aim of this paper is to analyze the transformations that occurred in Moldova's foreign trade on international markets, with focus on agricultural and food commodities. The research

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includes the analysis of Moldova's foreign trade activity with agricultural and food commodities, the changes that occurred in their structure, territorial distribution dynamics and competitiveness.

MATERIALS AND METHODS

The paper examines changes in both inter industry and intra industry trade of Moldova through the analysis of trade indicators as Relative Trade Advantages (RTA), Grubel Lloyd (GL) index.

The research analysis of trade indicators is based on secondary data provided by National Bureau of Statistics. The trade flows between 2010 and 2020 were examined. The analyzed data refers to trade flows dynamics and their territorial distribution on main trade partners.The agri-food trade data includes the 24 Harmonized Sections (HS) that belongs to agricultural and food products, according to the Combined Nomenclature of Goods. Aggregations 01-15 belong to agricultural commodities, while 16-24 refers to food commodities.

Most common measure to estimate specialization of revealed comparative advantage isRelative Trade Advantage index (RTA), developed by Vollrath (Vollrath, 1991). This index is estimated as the difference between relative export advantage (RXA) and relative import advantage (RMA):

$$RTA = RXA - RMA \quad (1)$$

Relative export advantage, sometimes named also Balassa index and can be computed as:

$$RXA = B = (X_{ij}/X_{it})/(X_{nj}/X_{nt}) \quad (2)$$

X – exports; i – a country; j – a commodity; t – a set of commodities; n - a set of countries.

Relative import advantages is calculated as:

$$RMA = (M_{ij}/M_{it})/(M_{nj}/M_{nt}); \quad (3)$$

M – import.

A comparative trade advantage is revealed through a value greater than zero of RTA index, while trade disadvantages indicates values lower than zero.If a country or sector has comparative advantage, then the given sector and/or industryin country i is trade competitive.

For intra-industry trade dynamics assessment, Grubel-Lloyd index (GL) (Grubel and Lloyd, 1975)was used.Intra-industry trade (IIT)refers to the trade between countries, where the costs of exports of particular industry/sectorare compared to the costs of imports of same industry/sector. GL index reveals share of intra industry trade in the total amount of exports of a particular industry and/or sector. GL index can take values from 0 to 100, and is computed according to the following:

$$GL_i = \frac{[(X_i+M_i)-|X_i-M_i|]}{X_i+M_i} \times 100\%, \quad (4)$$

where,

GLi – index of intra industry trade;

X_i - value of export in industry i;

M_i - value of import in industry i;

$X_i + M_i$ - total value of trade;

$|X_i - M_i|$ - trade balance of industry i.

When GL index takes value close to 100, most trade flows are of intra-industry trade, while values closer to zero indicates that most trade is of inter0industry type.

Intra industry trade (IIT) according to the Grubel Lloyd index is estimated according to the following equation:

$$GL_i = 1 - \frac{|X_i-M_i|}{(X_i+M_i)}$$

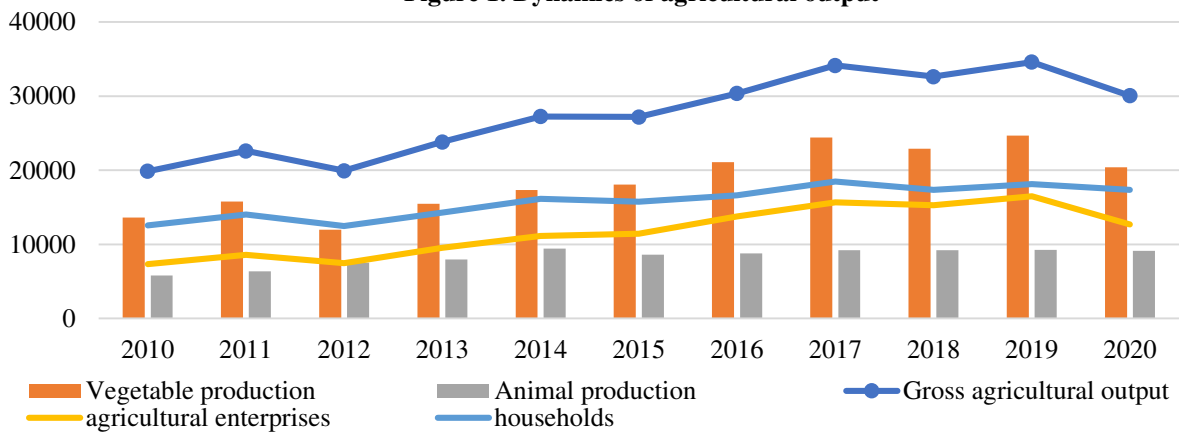
(5) where, Xirepresent the export in a certain type of commodities and Mishows imports within the same group of commodities. GL values are situated between 0 and 1, higher values indicating higher magnitudes of intra-industry trade.

RESULTS AND DISCUSSION

Moldova's economy traditionally relies on the agricultural sector. Despite the fact that the share of the agricultural sector in GDP decreased over the last decades and accounts about 12 percent in 2020. About half of Moldavian exports belong agricultural and food products (45 percent). Also, about one third of labor force is employed in agriculture. As non-agricultural activities have a small share in rural areas, the incomes of most of rural population depends on the development of the agricultural sector.

Gross agricultural output had increased over the examined period and accounted 30061 million MDL in 2020, with 12 percent less than in 2019. About 70 percent belongs to vegetable production, while animal production has a share of 30 percent. Households contribute with about 60 percent to Gross Agricultural Output (Figure 1).

Figure 1. Dynamics of agricultural output



Source: based on data from National Bureau of Statistics

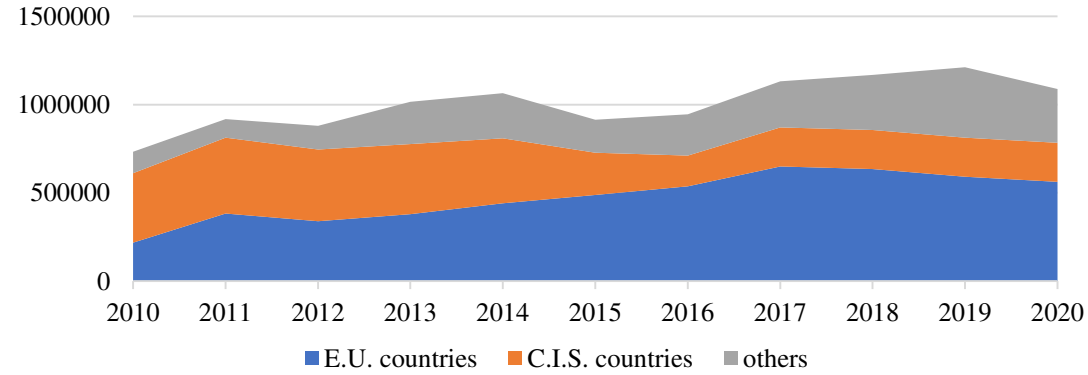
Moldova's trade flows dynamics on global markets experienced changes, both exports and imports flows with agricultural and food products increased considerable. The amount of exported agri-food exports to foreign markets constituted 1006 million US dollars while imported goods 714,5 million US dollars (average value during 2010-2020). The amount of exported agri-food products on international markets increased by 48 percent in 2010-2020, while imports increased by 43 percent within the same period. Moldova's total trade balance is maintained negative, as a result of large imported amounts of natural gas, energetic resources, oil etc. Agri-food products represent almost half of all exported goods. As result, trade balance for agri-food products is positive, despite the fast growth in imports in recent years.

The territorial distribution of trade flows on international agri-food markets changed after 2012-2013. The trade flows towards the European market for agri-food products had grown considerably after 2014. A major contribution to this change was due to the fact that Moldova signed a Deep and Comprehensive Free Trade Agreement (DCFTA) with E.U. at the end of 2013. In general, Moldova's trade flows to E.U. market started to increased slowly since 2005. Traditionally, C.I.S. countries were the main distribution market for Moldova's agricultural and food products, mainly Russian Federation, Ukraine, Belorussia. Due to several embargoes applied by Russian Federation, first in 2006 on Moldova's wine and other alcoholic beverages, followed by other restrictions in 2013 initially for wines, and extended lately to meat products, in 2014 were added new interdictions to fruit exports, local producers needed to find new markets.

A closer approach to E.U. market started earlier by being granted initially with General System of Preferences (GSP) and GSP plus in 2006. Later, Moldova benefitted from Autonomous Trade Preferences (ATP) in 2008 for several agri-food products as beverages, sugar etc (Cimpoies, 2016).

During 2010-2020 Moldova exported agricultural and food products on the European market in value of 475.1 million US dollars (Figure 2). The largest amount of exported agri-food products to E.U. countries were recorded in 2017 in value of 649.5 million US dollars, followed by a slight decrease in the next year. Traditionally Romania is the main distribution market for Moldova's agricultural and food products among E.U. countries. In 2019 Moldova exported to the Romanian agri-food market products in value of 183.2 million US dollars among which the largest share belongs to oil seeds and oleaginous plants (HS 12), beverages (HS22), fruits (HS 08), cereals (HS 10). In 2019 exports of agri-food products were also distributed on the market of Italy, Poland, Bulgaria, Germany.

Figure 2. Geographical distribution of Moldova's exports with agricultural and food products on international markets, 2010-2020



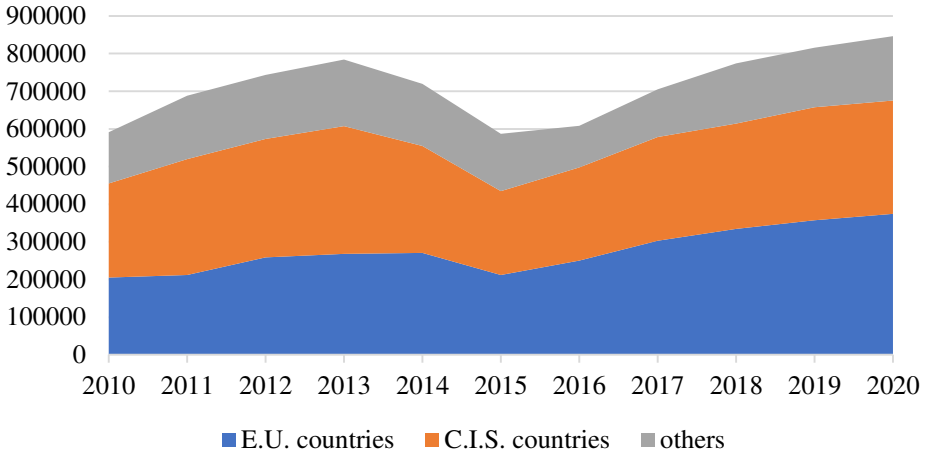
Source: based on data from National Bureau of Statistics

In recent years had decreased considerably the share of Moldova's exports of agri-food products to the C.I.S. market. During 2010-2020 the exports of agricultural and food products to this market constituted 299052.8 thousands U.S. dollars. The main distribution market for Moldova's agri-food products on the C.I.S. market is Russian Federation, Belorussia and Ukraine. In 2019 Moldova exported agricultural and food products on the Russian market in value of 121 million US dollars, among which the largest share belongs to edible fruits and nuts (HS 08), beverages (HS 22) and preparations of vegetables and fruits (HS 20). To Belorussia, were exported agri-food commodities in value of 62 million US dollars, mostly beverages (HS 22) in 2019. To Ukrainian agri-food market were exported commodities in value of 24 million US dollars.

In the same time, the agri-food exports towards other countries than the groups mentioned above had increased.Among this category of countries we can mention the agri-food trade flows oriented to Turkey, Switzerland, China, Georgia. Turkey was the destination market for Moldova's exported agri-food commodities in 2019 in value of 138 million US dollars. Among these products the largest share is for oil seeds and oleaginous fruits (91.7 million US dollars) and cereals (27.9 million US dollars).

In 2020, from the 846.5 million US dollars of imported agricultural and food commodities, 373,9 million US dollars were from European Union countries and 300,9 million US dollars from the C.I.S market. The imported agri-food products from both markets increased in the last decade, with a slight decrease in 2015 with all trade partners (Figure 3).

Figure 3. Geographical distribution of Moldova's imports with agricultural and food products on international markets, 2010-2020



Source: based on data from National Bureau of Statistics

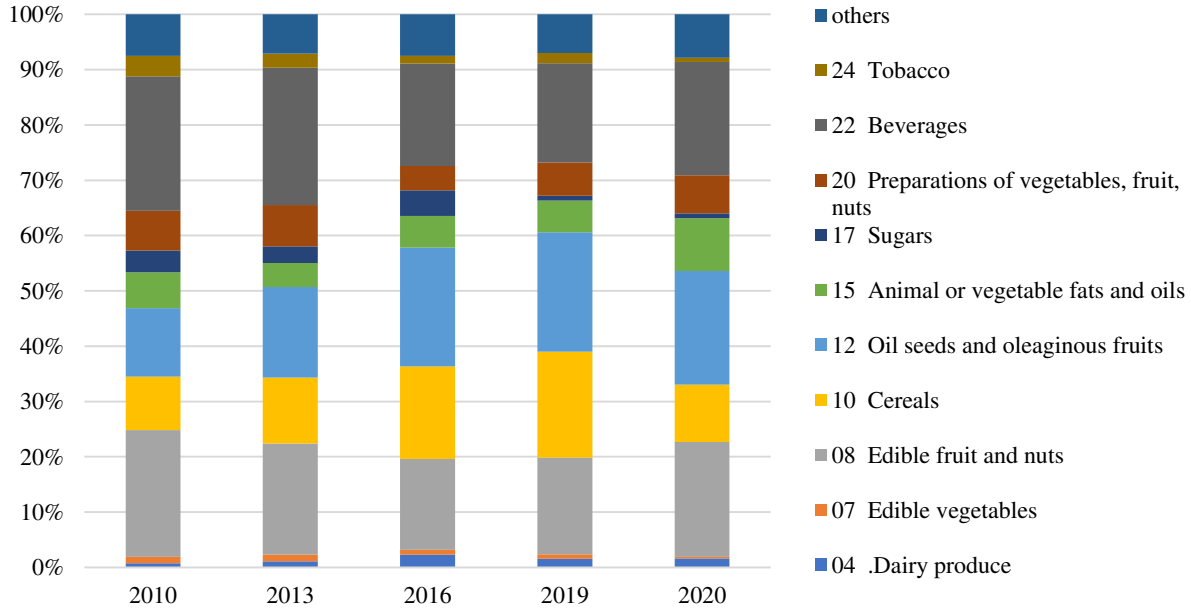
Among main trade partners for imported agri-food products on the European market are Romania, Poland, Greece, Germany, France etc. In 2019 the amount of imported agri-food products from Romania was in value of 74,5 million US dollars, mainly residues (HS 23), products of animal origin (HS 05), cereals (HS 10) and lac, gums, resins (HS 13).

From the C.I.S. market most of agri-food imports are originated from Ukraine (197,4 million US dollars in 2019), followed by Russian Federation and Belorussia. From Ukrainian market are imported mainly dairy products (HS04), beverages (HS22), preparations from cereals (HS19).

Imported agricultural products and foodstuffs are mainly originated from Turkey (HS06, HS07), Ecuador (HS08), China (HS24, HS10), United States of America (HS22, HS03, HS12).

Moldova's agri-food exports are dominated by four products that represent 80 percent of total exported agri-food products (Figure 4). These are: edible fruits and nuts (HS08), beverages (HS22), oil seeds and oleaginous fruits (HS 12), cereals (HS10) (Figure 4). Over the examined time series, the share of beverages and edible fruits and nuts had decreased. In the same time, increased the amount exported of oil seeds and oleaginous plants and cereals.

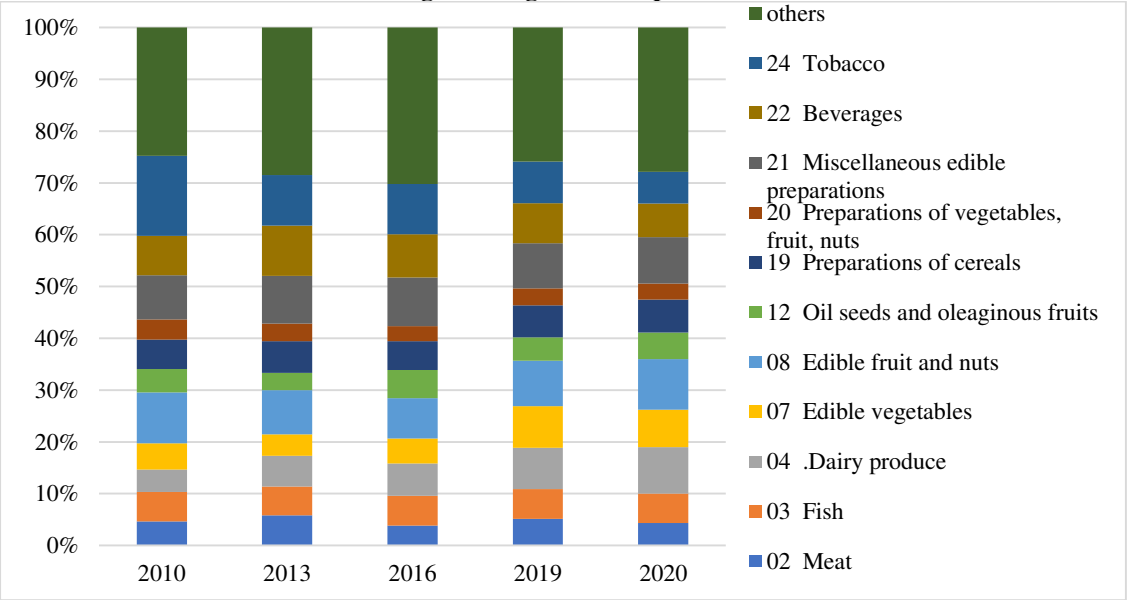
Figure 4. Agri-food exports structure



Source: Source: based on data from National Bureau of Statistics

Agri-food imports are more diversified (Figure 5). Main imported commodities are: tobacco (HS24), beverages (HS22), miscellaneous edible preparations (HS21), preparations of vegetables, fruit and nuts (HS20), preparations of cereals (HS19), oil seeds and oleaginous fruits (HS12), edible fruit and nuts (HS08), edible vegetable (HS07), meat (HS02) dairy produce (HS04), fish (HS03). Due to Moldova's geographical position and weather some particular agri-food products and only imported as exotic fruits, fish and seafood, coffee and tea.

Figure 5. Agri-food imports structure



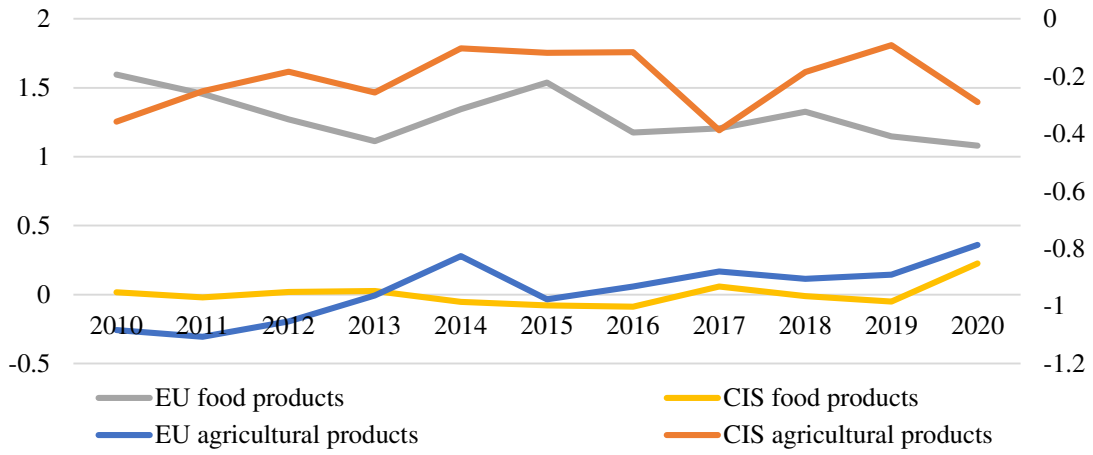
Source: Source: based on data from National Bureau of Statistics

We used exports and imports statistical data to analyze agri-food trade of Moldova during 2010-2019. The data include the 24 product groups that refer to agricultural commodities and foodstuffs. The analysis include section 01-15 for agricultural commodities and 16-24 for foodstuffs.

Moldova's relative trade advantages were calculated to show the competitiveness at regional level with European countries and C.I.S. countries.

According to the obtained results (Figure 6), Moldova has disadvantages in trade with agricultural commodities with both C.I.S. and E.U. countries.

Figure 6. Inter-industry trade of Moldova with main trade partners, 2010-2020



Source: own calculations

A more detailed analysis reveals that trade disadvantages are common for specific imported commodities as fish, coffee and tea. In relation to the European market, disadvantages are common for preparations of fruits and vegetables, preparations of cereals. In terms of competitiveness in the regional C.I.S. market, Moldova has also disadvantages for commodities as dairy products, edible fruits and nuts, beverages (Table 1).

The competitiveness of Moldova's foodstuffs on foreign markets is improving (Figure 6). Currently most foodstuffs have trade advantages of different agri-food markets.

Table 1. Relative agri-food trade advantages of Moldova by products

RTA >0		**RTA<0**		**RTA switching values**	
E.U.	**C.I.S.**	**E.U.**	**C.I.S.**	**E.U.**	**C.I.S.**
Edible vegetables 07	Animal or vegetable fats and oils 15	Fish 03	Meat 02	Edible fruit and nuts 08	Edible vegetables 07
Animal or vegetable fats and oils 15	Preparations of meat 16	Coffee, tea 09	Fish 03	Cereals 10	Cereals 10
Preparations of meat 16	Sugars 17	Cocoa 18	Dairy products04	Products of the milling industry 11	Products of the milling industry 11
Miscellaneous edible preparations 21	Preparations of cereals 19	Preparations of cereals 19	Products of animal origin 05	Oil seeds and oleaginous fruits 12	Oil seeds and oleaginous fruits 12
Beverages 22	Miscellaneous edible preparations 21	Preparations of vegetables, fruit, nuts 20	Edible fruit and nuts 08	Lac; gums, resins 13	
Tobacco 24	Tobacco 24		Preparations of vegetables, fruit, nuts 20	Sugars 17	
			Beverages 22		

Source: own calculations

Moldova has trade advantages on the European market for aggregations HS 07 edible vegetables, HS 16 preparations of meat, HS22 beverages, HS24 tobacco. In relation to C.I.S. countries, trade advantages are present in the case of six aggregations: HS15 animal or vegetables fats and oils, HS 17 sugars, HS 16 preparations of meat, HS19 preparations of cereals, HS 24 tobacco etc. (Table 1).

Certain agri-food commodities register fluctuating values of RTA index. This refers to aggregations as HS 10 cereals, HS 12 oil seeds and oleaginous plants etc. Such aggregations include intense changes in relative trade advantages. In certain periods they register positive values of RTA index, while in some periods they tend to have negative values. These commodities have potential to improve their competitiveness in these markets.

In international economics, an important concept is intra-industry trade which refers to simultaneous exchange of commodities within the same industry. There are different indices that allows us to estimate the level of intra-industry trade. One of most used indices to appreciate the level of intra-industry trade is considered to be Grubel-Lloyd Index (GL). Table 2 presents the results of calculated GL indices for agri-food commodities.

Table 2. Intra-industry trade with agri-food commodities between Moldova and all trading partners

GL	**2010**	**2012**	**2014**	**2016**	**2018**	**2020**	**average**
01 Live animals	75.91	92.95	54.40	79.28	58.67	77.15	78.34
02 Meat	54.13	68.07	78.83	53.53	42.51	28.41	54.54
03 Fish	0.82	0.31	0.04	0.31	0.00	0.13	0.24
04 .Dairy produce	34.25	32.45	59.92	72.57	59.99	37.32	51.41

GL	2010	2012	2014	2016	2018	2020	average
05 Products of animal origin	11.67	23.01	5.35	1.74	16.13	16.78	13.10
06 Live trees	38.31	31.05	18.14	32.76	18.11	20.60	25.80
07 Edible vegetables	45.03	66.85	66.78	43.76	23.31	9.77	46.44
08 Edible fruit and nuts	51.43	50.72	50.50	46.64	51.20	53.41	50.19
09 Coffee, tea	9.84	0.24	7.79	20.16	26.16	11.03	13.35
10 Cereals	24.07	51.22	15.88	17.20	17.77	45.28	24.70
11 Products of the milling industry	4.68	10.13	15.61	6.94	17.03	10.62	11.35
12 Oil seeds and oleaginous fruits	45.49	37.33	30.47	28.09	34.20	32.62	30.51
13 Lac; gums, resins	3.24	5.77	0.26	21.14	9.57	4.27	6.94
14 Vegetable plaiting materials	48.40	30.08	3.74	51.58	79.48	34.40	43.78
15 Animal or vegetable fats and oils	57.69	48.06	49.62	62.03	47.31	34.35	52.89
16 Preparations of meat	10.35	1.92	4.32	0.22	0.25	0.09	1.71
17 Sugars	60.27	93.54	47.77	74.84	97.34	66.35	74.23
18 Cocoa	21.00	24.22	41.92	46.92	52.21	42.36	38.65
19 Preparations of cereals	35.36	47.59	55.50	66.53	54.26	49.69	51.64
20 Preparations of vegetables, fruit, nuts	60.60	57.61	53.51	59.53	66.57	52.37	55.14
21 Miscellaneous edible preparations	16.31	19.95	19.58	25.04	26.37	15.54	21.08
22 Beverages	40.29	48.21	45.96	44.95	44.01	39.54	43.70
23 Residues	91.09	99.72	83.36	73.19	77.28	90.51	81.83
24 Tobacco	45.79	58.36	43.42	37.45	52.86	28.36	44.80

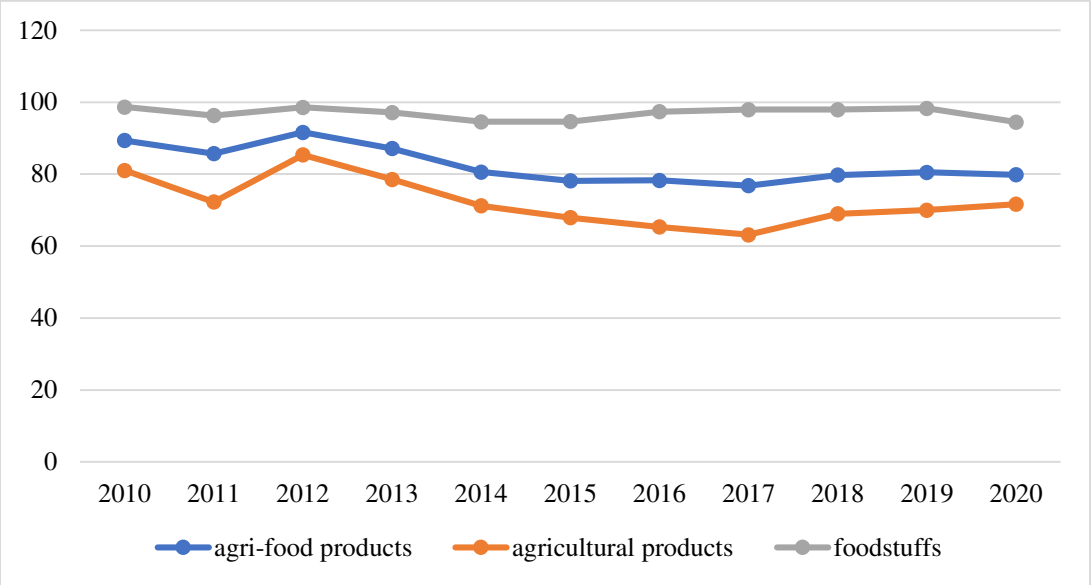
Source: own calculations

From the observed results in the evolution of GL indices, for certain commodity groups, high variability over time is noticed. High magnitude of intra-industry trade, according to the average GL indices results is present in the following commodities: live animals (HS 01), sugar (HS17), meat (HS02), dairy produce (HS04), animal or vegetable fats and oils (HS15), residues (HS23), preparations of vegetables, fruit, nuts (HS20), preparations of cereals (HS19), beverages (HS22). For some commodities, low levels of intra-industry trade is observed: fish (HS03), products of animal origin (HS05), coffee, tea (HS09), cereals (HS10), products of milling industry (HS11), preparations of meat (HS16).

Intra-industry trade indices were computed separately for agricultural products (HS01-15), foodstuffs commodities (HS 16-24) and all agri-food products (HS01-24) (Figure 6).

From the results, foodstuffs commodities have higher intra-industry trade indices (97 percent on average), comparing to agricultural products that have 72 percent on average in 2010-2020. This is due to the fact that intra-industry-trade is more common in sectors with product differentiation, and is less significant in sectors that produce mainly standardized products (agricultural products), where trade is mostly inter-industry (Kandogan 2003)

Figure 6. Intra-industry trade for agricultural and food products with all trading partners, 2010-2019



Source: own calculations

We could mention that for both foodstuffs and agricultural products the indices of intra-industry trade fluctuated in the same direction. The intra-industry trade indices for all agri-food products registered a high level during 2010-2020 (91.7 on average).

CONCLUSIONS

Moldova's trade flows dynamics on global markets experienced certain changes within the examined time series. The trade flows towards the European market for agri-food products had grown considerably after 2014. A major contribution to this change was due to the fact that Moldova signed a Deep and Comprehensive Free Trade Agreement (DCFTA) with E.U. at the end of 2013. In general, Moldova's trade flows to E.U. market started to increased slowly since 2005. Moldova's agri-food exports are dominated by four products that represent 80 percent of total exported agri-food products.

Trade disadvantages are common for specific imported commodities as fish, coffee and tea. In relation to the European market, disadvantages are common for preparations of fruits and vegetables, preparations of cereals. In terms of competitiveness in the regional C.I.S. market, Moldova has also disadvantages for commodities as dairy products, edible fruits and nuts, beverages.

High magnitudes of intra-industry trade, according to the average GL indices results is present in the following commodities: live animals (HS 01), sugar (HS17), meat (HS02), dairy produce (HS04), animal or vegetable fats and oils (HS15), residues (HS23), preparations of vegetables, fruit, nuts (HS20), preparations of cereals (HS19), beverages (HS22). For some commodities, low levels of intra-industry trade is observed: fish (HS03), products of animal origin (HS05), coffee, tea (HS09), cereals (HS10), products of milling industry (HS11), preparations of meat (HS16).

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STUDY ON THE EVOLUTION OF THE RAPESEED MARKET IN ROMANIA

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Abstract

Agriculture occupies an important place in the Romanian economy, helping to provide food to the population from *internal sources and facilitating links with secondary sectors. In recent years, the grain sector has seen a trend of growth in areas cultivated with rapeseed among the farm, this being attributed to the good yield of production and investment, as well as the high-profit margin of this crop. Romania covers more than 5% of Europe's total rapeseed crop, demonstrating that it has high agricultural potential, joining the world's major producers, such as Germany, France, or the United Kingdom. In the context of increasing the competitiveness of domestic producers, it is necessary to study the evolution of the rapeseed market and to create an overview of the current situation in Romania, concrete through an analysis based on the performance indicators of the sector. Therefore, the aim of the paper is to analyze agricultural development trends in the Regions of Romania, to observe the current market situation, and to determine its weaknesses. The research method is based on the quantitative analysis of the data provided by the National Statistical Institute and aims to determine the mechanism of the rapeseed market, to identify ways of its development at the regional level, but also to discover new directions for improving the sector.*

Keywords: rapeseed, market, agriculture, trade balance

JEL Classification: C8, Q1, Q11, Q12

INTRODUCTION

In recent years, due to the development of the biodiesel industry, as well as the increase in the share of non-food use of vegetable oils, interest in all oilseeds in the world is growing sharply. Today, one of the main places in the world ranking of oilseed crops is been occupied by rapeseed.

Rapeseed is been scientifically called Brassica napus and is a plant with flowers of bright yellow colour; it is part of the cabbage family that is botanically named as Brassicacea. (Aglaia et la, 2004)

In particular, rapeseed culture has a high level of proteins that are beneficial and necessary both in human diets and for animal feed. In addition, we can say that from the harvested seed crop is produced about 40% oil. (Rusu, 2005). The rapeseed crop has a positive impact on diminishing the erosion effect of the soil especially during winters, so the amount of biomass produced allows the reduction of weeds on the land where they been planted, helping farmers to reduce the cost of weeding. Another benefit of this crop is been represented by the development of soil inclination by helping the root system. (Varban, 2008)

The largest growers of rapeseed globally are Canada and China, which cultivate over 45% of the world's area of this crop. The top 10 countries in the world's largest rapeseed growers also include India, France, Ukraine, Germany, Poland, Australia, Russia and the United Kingdom.

Rapeseed is a very important raw material in the export strategies of traders and farmers. In the top of rapeseed producers in Europe, Romania occupies the eighth position alongside countries such as Germany, France and Poland.

MATERIAL AND METHOD

The main objective of this paper is to x-ray the Romanian rapeseed market and analyses in detail the indicators such as the cultivated area, the total production, the average yield per hectare, the price and the external trade. This study uses quantitative research methods of analysing statistical

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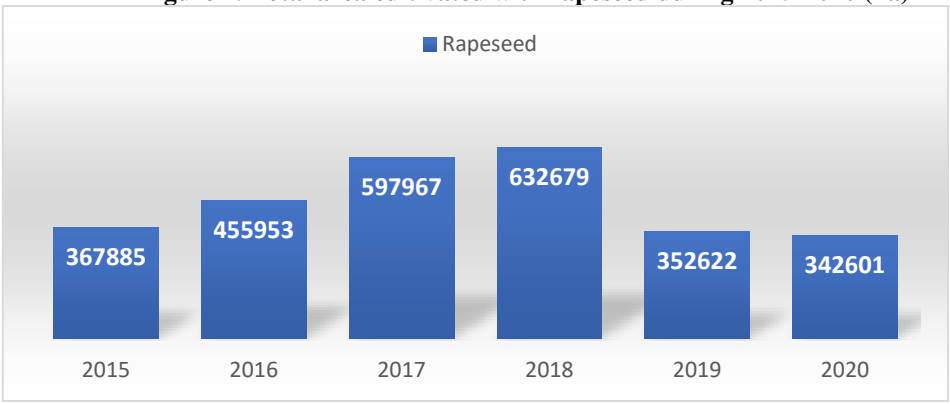
and economic data for the period 2015-2020 collected from the database of the National Institute of Statistics to provide an overview of the current market situation.

RESULTS AND DISCUSSIONS

According to the data collected from the database of the National Institute of Statistics in the period 2015-2020, the area cultivated with rapeseed in Romania is undergoing significant changes. More precisely, in 2020 we have a crop that stretches over 342.2 thousand hectares, less by 45% compared to 2018 when an area of 632.6 thousand hectares was registered.

Figure 1. Total area cultivated with rapeseed during 2015-2020 (ha)



Source: Own processing based on data available on http://statistici.insse.ro

Rapeseed is a crop with multiple utilities and proved that it occupies an important place in Romanian agriculture. The trade with this culture is a successful one because it contributes to a healthy human diet, it is an alternative to soy in animal feed, it is a climate smart choice and it is been used as raw material biodiesel industry.

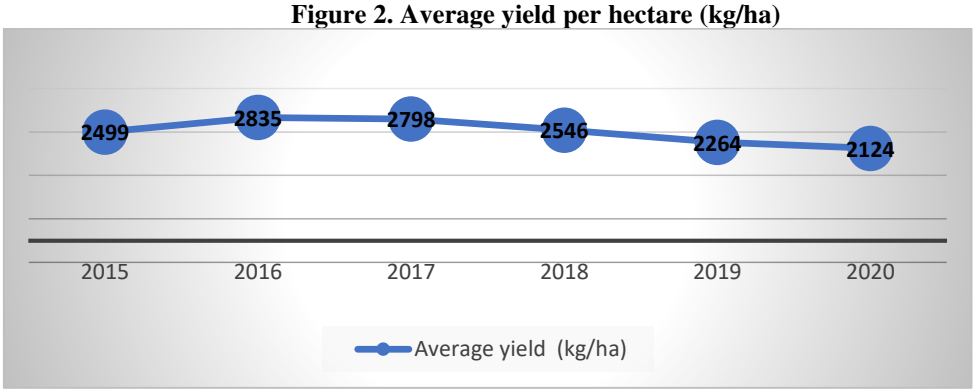
In terms of production at national level, 2017 is the year with the highest rapeseed production, the quantity in this period exceeding by just 1,673,000 tons, subsequently drastically decreasing to the value of 727,731 tons (about 56%) in 2020.

Table 1. Annual production of rapeseed (tonnes)

Year	2015	2016	2017	2018	2019	2020
Production (tonnes)	919473	1292779	1673327	1610907	798215	727731
Average production(kg/ha)	2499	2835	2798	2546	2264	2124

Source: Own processing based on data available on http://statistici.insse.ro

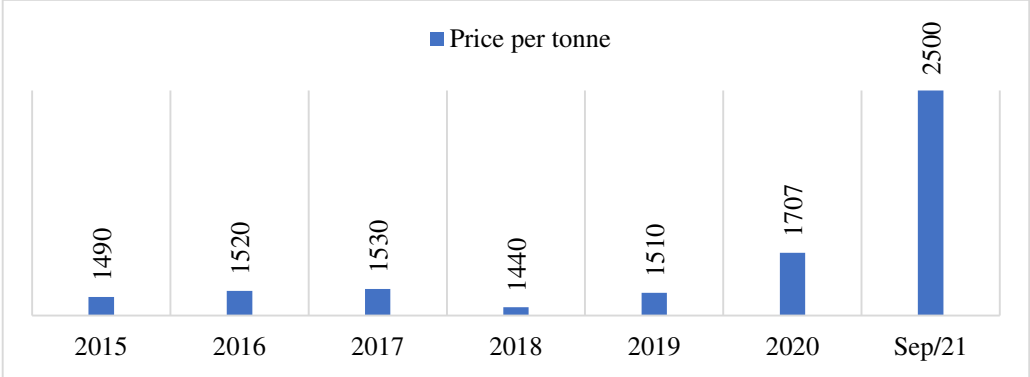
Figure 2. Average yield per hectare (kg/ha)



Source: Own processing based on data available on http://statistici.insse.ro

The evolution of the average production per hectare of rapeseed in Romania during the analysed period shows slight fluctuations from one year to another, but has a predominantly decreasing trend. Thus, it increases by 11% in 2016 compared to 2015, and then steadily decreasing to the value of 2124 kg per hectare in 2020.

Figure 3. Evolution of basic prices (Lei / ton)



Source: Own processing based on data available on http://statistici.insse.ro

Analysing Figure no.3 we can see that the price per ton in the case of rapeseed culture is fluctuating and has large differences from another. The minimum value was record in 2018 when a ton of rapeseed cost 1440 lei, and the maximum value of 2500 lei/ton was been reached in September 2021. This significant increase is due to several factors such as the COVID-19 pandemic, the rise in oil prices, the weather effects in the US on the soybean crop, as well as the severe drought in Canada.

Table 2. Foreign trade

(Thousands euros)	Product	2015	2016	2017	2018	2019	2020
Export	Rapeseed	311,501	557,396	592,275	476,716	184,245	229,643
Export	Rapeseed oils	26,029	29,962	23,750	19,015	16,571	16,520
Import	Rapeseed	27,548	32,787	53,430	50,280	63,385	57,765
Import	Rapeseed oils	9,700	8,403	9,533	6,744	5,069	4,965
Balance	Rapeseed	283,953	524,609	538,845	426,436	120,860	171,878
Balance	Rapeseed oils	16,329	21,559	14,217	12,271	11,502	11,555

Source: Own processing based on data available on http://statistici.insse.ro

According to the analysed data, we can see that the value of the import of rapeseed in the form of oil decreased from 9700 thousand euros in 2015 to 4965 thousand euros in 2020, and the import in the form of seeds recorded a huge increase, reaching from 27548 thousand euros in 2015 to 57765 thousand euros in 2020.

Analysing the table above, we deduce that the export value for rapeseed are constantly decreasing from 2017 to 2020, reaching from 26029 thousand euros to 16520 thousand euros in the case of oil, and in the case of seeds decreasing from 311501 thousand euros to 229643 thousand euros.

Upon a closer analysis, we can see that despite the decrease in exports, the value of Romania's trade balance is favourable throughout the analysed period, even if it also decreases from year to year.

CONCLUSIONS

The oilseeds market has become in recent years in Romania one of the most interesting sectors of agriculture, it represents a profitable field for farmers.

From the analysed data it appears that the area cultivated with rapeseed during 2015 -2020 has a fluctuating evolution, this increasing at the beginning of the period from 367885 hectares in 2015 to 632679 hectares in 2018, then decreasing to the minimum value 342601 hectares in 2020.

Both the total production and the average yield per hectare of rapeseed show oscillating values over the analysed period. Thus, the total production reaches the maximum value in 2017 with a national harvest of 919473 tons of rapeseed, and the minimum being record in 2020 with a value of 727731 tons. The average yield per hectare increases by 336 tons in 2016 compared to 2015, and then it decreases steadily to the minimum threshold of 2124 tons per hectare reached in 2020.

Due to the unfaithful climatic phenomena in the USA and Canada, the rapeseed crops were compromise, and the oilseeds market experienced an inevitable expansion that led to increased demand and automatically the price for these plants.

The basic price for one ton of rapeseed in the reference period is variable, it has slight increases from 2015 (1490 lei / ton) to 2017 (1530 lei / ton), then decreases in 2018 (1440 lei / ton), and will increase significantly by September of the current year (2500 lei / ton).

In some years, a large part of Romania's foreign trade has been capitalize by selling rapeseed in the form of seeds. In 2019, the import reached the maximum value of 63385 thousand euros; three times lower than the maximum value (184245 thousand euros) of export in the same year.

The trade balance for the rapeseed trade is a favourable one, but with values decreasing from one year to the next.

The Romanian market for rapeseed and oil products has undergone drastic changes in recent years and it is been expected that in the next period it will flourish due to the growing demand. The event that influences the market the most is the covid-19 pandemic, as well as the adverse weather phenomena in the major producing countries.

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ECONOMIC MODEL OF REGENERATIVE AGRICULTURE AND FACTORS OF AGRI-FOOD SYSTEM CHANGE

DANIELA TRIFAN[1], GEORGE TOADER[2,1], CĂTĂLIN-IOAN ENEA[3], ALIN-IONEL GHIORGHE[1], EMANUELA LUNGU[1], ELENA-VIOLETA TOADER[4], LEONARD ILIE[2]

Abstract

The basis of regenerative agriculture is represented by its main element, namely the soil. Ensuring good soil health will lead to many beneficial effects on agricultural ecosystems. Among the main beneficial effects of soil health we can list the management of groundwater resources and irrigation systems at large agro-zootechnical farms, recycling of nutrients from and to the soil surface with the help of green, environmentally friendly fertilizers and agroecosystems, maximizing crop yields, sustainability of crops, soil and productivity per hectare, sustainability of agri-food and livestock farms.

The fact that through regenerative agriculture, organic carbon in the soil structure can be exploited in order to maximize agricultural productivity and restore soil structure, regenerative agriculture focuses mainly on restoring soils that have suffered great degradation due to their acidification by using large amounts of pesticides and chemical fertilizer products.

This article aims to present the economic principles and methods of regenerative agriculture so that these processes combined into a unitary whole lead to the restoration of soil organic matter naturally, the principles of regenerative agriculture practitioners being that nature can regulate automatically the imbalances identified in nature. The less minimal the interventions on the soil, the less the residues from agriculture (reductions resulting from the activity of fertilization and plant protection) will be minimal, the products used will present a minimum invasiveness, which will lead to the acceleration of the recovery processes. soil, to balance the electrolyte balance of the soil and, implicitly, to develop the root system of plants so as to ensure a sufficient amount of mineral elements in the soil, in order to maximize agricultural production.

Keywords: organic farming, regenerative agriculture, farm profitability, food system, policy makers

JEL classification: Q01, Q34, Q57

INTRODUCTION

In the current context, at global, regional and implicitly state level, there are certain socio-cultural, economic, political, technological factors that have the role of determining, modeling and transforming agricultural land use, crop models and agricultural processes.Agriculture is one of the most pressing challenges facing the world today: climate change, food security and nutrition, water quality, biodiversity and livelihoods. Agricultural systems emit about 10% of greenhouse gas emissions into the environment, which will affect the yield and value of proteins in basic crops. The Sars-Cov-2 pandemic created great pressure on the development of agricultural production systems, on production systems causing profound disruptions and revealing the fragility of the food system. Key food producers, essential in the food system, have been recalibrated and rearranged on the basic societal values of health and nutrition (Boedeker, *et.all.,* 2020). Beyond this immediate crisis, there is a need to reformulate the way we produce and consume food and ensure that it can restore resilience and productivity while protecting our natural assets. A transition to regenerative practices could bring huge gains for farmers, food companies and the environment and a basis for a truly fit farming system for the future (Ceballos*et.all.,* 2020).

MATERIAL AND METHOD

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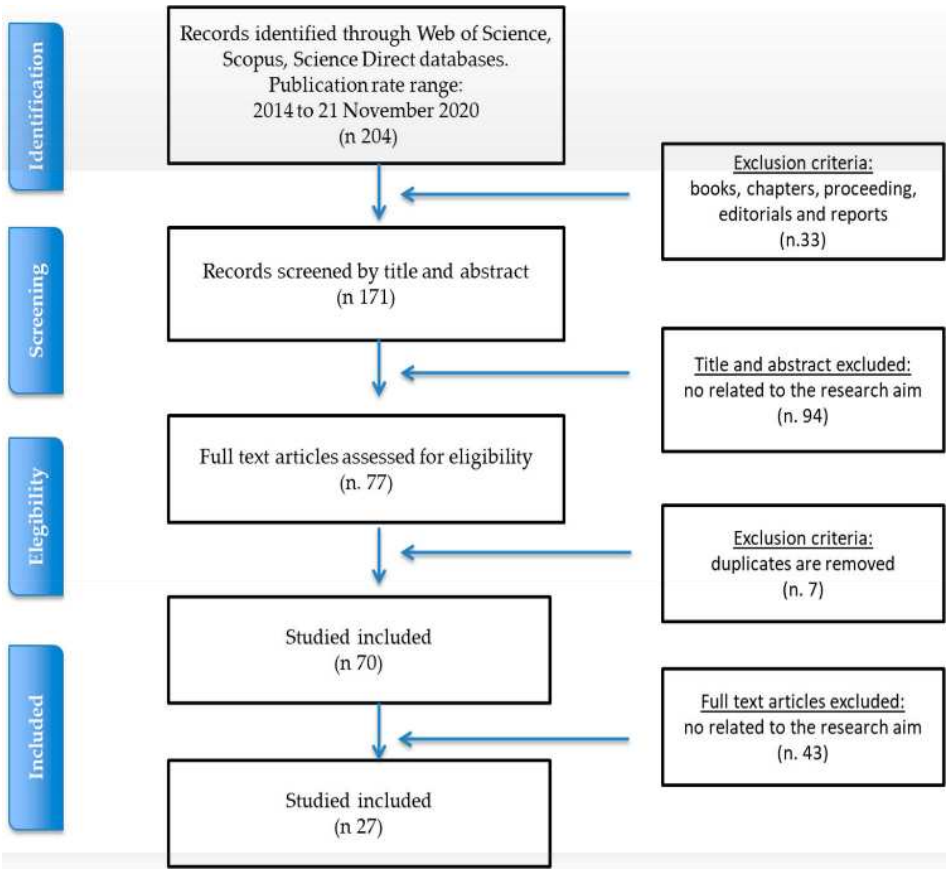
Our agricultural system is very successful in achieving its current objectives, maximizing profit and driving efficiency on short-term productive crops. However, this is detrimental to soil health, food quality, high carbon emissions and declining farmers' livelihoods.The Romanian agricultural system is a strong force in addressing the most pressing challenges worldwide, restoring ecosystem services, including soil health, water quality, biodiversity, diversification of production systems for all these aspects focusing on the quality of crops, agricultural products and from agri-food chains. Building a better agricultural system is an essential fact, even if monumental (Gava*et.all,* 2019)..The system can be feasible based on the collective effort of farmers, producers and distributors and stakeholders from all corners of our agricultural system, all these aspects being based on cooperation, in order to achieve and achieve important points such as: combating climate change, stopping health crises , especially on the support of farmers (Fava*et.all.,* 2021). The figure below (Figure 1) shows the diagram of the selection criteria that led to the first changes in the agri-food system at European level, each state being responsible for aligning with it. In order to develop these classification criteria, a series of research was conducted in 2012-2020 on agri-food systems (Kirchherr*et.all.,* 2017). In order to implement the principles developed by the European Commission on the support and evolution of agri-food systems, some specialists have proposed methods of recovery and management of residues from the agri-food production industry (biomass) and its conversion into active-functional ingredients which, by hot air drying or by freeze-drying, were converted to soil fertilizers. These powders from vegetable waste can also be used in the food industry as coloring and flavoring ingredients or natural preservatives or can be used to reformulate processed foods to improve their nutritional properties (Francis, *et.all.,* 1986)

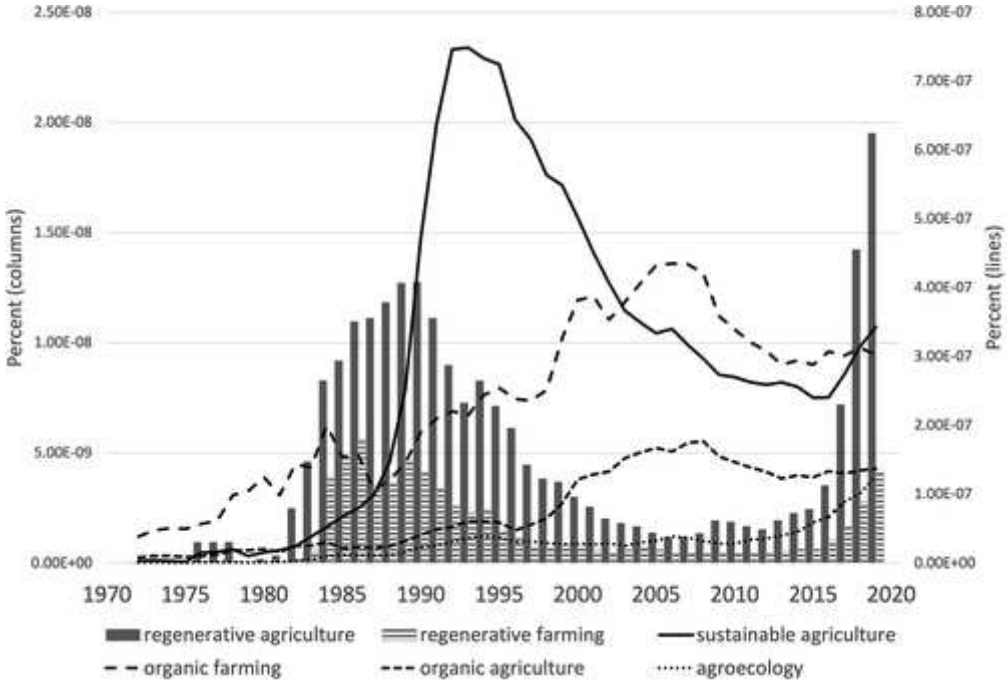
Figure 1. Diagram and flow of the literature search procedure



RESULTS AND DISCUSSIONS

A series of challenges have been identified that are interconnected to agri-food systems, more precisely environmental degradation, economic crises, social problems, extreme weather phenomena, all of which are determined, forecasted and identified possible solutions in specialized agri-food studies. After a (partial) restoration of agri-food systems and the development of the concept of regenerative agriculture, the term was quickly removed from specialized terminology (Francis *et all*., 1986) Regenerative agriculture has been set aside in favor of green, ecological agriculture, a more profitable, sustainable and environmentally friendly agriculture. However, farmers' interest in the regenerative agriculture system has grown significantly since 2015. It is important to note that between 1972 and 2018, regenerative agriculture appears in books much less frequently than other terms such as sustainable agriculture, organic farming, organic farming. and agroecology (Figure 2).

Figure 2. Terminology search results Regenerative agriculture



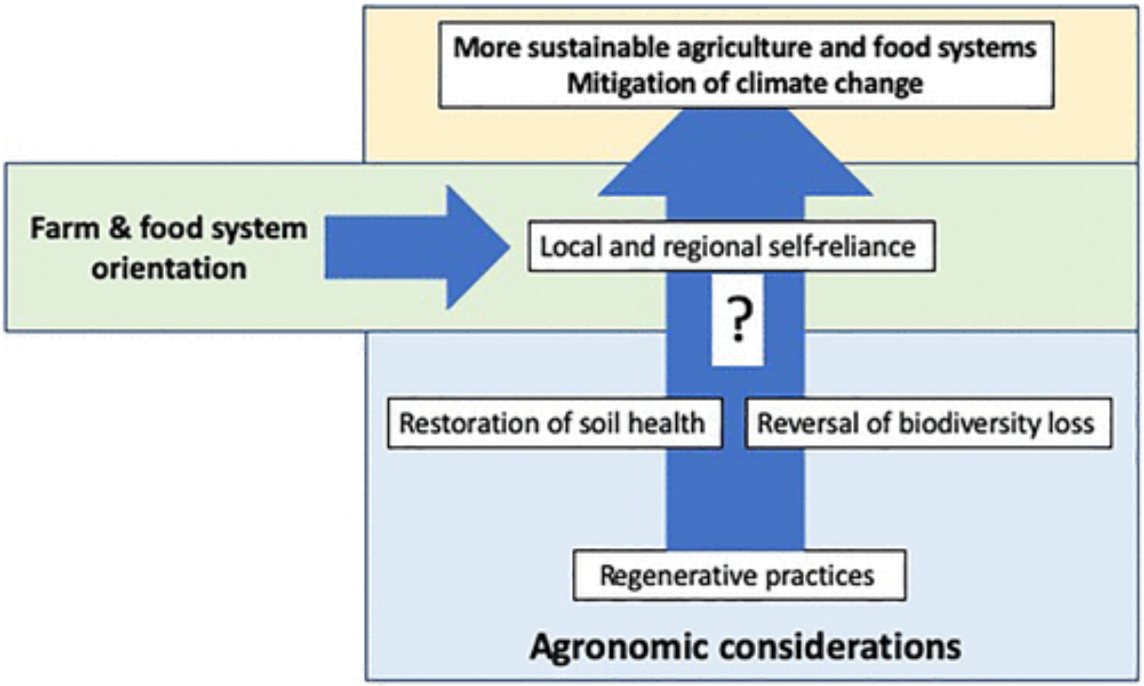
Thus, while the terms Regenerative Agriculture and Regenerative Agriculture have been used since the early 1980s, they have not been used as widely as other related terms to date, such as sustainable agriculture or organic farming. Since 2016 their appearance in books, news and on the internet has increased dramatically, reflecting the fact that they have now been adopted by a wide range of NGOs (e.g. The Nature Conservancy, World Wildlife Fund, GreenPeace, Friends of the Earth), multinational companies (e.g. Danone, General Mills, Kellogg's, Patagonia, World Council for Sustainable Business Development) and charitable foundations (e.g. IKEA Foundation). In connection with this new popularity, Diana Martin, communications director of the Rodale Institute, warned: "It is [Regenerative Agriculture] the new fashion word(Rodale Institute, 2014).

The most common themes associated with Regenerative Agriculture are improvements in soil health, the wider environment, human health and economic prosperity (Schreefel*et all*., 2020). The authors continue to define regenerative agriculture as "an approach to agriculture that uses soil conservation as an entry point to regenerate and contribute to the multiple supply, regulation and support of ecosystem services, with the aim that it will increase not only the environment but also its size. social and economic aspects of sustainable food production ".

Figure 4 shows what we understand to be the most common current articulation of the theory of change in Regenerative Agriculture. In the sense of this agronomically oriented work, the critical question is: How far and in what contexts do the proposed regenerative practices restore soil health

and / or reverse biodiversity loss? Given the diversity of understandings about regenerative agriculture and the different contexts in which it is promoted, it should come as no surprise that a section on regenerative agriculture promotes a wide variety of agronomic practices. We return to these practices later, but first we take a closer look at the two crises that Regenerative Agriculture aims to address.

Figure 4. Regenerative Agriculture: Agronomic consideration



The crisis of regenerative agriculture has led to a crisis in soil health. Soil health receives particularly strong attention in the narratives surrounding regenerative agriculture (Schreefel *et all.,* 2020) Indeed, the idea that soil and especially soil life are threatened underpins most, if not all, requires agriculture. regenerative. However, the term soil health is inherently problematic (Powlson, 2020). Like soil quality, soil health is a container concept, which requires disaggregation to be meaningful. Although it can be understood as something to look for, the basic functions of the soil need significant indicators that can be measured and monitored over long periods of time. Moreover, agronomic practices that benefit from an aspect of soil health (such as soil life) often have negative effects on other functions (such as nitrate leaching, primary production, or GHG emissions, (Berges *et all.,* 2019), there is usually not a single direction in soil health, but several trade-offs.

Those who promote regenerative agriculture frame the biodiversity crisis around the widespread use of monocultures, along with a strong dependence on external inputs and a lack of "biological cycle" (Francis *et all.,* 1986). Undoubtedly, large areas of genetically uniform crops can be susceptible to the rapid spread of pests and diseases and add little value to the quality of rural landscapes.Many practices associated with regenerative agriculture, such as crop rotations, cover crops, animal integration, are (or in some contexts have been) generally considered to be "good agricultural practices" and remain an integral part of conventional agriculture. Some are more problematic: conservation agriculture, for example, can be practiced in an organic environment or as a GMO, intensive in herbicides and fertilizers (Giller *et all.,* 2015). Others, such as permaculture, have a rather limited applicability for the production of many agricultural products. Others, such as holistic grazing, are highly controversial in terms of claims made for their wide applicability and environmental benefits in terms of soil C accumulation and reduction of greenhouse gas emissions (Briske *et all.,* 2014; Garnett *et all.,* 2017).Practicile de agricultură regenerativă, criza solului și schimbările climatice. Majoritatea practicilor de agricultură regenerativă se concentrează pe managementul solului, cu un accent deosebit pe creșterea solului C, sub premisa că va crește randamentul culturilor și va atenua schimbările climatice. SOM este un indicator important al

fertilității solului (Reeves, 1997), deoarece îndeplinește multe funcții în sol, de exemplu în furnizarea de substanțe nutritive, structura solului, capacitatea de reținere a apei și susținerea vieții solului (Johnston et al., 2009).

Regenerative agriculture practices and the biodiversity crisis. Although reversing biodiversity loss is a central principle of regenerative agriculture, it receives surprisingly little attention in discussions of best practices. The "encourage plant diversity" principle is, of course, central and is one of the means to address the "pesticide avoidance" principle. However, little attention is paid to approaches such as integrated pest and disease management (IPM). The principles of IPM - to minimize the use of chemicals and maximize efficiency when used - are well established. Genetic resistance is essential, and regular crop research is used to trigger receptive spraying when a certain pest and disease threshold is observed, rather than preventive spraying at certain times in the harvest schedule. Recommended practices, such as rotations and cover crops (multi-species) fall within the IPM, as do approaches such as inter-crop and strip-cutting, which are largely ignored in discussions on regenerative agriculture. IPM is knowledge intensive, requires regular crop monitoring and the ability to identify early signs of outbreaks of multiple pests and diseases.

CONCLUSIONS

From the testimonies of many farmers on the Internet, it is clear that their movements towards regenerative agriculture are supported by a philosophy that aims to protect and improve the environment. The main argument is most often around soil health and, in particular, soil biological health, which is seen as threatened and attributed to somewhat mythical properties. Much of the promotional material available in the public domain makes exaggerated claims about the potency and functioning of soil microorganisms, in particular. Instead, for many NGOs that militate, blocking or sequestering carbon in the soil is paramount, with a vision of agriculture without external inputs or GMOs that mimics nature and contributes to solving the climate crisis. Not surprisingly, the claimed potential of regenerative agriculture has attracted considerable criticism aptly captures in his blog "Regenerative Agriculture: Solid Principles, Extraordinary Claims". It seems unlikely that regenerative agriculture can bring all the positive benefits to the environment, as well as the necessary increase in world food production. The reflective engagement of research agronomists is now extremely important.

The way in which a food start-up has improved innovations in the business model has been investigated, given the importance of social and environmental issues. The researchers said that expanding the innovation of the sustainable business model in the agri-food sector is essential, because the business is linked to the social and environmental dimension. A theoretical framework for innovating sustainable business models in the agri-food industry has been suggested to address the challenges from a sustainable perspective. A combined theoretical vision has been developed to understand the innovations of the business model that lead to improvements in the economic, environmental and social performance of an organization. According to the authors, planning a sustainable business model requires the organization of sustainable value flows between different actors. The authors concluded that taking into account the interests and responsibilities of stakeholders in creating mutual value is imperative to achieve a sustainable business model. Sustainable business models in different sectors were discussed, taking into account the process of building a sustainable business model as an innovative part of a business strategy, in order to provide beneficial solutions to all stakeholders and to meet the requirements of the environment and society.

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THE PROMOTION OF AN AGRICULTURAL SYSTEM WITH SUSTAINABLE TECHNOLOGY ELEMENTS, THE USE OF VEGETABLE RESIDUES AND GREEN FERTILIZERS FOR MAIZE CULTIVATION IN THE TRANSYLVANIA HILLS

FELICIA CHEŢAN[1]

Abstract

The paper presents the results of research conducted under the conditions of Turda Agricultural Research and Development Station (ARDS Turda) located in the hill area of Transylvania, regarding the influence of the soil tillage system (CS - plow, MC - minimum chisel, MD - minimum disk and NT - direct sowing), the vegetable residues and the fertilization system on maize yield, in the period 2019, 2020. The systems MD (6430 kg/ha) and NT (5421 kg/ha) negatively influence the yield of maize, the differences from the control (SC 8779 kg/ha) being between 2260 kg/ha - 3239 kg/ha. The yield average achieved in MC(8653 kg/ha) with a difference of 126 kg/ha, does not present statistical assurance. The technological variant with 2.5 t/ha vegetable residues + 350 kg/ha NPK proved to be more efficient in obtained the yield, compared to the variants without mineral fertilizers (vegetable residues + mustard green fertilizer; vegetable residues + gulle).

Keywords: vegetable residues, tillage systems, fertilization, yield, maize

JEL classification: Q01, Q15, Q16

INTRODUCTION

To reduce soil and environmental degradation, due to conventional agriculture and improperly applied technologies that have contributed to lower fertility of agricultural land, numerous studies and research have been conducted to implement new, conservative agricultural technologies, whose main component is the way of cultivating the land for sowing (Yule,1984; Ungher &Cassel,1991; Horn et al., 2000; Ibanez et al., 2008; Ulrich et al., 2006; Guş & Rusu, 2011; Wozniak et al., 2014).

The system with minimal works involves the basic work without turning the furrow using several variants: disc harrow, chisel, rotary harrow and preservation of plant debris (in proportion of over 30%) on to the soil surface or superficially incorporated by the works performed, fulfilling the role of mulch. The disc penetrates into the soil up to 15 cm, cuts and grinds it, partially turning it, but its excessive use leads to the deterioration of the soil structure for the most part. The chisel swells the soil, loosening it, and the work is of better quality if performed when the soil is relatively dry. The data published by Behrens (1979) show that in 1973 of the total area cultivated with corn in the USA, the minimum tillage technology was practiced on approximately 12% and no tillage on 23%. Argentina, Brazil, Paraguay and Uruguay use the system for more than 70% of the total cultivated area.

Of the total global area occupied by conservation systems, about 42% is in South America, 34% in the US and Canada, about 11% in Australia and New Zealand, approximate 7% is in Asia and the remaining 5% is in the rest of the world, comprising 3% Europe and Africa 1%. Since the 2000s, the areas occupied by conservative agriculture have expanded in Europe as a result of promotion by the European Federation for Conservative Agriculture (ECAF), according to data presented by the Food and Agriculture Organization of the United Nations (https://journals.openedition.org/factsreports/3966). The same source mentions that in 2013, of the total area of cultivated land on all continents, conservative agriculture occupied about 11%.

According to National Research and Development Institute for Soil Science, Agrochemistry and Environment - ICPA Bucharest, approximately 49.6% of the arable area (4,984 million ha) is

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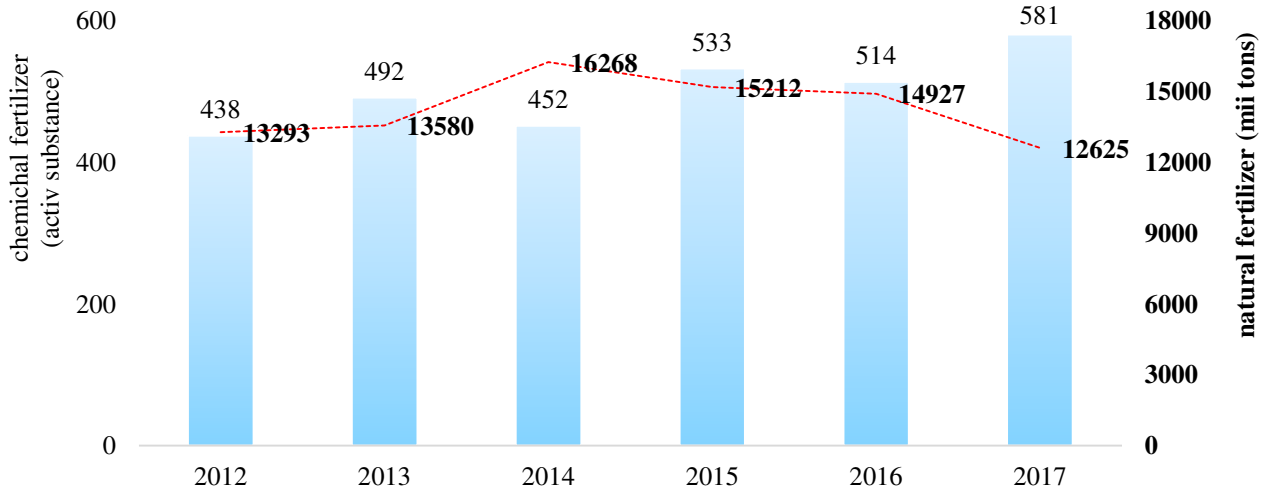
suitable for conservative systems, 15% being represented by flat lands with low slopes and approximately 35% are lands with higher slopeson which there need to be combined conservative variants with anti-erosion works performed on contour lines. The largest land areas suitable for unconventional technology are in the Moldova and Dobrogea. (www.icpa.ro/documente/coduri/Aplicarea_lucrarilor_conservative_ale_solului.pdf).

The new soil tillage systems depend on the local pedo-climatic conditions, therefore when choosing the tillage variant, the technological properties of the soil have to be taken into acount: humidity, soil exposure, macro and microclimate, humus content, etc. (Malschi, 2007; Cheţan et al., 2018; Cheţan & Cheţan, 2020). Optimal climatic conditions, humidity in particular, loamy, loamy-clay soils with a high humus content contribute to the success of maize cultivation obtained in a minimal system (Hulpoi, 1970). The failure of the extension in practice of some alternative land cultivation variants were related to cultural deficiencies and lower yields in the first years of application, requiring a period of at least 10 years for the system of conservative agriculture to balance (Cheţan, 2020 a).

The application of unconventional mulching systems, green manures, as well as crop rotation are practices that contribute to maintaining and improving the soil quality. As green manure, there can be sown mustard, a crop that is not expensive, grows quickly,which by shading protects the soil from high temperatures that occur in late summer-early autumn and loosens it due to the well-developed root system (pivoting) that explores in depth the ground. After harvesting the wheat, it can be immediately sown in stubble and in late autumn, when the mustard is in bloom, the crop is abolished at the time of the autumn technological works (plowing, chisel, disk), because the plants are not resistant to low temperatures and are destroyed by frost. In the no tillage system, the crop is not mechanically destroyed. It is preserved, but the plants rot completely until spring, without preventing the sowing of corn (Cheţan, 2020 b).

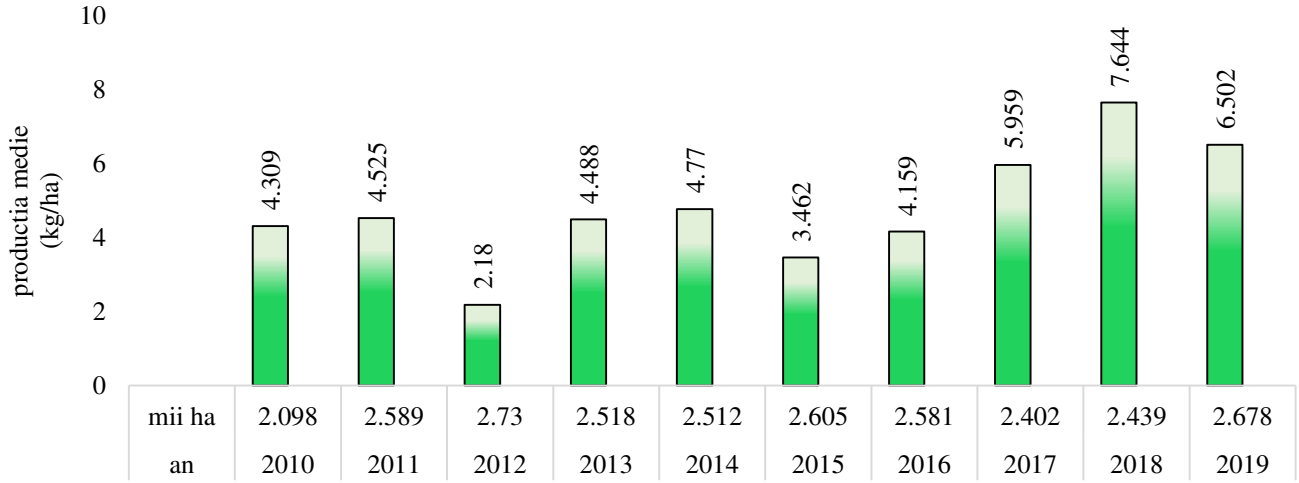
Figure 1. Chemical and natural fertilizers used in Romanian agriculture, 2012-2017



Source: https://www.madr.ro/

In recent years, there has been an increase in the sum of useful temperatures during the vegetation period of the maize crop, to which has been added the poor, uneven distribution of rainfall (during the critical periods of June and July), which led to the promotion of hybrids with a longer vegetation period (from the FAO group 300-400) that have better resistance to low temperatures (from the first part of the vegetation period), to drought but also to heat (Has and et al., 2010; Grecu et al. , 2011). It is known that the hybrid alone, without proper technology, cannot ensure high performance, and if there are no valuable hybrids, much of the investment expenditure, primarily machinery and equipment needed to practice unconventional agriculture, is lost.

Figure 2. The maize cultivation in Romania, 2010-2019



Source:http://faostat3.fao.org

The paper presents the results of research conducted in 2019 and 2020 on the influence of soil tillage, fertilization and mulch on corn production, in the soil and climatic conditions at the Turda Agricultural Research and Development Station (ARDS Turda).

MATERIAL AND METHODS

In 2018 (after the wheat harvest), an experimental field was set up with four tillage systems, to test their influence on the production of two maize hibrids. It should be noted that the land was not cleared of plant debris and was completely preserved (2.5 t/ha). The multifactorial type experiment (subdivided plots method) was located on a vertical clay-iluvial chernozem type soil (SRTS 2012), with pH 6.9; humus 2.95%; total nitrogen 0.211%; phosphorus 23 ppm; potassium 283 ppm, values determined on 0-30 cm depth.

The sowing was carried out with the MT-6 machine at a density of 65,000 plants/ha, the seed treated with 1.0 l/to fungicide based on 25 g/lfludioxonil 9.7 g/lmetalaxyl-M (mefenoxam).

Regardless of the cultivation system practiced, in order to obtain superior productions from a quantitative and qualitative point of view, an important role,aside from all the other technological links, plays is the weed control. In general, pre-emergence and supplementation with post-emergence herbicide ensures a weed-free cultivation, the condition being the knowing of the spectrum of weeds in order to take effective control measures.

In preemergence was applied 0.4 l/ha product based on isoxaflutole 240 g/l and cyprosulfamide (safener) 240 g/l) + 1.4 l/ha based on dimethenamid-P (optically active 720 g/l) and in postemergence 1.0 l/ha product based on fluroxypir 250 g/l to control dicotyledonous weeds (especially *Convolvulus arvensis, Rubus caesius*) + 1.5 l/ha based on 40 g/l nicosulfuron to control annual monocotyledonous weeds and perennials (*Agropyron repens, Sorghum halpense, Setaria* sp., *Cynodon dactylon*, etc.). Against pests (*Tanymecus dilaticollis, Diabrotica v. Virgifera*) 0.15 l/ha of thiacloprid product 480 g/l was applied.

The experimental factors:

A - tillage system: classic a_1 (CS), plowing with Kuhn Huard Multi Master 125T cormorant plow + germination bed preparation (spring) with rotary harrow HRB 403 D + sowing + fertilizing with MT-6 seed drill + crop maintenance + harvesting; a_2 minimum tillage (MC), land prepared with Gaspardo Pinochio 2,5 chisel (autumn) + germination bed preparation (spring) with rotary harrow HRB 403 D + sown + fertilized with MT-6 seed drill + crop maintenance + harvesting; a_3 minimum tillage (MD), prepared ground Hard Disc Discovery 4 (autumn) + germination bed preparation (spring) with rotary harrow HRB 403 D + sown + fertilized with MT-6 seed drill + crop maintenance

+ harvesting; a_4 no tillage (NT), directly sown + fertilized with MT-6 seed drill + crop maintenance + harvesting.

B - cultivar: b_1 Turda 332; b_2 Turda 344.

C - fertilization: c_1 vegetable residues 2.5 t/ha + 350 kg/ha NPK (16:16:16); c_2 vegetable residues 2.5 t/ha + green mustard fertilizer, using 10 kg/ha of mustard seed for sowing; c_3 vegetable residues 2.5 t/ha + gulle 10 t/ha.

D-year (climatic conditions): d_1 2019; d_2 2020.

The maize production obtained on each experimental plot was weighed and transformed at STAS humidity (14%). The experimental data was processed by analyzing the variance and establishing the limit differences (LSD 5%, 1%, 0.1%), ANOVA 2015.

The meteorological conditions from April to September in the two years of experimentation (Turda Meteorological Station, longitude: 23°47 '; latitude 46°35'; altitude 427 m) are presented in Table 1.

Table 1. The thermal and pluviometric regime from April-September 2019, 2020at the ARDS Turda

Average monthly temperature (°C)						
Year/month	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**
2019	11.3	13.6	21.8	20.4	22.1	17.1
2020	10.3	13.7	19.1	20.2	21.5	17.8
Average 63 years	9.9	15.0	17.9	19.7	19.3	15.1
Precipitation monthly amount (mm)						
2019	62.6	152.4	68.8	35.0	63.8	19.4
2020	17.8	44.4	166.6	86.8	58	57.4
Average 63 years	45.9	68.7	84.8	77.1	56.5	42.5

RESULTS AND DISCUSSION

In 2019 the average temperature recorded in April (11.3^{o}C) was close to the multiannual average for 63 years (9.9^{o}C). In May there were lower temperatures than normal (13.6^{o}C) the month being characterized as a cool month, after which the temperatures increased generating a warm month (June 21.8^{o}C). The average monthly temperature of 20.4^{o}C recorded in July exceeded the multiannual average by 0.7^{o}C, and, by the end of the year, the temperatures remained high, generating two warm months (August 22.1^{o}C; September 17.1^{o}C). From the point of view of the pluviometric regime, April was very rainy (62.6 mm), the most excessively rainy month (152.4 mm), followed by a reduction of the precipitation amounts in June (68.8 mm). The lack of precipitation was felt in July (35 mm) and September (19.4 mm), but not in August, when the precipitation amounted to 63.8 mm.The monthsApril (10.3^{o}C) and May (13.7^{o}C) of 2020 were hot and dry, the pedological drought continuing until mid-June, after which the rainfall totaled 166.6 mm/month, the rains being accompanied by strong winds. In July (20.2^{o}C) the temperatures were above the multiannual average for this period by 0.5^{o}C and the precipitations exceeded the multiannual average by 9.7 mm, being considered a slightly rainy month. August and September were two warm months, with higher than normal thermal values. The precipitation recorded in August was close to the value of the multiannual average for this month (58 mm), but almost all the precipitation was recorded after the first decade of the month. September is characterized by a total rainfall, although almost all the precipitation was recorded in the last decade of the month (57.4 mm). Unfavorable conditions from the end of September to the beginning of October (rain and fog) maintained a high humidity of the cobs and the harvest took place after October 12.

The analysis of variance (Table 2) indicates that the maize production was affected by the working system, the difference between the control (8779 kg/ha) and the MC system (8653 kg/ha) not being very large (126 kg/ha). It seems that the MD and NT systems have a very significant

negative influence compared to Cs, the production differences being of 2348 and 3358 kg/ha respectively.

On the contrary, the results of the study conducted by Cociu et al. (2017) at Fundulea, indicates that the average production for 8 years for maize was significantly lower in the conditions of tillage with plow (8.82 t/ha) than in the chisel processing (9.05 t/ha).

Table 2. The influence of the tillage system on the maize production, ARDS Turda

The soil system factor (A)	Production (kg/ha)	(%)	Difference (kg/ha)	Significance
a_1 clasic (CS)- plow	8779	100.0	0.00	Ct.
a_2 minimum tillage (MC) -chisel	8653	98.6	-126	0
a_3 minimum tillage (MD) - disk	6430	73.2	-2348	000
a_4 no tillage (NT) –direct sowing	5421	61.8	-3358	000
LSD (5%) = 113; LSD (1%) = 207; LSD (0.1%) = 460.				

The difference between the simple hybrid Turda 332 (control) and the trilinear hybrid Turda 344 is insignificant (only 74 kg/ha). The two cultivars are part of the FAO group 380 (Food and Agricultural Organization) and were distinguished by a production potential of over 7000 kg/ha of grains, which we believe is mainly due to the superior capacity to capitalize on the applied technological factors (Table 3).

Table 3. The influence of the cultivar on the maize production, ARDS Turda

The cultivar factor (B)	Production (kg/ha)	(%)	Difference (kg/ha)	Significance
b_1 Turda 332	7358	100.0	0.00	Ct.
b_2 Turda 344	7284	99.0	-74	-
LSD (5%) = 24; LSD (1%) = 40; LSD (0.1%) =74.				

Compared to the production obtained in the version with fertilization with 350 kg/ha NPK (16:16:16) + 2.5 t/ha vegetable residues that determined a production of 7845 kg/ha (control), the production decreases with 881.2 kg/ha in the case of fertilization with vegetable residues 2.5 t/ha + green mustard fertilizer 10 kg/ha (6964 kg/ha) and with 691.2 kg/ha in the case of the variant with 2.5 t/ha vegetable residues + gulle 10 t/ha (7154 kg/ha), these variants very significantly negatively influencing the production of corn grains. The application of mineral fertilizers (NPK) has a beneficial effect in a better development of plants, and on the increase of production, as can be seen from the data presented in Table 4.

Table 4. The influence of the fertilization on maize production, ARDS Turda

The fertilization factor (C)	Production (kg/ha)	(%)	Difference (kg/ha)	Significance
c_1 vegetable residues 2.5 t/ha + 350 kg/ha NPK (16:16:16)	7845	100.0	0.00	Ct.
c_2 vegetable residues 2.5 t/ha + green mustard	6964	88.8	-881.2	000
$c_3$vegetable residues 2.5 t/ha + gulle 10 t/ha	7154	91.2	-691.2	000
LSD (5%) = 74; LSD (1%) = 102; LSD (0.1%) =140.				

The analysis of the variance shows that the maize production was not largely influenced by climatic conditions during the experimentation period (Table 5). The maize production in the control variant (the average of the two experimental years) was 7321 kg/ha, the production differences registered in 2019 and 2020 being around 16 kg/ha, almost insignificant. In the two years, the amount of precipitation (mm) between May and August was higher than the 63-year average (287.1 mm), registering 322 mm in 2019 and 355.8 mm in 2020. As a result, the grain maize registered a high yield (7337 kg/ha in 2019 and 7305 kg/ha in 2020). In fact, J. Humlum (quoted by Salontai, 1982) established for the conditions in Romania that production increases above average when rainfall exceeds 40 mm in May, 60 mm in June, 60 mm in July and less than 80 mm in August, and that

summer rainfall has a decisive influence on maize production, its distribution being more important than the total amount of rainfall.

Table 5. The influence of the year on the maize production, ARDS Turda

The year factor (D)	Production (kg/ha)	(%)	Difference (kg/ha)	Significance
$d_0$mean	7321	100.0	0.00	Mt
d_1 2019	7337	100.2	16.1	-
d_2 2020	7305	99.8	-16.1	-
LSD (5%) = 41; LSD (1%) = 55; LSD (0.1%) =74.				

CONCLUSIONS

In the pedoclimatic conditions in the experimental area, the level of maize production was closely related to the tillage system.

NPK type mineral fertilization applied simultaneously with sowing contributes significantly to the achievement of superior maize yields.

The minimum chisel-working system had a greater impact on maize production, showing a superiority over the straight-sowing or direct-seeding variant.

The tillage variant with the chisel could be considered as an alternative to the classic plowing system, the difference in production between the two systems not being very large (only 126 kg/ha).

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AGRO-TECHNICAL METHODS FOR INCREASING PRODUCTION OF SPRING BARLEY IN THE HILL OF TRANSYLVANIA

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Abstract

The formation of the spring barley crop is influenced by the variety chosen in the culture, the pedo-climatic conditions, the precursor plant and the applied technology. Experiences carried out at SCDA Turda in 2019 and 2020 have shown that spring barley grown in no-tillage technology responds favorably in achieving yield regardless of whether it rotates after sugar beet (4855 kg/ha) or maize (4735 kg/ha).

Keywords: direct sowing, spring barley, rotation, yield

JEL Classification: Q 01, Q 15, Q 16

INTRODUCTION

When establishing crop rotation in an agricultural holding, the particularities of the plants that rotate must be taken into account, and here we refer primarily to: water requirements and consumption (Ardelean, 2006) and nutrients, the possibilities of the root system for exploring of the soil horizontally and vertically, the vegetation period, etc., in order to avoid the appearance of the "soil fatigue" effect (Vasiliu, 1979 quoted by Budoi & Penescu, 1996). Crop rotation is the basic component that determines the reduction of land weeding (Berca, 2004), pest control (Lazăr et al., 1980; Boguleanu et al., 1980; Bărbulescu et al., 2000) and diseases (Perkowski et al. 2003; Munteanu et al., 1982; Bărbulescu, 2001 a, 2001 b; Bunta, 2003).

Crop rotation should be seen as a method of reducing technological costs (labor, pesticides, fertilizers, etc.) without diminishing quantitative and qualitative yield (Dincă et al., 1971; Bandici, 1997). The inclusion of legumes in crop rotation has a favorable effect on successor crops, improving the soil in nitrogen and contributing to the development of the root system (Vidican et al., 2013; Cheţan et al., 2016). Poor crop rotation can promote soil compaction by limiting differences in plant root system and the major role it plays in restoring the physical properties of the soil and even in breaking the deep compacted layers. The potential for compaction at the beginning of the vegetation period also increases due to the increase in the number of passes and traffic on the ground (Canarache, 1990; Domuţa, 2008; Guş et al., 1998, 2004).

Spring barley (two-row barley) must be framed in a rotation of at least 3-4 years, the best precursors are the potato and sugar beet followed by soybeans, sunflowers, maize. It is not recommended to place spring barley in monoculture, and after perennial legumes, it is preferable for barley to follow in the second year (Drăghici et al., 1975; Muntean et al., 2008; Pintilie & Sin, 1974). Due to the shorter vegetation period, between 90 and 120 days, the requirements of spring barley for fertilizers are generally lower, being able to capitalize well on the residual effect of fertilizers applied to the previous crop.

It is also not pretentious to the soil works, it can be sown in the no tillage system (directly in the stubble of the precursor plant), with the help of precision seeders whose coulters penetrate into the soil to the depth of incorporation of the seed (4 - 5 cm), simultaneously with the sowing and the fertilizers are dosed and unloaded in the seed tube. The barley forms many tillers and a high growth rate, thus making it easier to control weeds with crop problems(*Setaria* sp., *Sonchus arvense, Agropyron repens*); production costs are low, making it a profitable crop; release the land early, etc. (Cheţan et al., 2021).

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The Transylvanian Plain has a special aspect, being predominant the hilly areas, in which the phenomena of soil erosion by leaching are frequently encountered. Direct sowing in the vegetable residues of the previous crop (mulch) as well as crop rotation are practices that can reduce this phenomenon, contributing to maintaining and improving soil quality and achieving close harvests in value or even higher than those obtained by conventional cultivation (Rusu & Guş, 2007; Rusu et al., 2014; Cheţan, 2020). Within the Turda station, by purchasing high-performance machines and equipment, the conservative agriculture system can be practiced, both for straw cereals sown directly in the raw soil, and for maize, soybeans, peas, etc., sown in the system with minimal work that involves the basic work without turning the furrow and keeping the vegetal remains in proportion of over 30% at the surface of the soil or incorporated superficially, fulfilling the role of mulch (Ignea et al., 2013; Cheţan et al., 2019; Suciu et al., 2019; Cheţan et al., 2020) .

The paper presents the results of research on the influence of the precursor plant on the production of two varieties of spring barley sown in no tillage system, in the pedo-climatic conditions of the Agricultural Research-Development Station (ARDS) Turda.

MATERIAL AND METHOD

The researches were carried out in the period 2019-2020, at SCDA Turda located in the Transylvanian Plain, on avertical clay-iluvialtypesoil, with a loam-clay or even clay-loam texture (SRTS, 2012), with neutral or weakly alkaline pH, with a medium-good and even very good supply with mobile P and very good with mobile K and with an average humus content. There are four experimental variants, the surface of each variant is 1.0 ha.

The experimental factors:

A: precursor plant, a_1 sugar beet, a_2 maize; **B**: variety, b_1 Romaniţa, b_2 Daciana; **C**: year (climatic conditions), c_1 2019, c_2 2020.

Barley sowing was carried out in the optimal period (March second decade) with the Directa-400 seed drill at 18 cm between rows, the seed being treated with 0.5 l/t of systemic fungicide based on protioconazole 150 g/l + tebuconazole 20 g/l. The sowing density of 500 gg/m^2 was established depending on the cultural value of the seeds, the twinning capacity and the climatic conditions specific to the area. Simultaneously with the sowing, the basic fertilization was performed with $N_{50}P_{50}$ (250 kg/ha NPK 20: 20: 0) and completed with $N_{32}Ca_8$ (120 kg/ha nitrocalcar) in the phase of the end barley tillering.

The chemical treatment for weed control, at the end of the barley twinning was performed with 0.12 l/ha product based on iodosulfuron-methyl-Na 25 g/l + mefenpyr diethyl 250 g/l (safener) + 0.6 l/ha product based on 660 g/l 2.4% D acid from dimethyl amine salt (825 g/l 2.4 D dimethyl amine salt). Control of diseases and pests, first of all preventive by observing the agrotechnical measures (crop rotation, rotation, seed treatment, sowing in the optimal time, density, etc.) and curative with two chemical treatments on vegetation: I simultaneously with herbicide with 0.2 l/ha insecticide based on Tau-fluvalinate 240 g/l and 0.7 l/ha fungicide based on protioconazole 53 g/l + spiroxamine 224 g/l + tebuconazole 148 g/l; II on the standard leaf with 0.7 l/ha fungicide based on protioconazole 175 g/l + trifloxystrobin 150 g/l + 0.2 l/ha insecticide based on cypermethrin 100 g/l.

After harvesting the barley and weighing each variant (kg/ha), samples were taken in order to establish the grain humidity (with the Granomat PERTEN laboratory humidometer), after which it was recalculated to the STAS humidity (14%) using the correction factors (at 86% dry matter).

The experimental data were processed by analyzing the variant (PoliFact, 2015) and establishing the limit differences (LSD, 5%, 1%, 0.1%).

The climatic conditions from January to July 2019, 2020 (source: Turda meteorological station: longitude 23°47- latitude 46°35′ - altitude 427 m) are found in Figure 1 and 2.

For the last 63 years (1957-2019) in Turda, the multiannual average temperature was 9.2ºC and the multiannual amount of precipitation was 531.4 mm.

January 2019 was warm (-2.2°C), February (1.7°C) and March (7.3°C) were also warm, the average temperature recorded in April (11.3°C) was close to normal for the period (10.0°C multiannual for 63 years). In May there were lower temperatures than normal (13.6°C) the month being characterized as a cool month after which temperatures increased generating a warm month (June 21.8°C). The average monthly temperature of 20.4°C recorded in July was close to the multiannual average (19.8°C). From the point of view of the pluviometric regime, in the first month of 2019 the precipitations were abundant (January 46 mm) after which the drought phenomenon was installed (February 17.7 mm and March 12.3 mm). April was very rainy (62.6 mm), the most excessively rainy month (152.4 mm) followed by a reduction in precipitation in June (68.8 mm) and July (35 mm).

The year 2020 started with a normal month in terms of temperature (average -2.2°C) but excessively dry, the rainfall recorded (10.4 mm) was below the value of the multiannual average (21.8 mm) with deviation -11, 4 mm followed by two warm and rainy months, February and March, but without raising any problems regarding the sowing of spring barley, this being done at the optimal time, between March 16th. The soil moisture in March favorably influenced the emergence of the crop. In April, a pedological drought set in, which continued until mid-June when torrential rains (115 mm) were recorded, accompanied by strong winds, with a rather low impact on the crop, the varieties created in Turda have quite good resistance to fall. In July, temperatures were close to normal, with a deviation of only 0.5°C and rainfall exceeded the multiannual average by 9.7 mm, being considered a slightly rainy month, so that the harvest took place in optimal conditions without delays, affect the quality of the grains.

Figure 1. The thermic regime, January - July 2019, 2020 at SCDA Turda

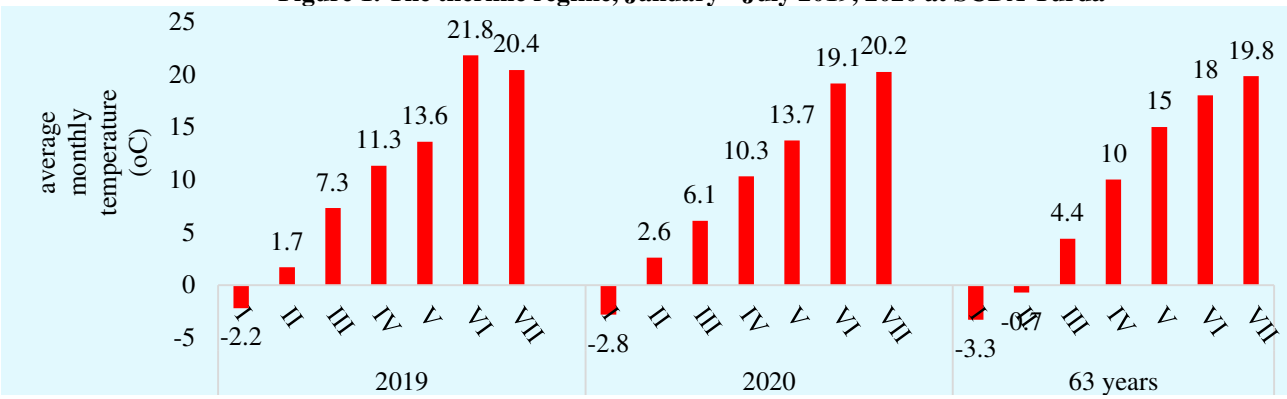
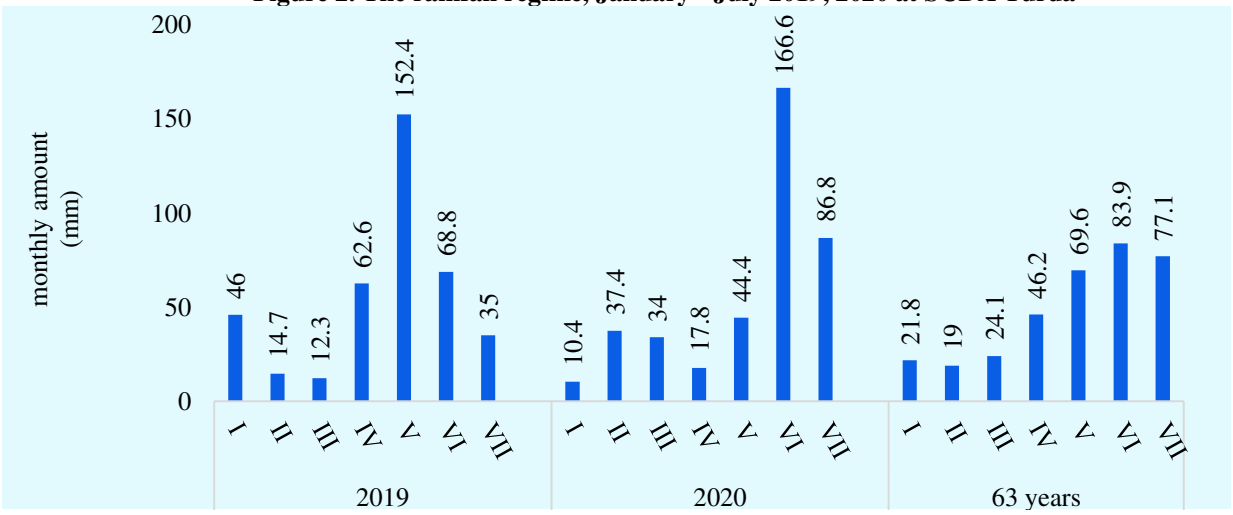


Figure 2. The rainfall regime, January - July 2019, 2020 at SCDA Turda



Specific to the two years studied, was the uneven distribution of rainfall, there were dry periods of time, with prolonged pedological droughts followed by torrential rains.

RESULTS AND DISCUSSION

Although sugar beet and maize are part of the middle group in terms of favorability as a precursor to barley, it seems that maize has significantly negatively influenced the yield potential of barley, the average recorded yield shows statistically assured differences, these being 4855 kg/ha after sugar beet (control) and 4735 kg/ha after maize (Table 1). We believe that these values are primarily due to the fact that after the beet the soil remains looser in depth which allowed a better development of the root system in barley and thus better absorption of nutrients from the soil. In fact, the vegetable remains left after the beet harvest (leaves, package, small roots, etc.) were easily destroyed during the winter. Maize harvesting was carried out with the high-capacity CASE combine, which has the advantage of chopping and spreading by-products on the ground, which decompose more slowly and seem to offer less favorable conditions for barley, which can be seen from the average yields achieved in the two years of experimentation.

Table 1. The influence of the precursor plant on the yield of spring barley, ARDS Turda

The precursor plant (A)	Yield (kg/ha)	(%)	Differences (kg/ha)	Significance
$a_1$sugar beet	4855	100,0	0,00	Ct
$a_2$maize for grain	4735	98	-120	0
LSD(5%) = 61; LSD (1%) = 149; LSD (0.1%) = 237.				

For the success of the culture, the spring barley needs approximately 180-300 mm of water for the entire vegetation period (https://www.agrimedia.ro). Although in 2019 between April 11 and July 10 the rainfall regime was 287 mm and in 2020 for the same period it was 251.8 mm, compared to the average of the two experimental years (control) the yield was significantly different (negative or positive) of climatic conditions. These results are due, we believe, to temperature fluctuations and the non-uniformity of precipitation during the experimental period.

Table 2. The influence of the year on the yield of spring barley, ARDS Turda

The year (B)	Yield (kg/ha)	(%)	Differences (kg/ha)	Significance
b_0 average years	4637	100,0	0,00	Ct
b_1 2019	4391	95	-246	00
b_2 2020	4883	105	246	**
LSD(5%) = 81; LSD (1%) = 117; LSD (0.1%) = 176.				

Of the two varieties of spring barley, the genotype Romaniţa (control) is noted, in terms of average yield in the two years, which records yield increases (4805 kg/ha) and for the Daciana variety the difference in yield compared to the control is 335 kg/ha, presents statistical assurance and very significant negative influence.

Table 3. The influence of the variety on the yield of spring barley, ARDS Turda

The barley variety (C)	Yield (kg/ha)	(%)	Differences (kg/ha)	Significance
b_1 Romaniţa	4805	100,0	0,00	Ct
b_2 Daciana	4470	93	-335	000
LSD(5%) = 31; LSD (1%) = 51; LSD (0,1%) = 95.				

CONCLUSIONS

In the area of the Transylvanian Plain, it is recommended to cultivate the two varieties of spring barley in no tillage system, which is distinguished by average annual yields over 4000 kg/ha.

Spring barley it is more suitable if it follows after the sugar beet than if it follows after maize.

The process of harvesting the spring barley is negatively influenced by the higher temperatures in June and July 2019.

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ANALYSIS OF AGRICULTURAL LABOR EFFICIENCY FROM THE PERSPECTIVE OF LABOR PRODUCTIVITY

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Abstract

The approach regarding the efficiency of the labor force in agriculture, but also from the perspective of labor productivity in this sector, is determined by the economic activities for the development of the national economy. This paper is based on the comparative analysis of statistical data from a quantitative and qualitative point of view, highlighting labor productivity and labor resource consumption for the main activities of the national economy. For this research were identified statistical data provided by the National Institute of Statistics, data on the value of production, production costs, and the level of labor. With the help of these data, relating the value of production and production expenditures to the volume of labor, it was possible to determine two indicators that can be used to analyze the economic efficiency of labor, namely labor productivity and labor consumption. These two indicators were determined for the main branches of the national economy, implicitly also of the agricultural sector. Agriculture is considered one of the most powerful forces shaping human behavior and therefore economic activity. This paper investigates the effects of agriculture on labor productivity and the agricultural labor force that drive this relationship and are determined by the main activities of the national economy.

Keywords: labor force, agriculture, labor productivity, economic efficiency

JEL classification: Q10, Q15

INTRODUCTION

Agriculture occupies an important share of the Romanian economy, although more than 49% of the population works in rural areas, its contribution to GDP is about 8-9%. In the last 20 years, Romanian agriculture has undergone huge structural changes through the liberalization of the market and production in order to adapt to the new sustainable agricultural needs. Agricultural human resources include not only the labor force needed to carry out agricultural work, but also the labor force that provides technical guidance, organization and management of all agricultural resources. Labor resources (labor resources) refer to all persons engaged in agricultural activities with certain physical and intellectual abilities, experience and professional qualifications that are used in certain economic and social conditions depending on the degree of mechanization offered**.**

The economic importance of living labor comes from its high proportion of agricultural production costs, especially in households. Labor occupies an important position in agricultural production and is a decisive factor in the development of land capital and working capital. Under the influence of scientific and technological progress, increasing labor organization, employment and increasing agricultural labor productivity are the foundation of agricultural economic progress.Agricultural labor management requires specific approaches to other areas of activity, in which the employed labor force dominates. In Romania, the special social nature of agricultural work is not only manifested at the family level. For more than 40 years, a large number of people from rural areas have migrated, and agricultural workers have relied on expert guidance.In agriculture, the labor force is made up mostly of members of peasant families. Family work in agriculture has many advantages over other sectors. Farmers and their families work alone and do not feel the difficulties of the workers, and the rewards are better than those of the agricultural workers. Priority solutions and plans are needed to stabilize the rural workforce, improve its quality structure and increase employment to:

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a) stimulating the occupational field of the rural population and ensuring the stabilization of the youth;
b) improving the system of general and professional training of young people and recycling of farmers;
c) lasting stimulation of the growth of agricultural production, especially animal husbandry through modern financing systems;
d) favoring the withdrawal from the activity of the elderly farmers and supporting the formation of family farms in lease system, as well as the establishment of different associative forms of agricultural exploitation;
e) development of extension and consultancy and improvement of the activity of agricultural centers to support the professional training of small farmers;

MATERIAL AND METHODS

The data in this paper are based on data provided by the National Institute of Statistics, which aimed to highlight labor productivity and labor consumption of resources for the main activities of the national economy. A number of significant elements are presented in relation to the value of production, production costs, and the level of labor. With the help of these data, linking the value of production and production costs to the volume of labor, hence two indicators can be determined that can be used to analyze the economic efficiency of labor, namely labor productivity and labor consumption. These two indicators are determined for the main sectors of the national economy and are also involved in the agricultural sector. This paper is based on the comparative analysis of statistical data from a quantitative and qualitative point of view, highlighting labor productivity and labor resource consumption for the main activities of the national economy. As a method in this paper, we find the index with a fixed base - it reflects the relative increase or decrease of the researched phenomenon in each period compared to the comparison period.

RESULTS AND DISCUSSION

In the economic literature and in current practice it is used alongside the notion of agricultural holding and those of agricultural unit and agricultural enterprise, often intersecting or even substituting. It follows from the above that the definition of agricultural holdings must contain the statement that: it is an economic unit; of production; whose basic activity is the exploitation of land, plants and / or animals; in order to obtain agricultural products.

According to the Institute of Statistics, labor productivity is defined as: The employed population comprising all persons - both employees and self-employed - employed in production activities that fall within the limits of production in national accounts. Labor productivity per employed person was calculated as the ratio between gross value added and the number of employed persons.

Table 1-Labor productivity per person, by main activities of the national economy, lei / person / year

Activities of the national economy	2013	2014	2015	2016	2017	2018	2019	2019/2013 %
Agriculture, forestry and fishing	13187.9	12482.5	13241.1	15465.4	18357.7	20482.6	22742.6	72.5
Industry	91043.4	93494.6	96604.1	100228	107779.1	114273.4	120954.7	27.1
Construction	70736.6	67339.3	66491.8	68631.1	63553.7	77574.1	89906.2	83.0
Trade	52859.4	57721.4	66411.7	73839.2	83322	88987.5	96706.5	74.5
Information and communications	225489.5	219899.6	208870.3	235013.9	254372	278230.6	348225.7	32.9
Financial intermediation and insurance	203895.8	197109.3	210277.4	225853.9	184545.3	223641.9	218138.3	62.7
Professional activities	123258.1	118593.3	138772.5	139821.2	168410.8	179544.4	200589.9	7.0
Public Administration	75072.4	80809.9	96382.7	90940.9	108984.5	127457.5	131036.7	54.4

(Source: National Institute of Statistics)

From the analysis period 2013-2019, it is noted that the highest value was registered in the information and communications activity, professional activities but also the public administration for the analysis period with values between 200 thousand lei / person / year reaching up to 348 thousand lei / person / year due to the increase of added value, and the lowest values were found in the activity of agriculture, industry, construction and trade in the period 2013-2019, these values were noted due to the fact that the amount of these activities is much smaller for each employee.

The main reason for the increase in labor productivity both in the agricultural sector and in the rest of the economic activities is due to the increase in gross value added. According to the Institute of Statistics, the average monthly labor cost represents the total expenses incurred by the unit for labor, namely: gross amounts paid directly to employees (direct expenses) from: - salary fund (including bonuses and rights in kind) respectively, the amounts granted directly for the work actually performed (basic salary, bonuses and allowances granted as a percentage or in a fixed amount, additions to basic salaries); - net profit and other funds (including rights in kind) - prizes and incentives from the fund for participation in net profit, rights in kind and cash benefits, incentives, expenses representing meal vouchers granted to employees;

Table 2. Average monthly labor costs per employed person, main economic, lei / person / month

Activities of the national economy	2013	2014	2015	2016	2017	2018	2019	2019/2013 %
Agriculture, forestry and fishing	2095	2248	2375	2794	3191	3675	3898	86.1
Industry	2932	3099	3214	3477	3881	4309	4745	61.8
Construction	2112	2181	2435	2606	2910	3324	3999	89.3
Trade	2237	2421	2650	2901	3397	3785	4064	81.7
Information and communications	5294	5679	6267	7002	7596	8623	9319	76.0
Financial intermediation and insurance	6568	6523	6903	6976	7456	7947	8729	32.9
Professional activities	4125	4254	4648	5068	5319	5949	6619	60.5
Public Administration	3501	3925	4033	4354	5415	6230	7068	101.9

(data Source: National Institute of Statistics)

As can be seen, each economic activity recorded increases in average monthly costs, with agriculture ranking third, with relatively low costs compared to other activities, where as can be seen the highest costs per person during one month is recorded for economic activity (information and communications). The main reason why the average monthly costs increased both in the main sector analyzed, namely agriculture, but also in other economic activities is due to the increase of the minimum wage in the economy, so that the employer's contributions to the state have changed.

According to the average monthly labor costs measured in lei per person in the agricultural sector, it ranks third among all economic activities, given that this activity is characterized by the availability and need of people depending on the season, so the costs per person does not register in all months of a current year. Thus, analyzing the evolution of this indicator, there is an increase in costs per person in agriculture, reaching in 2019 (2794 lei / person / month), being 33.4% higher than the base year, representing an absolute value of approximately 700 lei / month / person.

Table 3. Comparison between labor productivity and labor costs, by main economic activities, in 2019

Activities of the national economy	Labor productivity	Average costs
Agriculture, forestry and fishing	1,895	3,898
Industry	10,080	4,745
Construction	7,492	3,999
Trade	8,059	4,064
Information and communications	29,019	9,319
Financial intermediation and insurance	18,178	8,729
Professional activities	16,716	6,619
Public administration	10920	7068

(Source: National Institute of Statistics)

The table above, comparing labor productivity and labor costs by main economic activities, shows that in Agriculture, forestry and fishing, the average costs are higher than in productivity, the costs in agriculture are much higher than the sum produced per employee, due to the fact that extensive agriculture in Romania requires an additional manual labor force, compared to other systems with a high degree of mechanization in other states, the rest of the analyzed activities did not notice significant changes.

Making a comparison between labor productivity and labor costs, we note that in terms of labor productivity agriculture is below the average for all economic activities, respectively 127994.8 lei / person / month, while the average monthly cost for all economic activities presented is 6055.1 lei / person / month. It should be noted that the labor costs in information and communications register an increase of 29019 lei person / year.

CONCLUSIONS

The National Employment Strategy aims to be an integrated approach to relevant policies, both from the perspective of demand development and from the perspective of efficient supply management on the labor market and proposes realistic approaches, which can be financed from the national budget, unemployment insurance budget and financial resources allocated in the 2014-2020 programming period. The success of this strategic approach depends on the real involvement of all stakeholders (central and local public authorities, social partners, civil society, etc.) in substantiating, implementing, monitoring and evaluation of the actions to be developed.

The Romanian labor market has developed and maintained a number of structural deficits in terms of population and labor force, deficits that have been amplified by the economic and financial crisis. Thus, until 2016, it was not possible to recover the job loss suffered during the crisis. In connection with the increase of employment, in Romania there is, compared to the situation at European level, an important reservation that refers to the oversizing in the conventional statistics of the official population employed in agriculture, in relation to the requirements of a modern economy. at a low average productivity at national level.

The main reason for the increase in labor productivity both in the agricultural sector (forestry and fishing) and in the rest of the economic activities is due to the increase in gross value added. According to the Institute of Statistics, the average monthly labor cost represents the total expenses incurred by the unit for labor, namely: gross amounts paid directly to employees (direct expenses) from: - salary fund (including bonuses and rights in kind) respectively, the amounts granted directly for the work actually performed (basic salary, bonuses and allowances granted as a percentage or in a fixed amount, additions to basic salaries); - net profit and other funds (including rights in kind) - prizes and incentives from the fund for participation in net profit, rights in kind and cash benefits, incentives, expenses representing meal vouchers granted to employees;

According to the average monthly labor costs measured in lei per person in the agricultural sector, it ranks third among all economic activities, given that this activity is characterized by the availability and need of people depending on the season, so the costs per person does not register in all months of a current year.

Thus, analyzing the evolution of this indicator, there is an increase in costs per person in agriculture, reaching in 2019 (2794 lei / person / month), being 33.4% higher than the base year, representing an absolute value of approximately 700 lei / month / person.

In conclusion, comparing labor productivity and labor costs by main economic activities, it appears that in Agriculture, forestry and fishing, the average costs are higher than in productivity, the costs in agriculture are much higher than the amount produced per employee. , due to the fact that extensive agriculture in Romania requires an additional manual labor force, compared to other systems with a high degree of mechanization in other states, the rest of the analyzed activities did not notice significant changes.

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A SYSTEM DYNAMICS MODEL FOR AGRICULTURE IN DANUBE MOUTHS REGION

Steliana RODINO[1]

Abstract

A dual challenge for the sustainable development of the Danube mouths region is the conservation of the natural ecological assets and the improvement of the quality of life for its residents. Aiming to offer support for regional sustainable policies for improvement of land sea synergies in the Coastal area of Romania, we have developed a system dynamics model for the development of agricultural sector in this region. The model scope is strongly linked to Farm to Fork strategy released by European Commission in 2020 as a response to the global challenges of providing access to healthy food, protect biodiversity and adapt to climate changes. The potential of our case study area for conversion to organic farming is closely related to the presence of protected areas on Tulcea territory. The system dynamics model is built so as to highlight that agricultural sector and the work of farmers is part of the solution not the problem, as we move towards transition to bioeconomy.

Keywords: organic agriculture, Romanian coastal area, system dynamics

JEL classification: Q15, Q5

INTRODUCTION

Current European strategies provide for an explicit commitment to aim higher in terms of the environment and climate. An important objective is stimulating the consumption of organic products, increasing organic production and further improving the sustainability of the sector, to ensure a balanced growth of the agriculture sector. In the recommendations to Member States on their CAP strategic plans, published in December 2020, the Commission included the goal of reaching 25% of the EU's organic farming area by 2030. However, the Member States were invited to set national values for this objective in their CAP plans, based on their local conditions and needs.

Transition to a sustainable economy should be one of the key goals of the national strategies in Romania, as well. Of course, objectives and directions to act will be set up based on extensive analysis of regional assets. When speaking of Danube Delta Region, the sustainable development of this region implies both the conservation of key elements of natural heritage and the enhancement of the quality of life for its inhabitants. Agriculture production is an important source of income for the rural community in this region, located mostly in Tulcea County. According to official National Statistical data, agriculture and forestry make up a third of the total workforce in Tulcea County, followed by fishing, industry and services (Rodino et al., 2019). In the last 30 years, the crop cultivation sector in Tulcea region was characterized by extensive production systems, dominated by cereal cultivation However, the agricultural production must comply with the environmental restrictions imposed by the legislation in force related to of the Danube Delta Nature Reserve (Butu et al., 2016). Farmers will need to produce more with less resource consumption while protecting the environment. The potential for conversion to organic farming is closely related to the presence of protected areas on Tulcea territory.

Taking all these into consideration, while analyzing land sea interactions in terms of possible impact of human activities on water quality in Danube Delta mouths region, we developed a system dynamics model for the socio-economic development of the area. The goal of the model is to explore alternative scenarios to improve the quality of life and sustainability within the Danube Delta Biosphere Reserve and its marine waters (Black Sea) as one of the most impacted areas along the Romanian littoral.

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MATERIAL AND METHODS

Land-sea interactions in the coastal region were identified through separate sector workshops and a combined multi-sectoral workshop. For practical reasons due to data availability and considering that the activity on the area upstream has effect on this highly biodiverse area the model included data collected for the entire county of Tulcea. Knowledge on the structure of agricultural production was used for predicting the effects of agricultural activities towards the quality of the environment in the case study area.

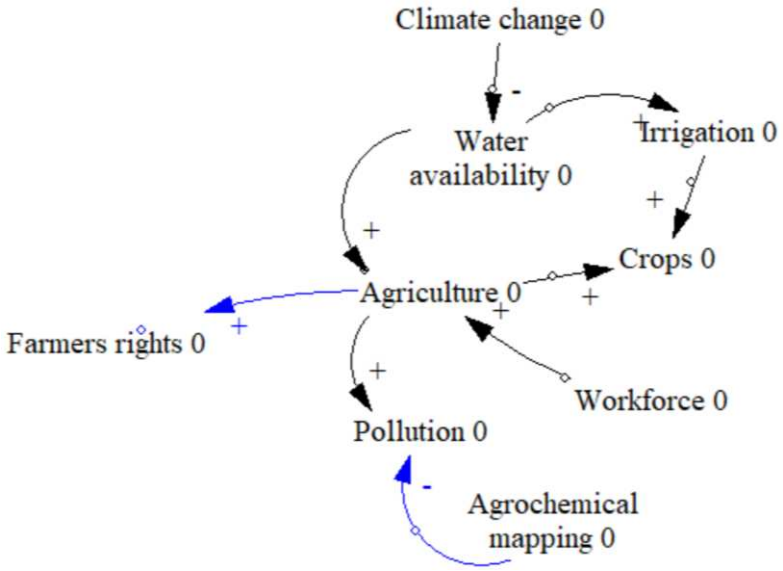
RESULTS AND DISSCUSION

In order to evaluate potetial impacts and interactions of agriculture sector on sustainable development of Danube Mouth region , was applied an interdisciplinary systems approach assisted by System Dynamics (SD) programming using Vensim pregramme (Sterman, 2000; Turner et al., 2016).

The interactions between the maritime area and the land considered, were defined based on the goals to improving the overall sustainability of the area and improving the quality of the Black Sea waters which is affected by the quality of the Danube water and possible pollutants (from agriculture and inadequate rural infrastructure)

The initial Causal loop diagram (CLD) from the Agriculture stakeholders meeting (Figure 1.) was translated to a stock and flow model where the main variables were based on the lexical transformation of the initial variables Agriculture to Agriculture production; Traditional farm area and eco-farm area), Farmer rights and Farmers welfare to Farmers income and Pollution to Pollution from Agriculture and further on to Nitrogen load as pollution also is considered in other sub models (More specifically this will be accounted as the impact of agriculture on water quality).

Figure 1. Initial CLD - Agriculture stakeholders meeting -partial view.



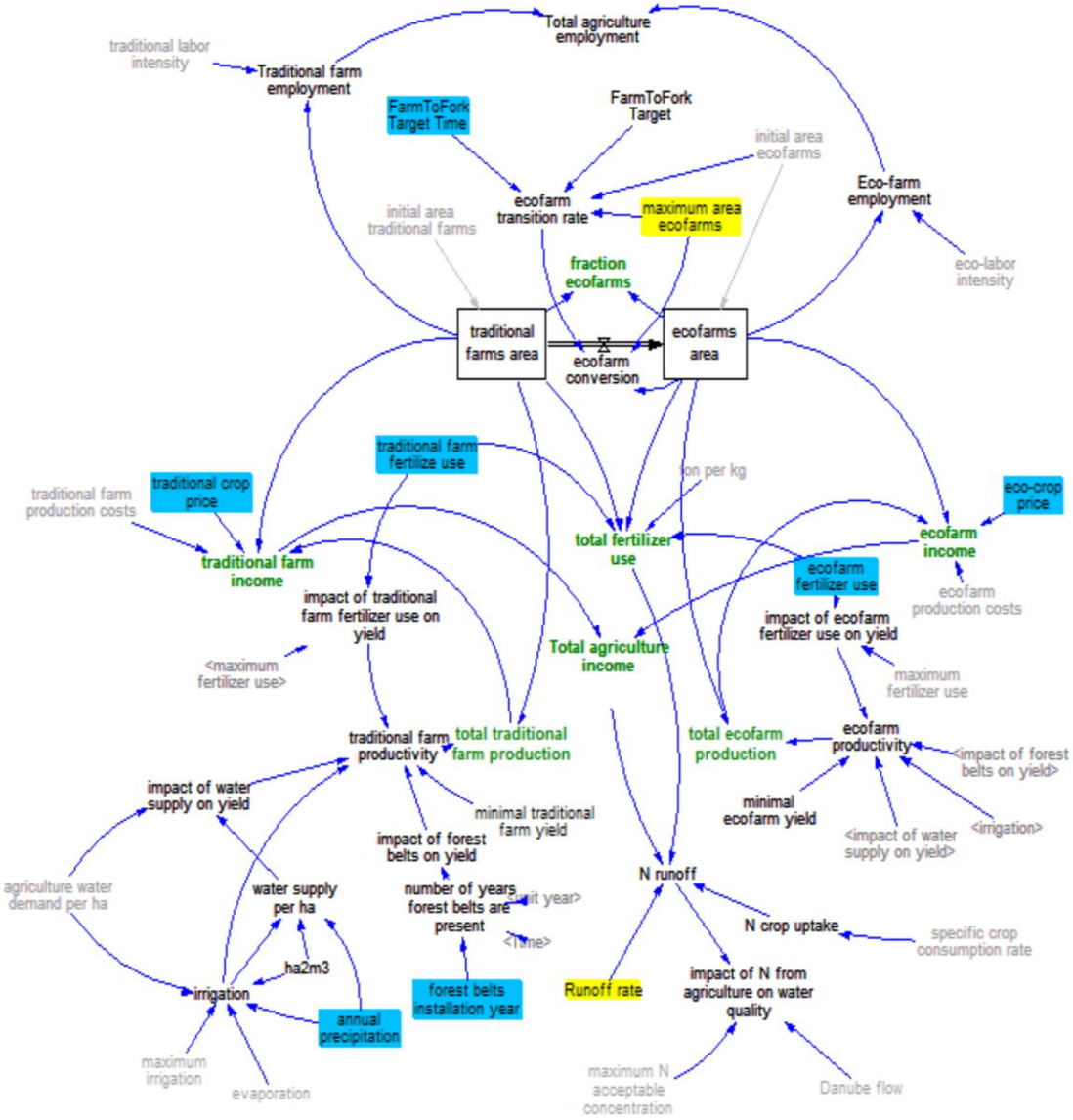
Forest belts as a variable, were also added to the model. The forest belts will improve water availability and this will increase the agricultural productivity. It is to be highlighted that the establishment of protective forest belts and increasing the forested area is part of several policy papers in the development of the Danube Mouths region such as Danube Delta strategy, National Regional Development Program, etc. The forest belts offer multiple beneficial effects including biodiversity increase, reducing soil erosion, mitigating of flood risks, trapping snow, and increasing crop yields.

The potential of our case study area for conversion to organic farming is closely related to the presence of protected areas in the Tulcea territory. Over 500,000 hectares have the status of protected areas, which represents more than half of the county's surface. Only organic agriculture can be practiced within these areas, and the use of chemical fertilizers should be prohibited. Inside the Danube Delta Biosphere Reserve, there are over 40,000 hectares suitable for agriculture.

Quantification in the agriculture model

The model is structured as a generic one crop system, namely wheat production. This crop was chosen taking into account that it has the largest share of the cultivated area in the case study region.

Figure 2. Agriculture stock flow model



Moreover, organic wheat has the highest share in organic production (across the entire country and in the case study area as well) with an average of 30% and a steady increase over the last ten years.

For accuracy of official statistics data included in the model equations, we took into account, as a case study region, the entire county of Tulcea. The start time of the model data is 2019 and timeframe was set to 2050.

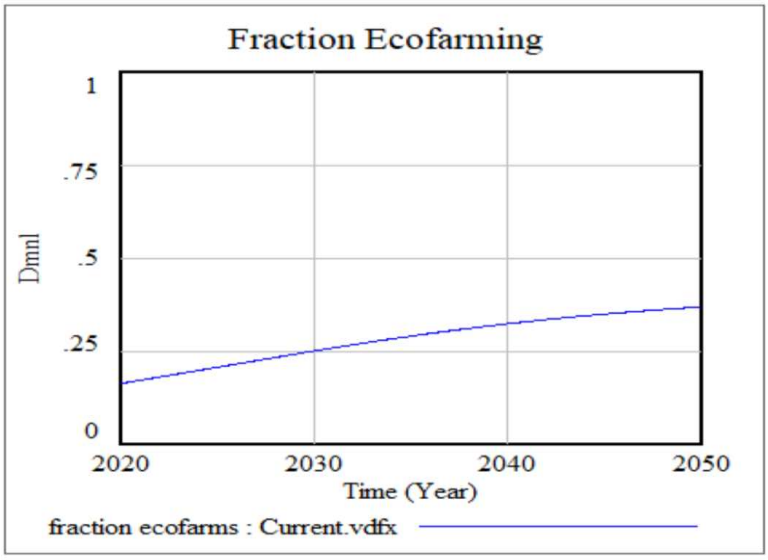
The core objective of this sub-model is to model the transformation from conventional farming vs eco farming by trying to fulfil the EU's recent recommendations, while assuring food security and farmer's competitiveness on the market (Figure 2).

The conversion to eco-farming is expected to have a beneficial effect on the environment by decreasing the negative impact of farming on soil, water and air quality. Given the land-sea interaction envisaged, this sub model is accounting for the impact of farming on water quality.

The model has two stocks: traditional farms area and eco farms area. The entire architecture has a symmetric structure for several variables (farm income, farm production, fertiliser used) respectively for the traditional farming system and the eco farming system.

The eco farms area equation was set taking into account the Farm2Fork strategy of at least 25% of European agricultural area to be cultivated under organic system by 2030.

Figure 3. Fraction of eco-farms



At present, the organic production area in Romania accounts for 2,9% of total agricultural land. Tulcea county is ranking the first in the country with a share of 16% area under ecological farming from total agricultural land of the county (366.3 thousand hectares).

The overall traditional farm income is obtained as function of production value (total traditional farms production multiplied by crop price) divided by traditional farm area and subtracting the traditional farm production cost. The same rationale was used for eco-farm income.

Figure 4. Area of eco/traditional farm land

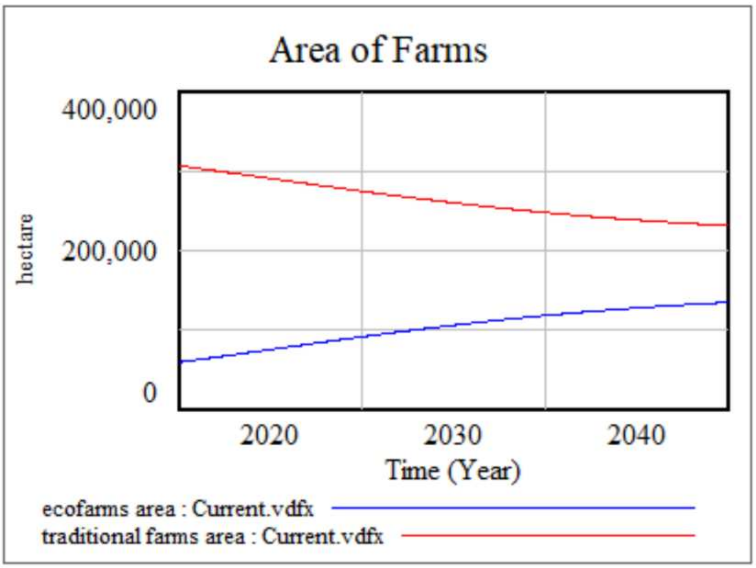
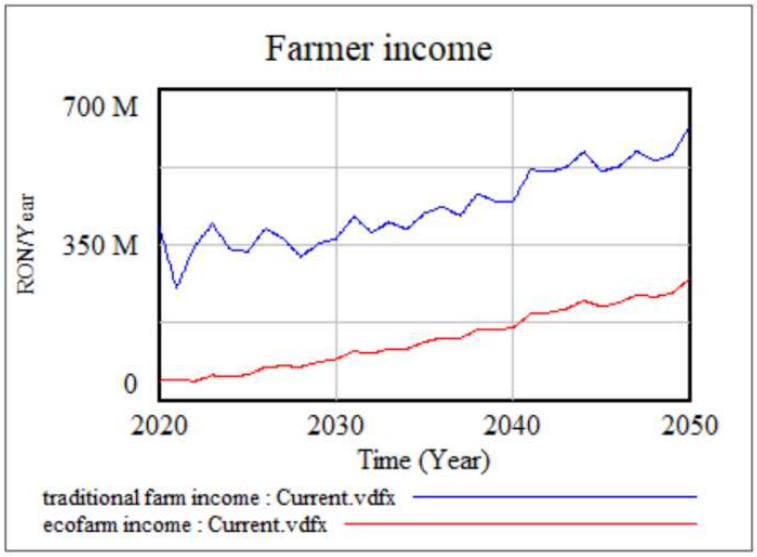


Figure 5. Eco/traditional famer income



The traditional farm yield is expressed as tons crop per year and is obtained by multiplying the average farm production and the total area under traditional farming system. Again, the same rationale applies for eco-farm yield. The higher the yield is the higher the productivity and profitability of a farm and this increases the well-being of farmers.

Generally improved yields are generated with improved practices (innovation, farming infrastructure, irrigation, crop varieties). As our objective is to study land sea synergies, we have chosen for the modelling the water needs (from irrigation and precipitation), fertiliser use and at the stakeholder's suggestion, the installation of forest belts. Regarding the fertilisers, the variables implying this production factor should be read as Nitrogen containing fertilisers. This decision was taken to address the most relevant compound for water quality in the area. Data on fertiliser use were extracted from official statistics and good agricultural practices code for traditional farming and farmers survey and good agricultural practices code for eco-farming.

CONCLUSIONS

The agriculture sub model scope is strongly linked to the Farm to Fork strategy set out by the EC in 2020. The European Commission's "Farm to Fork" strategy (Farm2Fork) is a response to the global challenges of providing access to healthy food, protecting biodiversity and adapting to climate changes. Farmers working in agriculture will need to produce more with less resource consumption while protecting the environment. The Agriculture sub model is built so as to remember that farmers and their work are part of the solution not the problem as we move towards a transition to a bio-economy. The model can contribute to the Green Deal implementation and Greening the Common Agricultural Policy as follows:

- Support to the objective of at least 25% of the EU's agricultural land under organic farming by 2030 from Farm2Fork strategy by encouraging the expansion of organic area,
- Encouraging the establishment of agro-forestry practices from Farm2Fork strategy by planting forest belts

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BIOETHANOL - RENEWABLE ENERGY SOURCE

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Abstract

According to the official document of Romania's energy policy for the period 2020-2030, with a view to 2050, the main objective of the strategy is to increase the energy sector in conditions of sustainability by setting targets for reducing greenhouse gas emissions and promoting renewable energy. In Romania, due to the specifics of each geographical area and environmental restrictions, production systems can be developed by types of renewable sources. The paper presents the importance of using renewable energy for bioethanol production as well as a SWOT analysis to highlight strengths, weaknesses, opportunities and threats regarding bioethanol production in Romania. This type of analysis is useful for decision makers as well as those involved in the value chain for obtaining bioethanol. Considered the most widespread biofuel, bioethanol is a renewable energy source with multiple benefits. The main resources used to obtain bioethanol come from starch raw materials (corn, wheat, potatoes, cassava) to which are added lignocellulosic raw materials in the form of agricultural waste (cereal straw, sugar cane waste, fiber and cotton waste). Renewables currently have a relatively small share in the structure of energy sources in the EU. This requires the promotion of the renewables sector: from legislation to the integration of technologies and the support of innovation in this field.

Keywords: energy policy, renewable energy sources, biofuels, bioethanol

JEL classification: Q2, Q20, Q28

INTRODUCTION

Today, the world's population is consuming more and more fuel than it can produce. This leads to increased use of natural resources and environmental pollution. To meet their growing energy demand, most countries rely on burning fossil fuels, especially coal and natural gas, which lead to greenhouse gas emissions with a major impact on climate change and rising global average temperatures. Due to the diversity of energy resources available and existing technologies in this field, Romania has a high energy potential from renewable sources, sources that can contribute to reducing air pollution and access to clean energy. Also, these renewable energy sources are a source of economic growth and job creation. Bioethanol, the second most renewable energy source after biodiesel used in the transport sector, accounts for 20% of total biofuel consumption [1]. Made from different types of renewable raw materials, bioethanol is one of the viable strategies for replacing fossil fuels and their derivatives and significantly reducing carbon emissions from the air. The aim of this research is to study the key factors that determine the interest in the use of energy from renewable sources, in particular the interest for the production of bioethanol from biomass sources. This paper also provides an insight into the issue of environmental pollution,a better understanding of sustainable energy policies to promote the use of renewable energy sources.

MATERIALS AND METHODS

The materials and working methods used in this paper refer directly to specialized scientific studies in the field and to the processing of related data as a result of the research conducted. The paper presents directions and policies on the evolution of the renewable energy sector, in particular the use of bioethanol which, together with other biofuels, will play an important role in implementing policies to reduce energy consumption, CO2 emissions and transform energy needs into renewable sources. Also, a SWOT analysis for bioethanol was conducted, based on the prospects of bioethanol production with an impact on increasing agricultural incomes, creating new jobs and ensuring energy security in Romania. The number of negative or positive aspects resulting from the analysis does not determine the overall evaluation of bioethanol, due to the fact that not all aspects are analyzed

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quantitatively. The results of the analysis are based on tables showing strengths, weaknesses, opportunities and threats.

RESULTS AND DISCUSSIONS

The Energy Union Strategy launched in February 2015 and approved by the European Council in June 2015 set out priority objectives for the creation of an energy union that ensures security, sustainability, competitive and accessible energy [2]. Through this strategy, the European Union has taken on the role of leading the global transition in combating climate change by providing clean energy. According to the framework strategy launched, in order to achieve the proposed objectives, the Energy Union focuses on 5 interconnected and mutually reinforcing dimensions, which focus on improving sustainability, competitiveness and energy security at Community level:

- Security, solidarity and trust through: diversification of Europe's energy sources, collaboration to ensure a high level of energy security for EU countries, solidarity and cooperation between the main energy producing countries as well as between countries through which energy is transited, ensuring transparency of commercial energy supply contracts and the protection of the confidentiality of sensitive information;
- The fully integrated European energy market by: connecting internal markets through interconnections with a key role for improving security of energy supply, fully implementing and updating existing and related energy legislation, increasing regional cooperation in a common framework enabling the free flow of energy between the countries of the European Union, new benefits for consumers and the protection of vulnerable consumers;
- Improving energy efficiency in order to reduce dependence on energy imports with an impact on reducing gas emissions as well as growth and job creation;
- Decarbonising the EU energy system by using low-carbon energy sources and reducing the use of fossil fuels;
- Research, innovation and competitiveness by promoting advances in innovative technologies that must meet the following conditions: be reliable, secure, sustainable and environmentally friendly.

As a structural element of the European Green Deal, the renewable energy sector is one of the areas of action aimed at stimulating the most efficient use of resources, reducing pollution and restoring biodiversity. Thus, in order to grow a sustainable economy, the European Commission aims for climate neutrality by 2050 and a share of 32% of renewable energy and by 2050 a reduction of greenhouse gas emissions by at least 55% [3].

Regarding the share of renewable energy, at national level, the target on the share of energy from renewable sources was recalculated from a share of 27.9% in PNIESC for 2030 to a share of 30.7% [4].

Returning to bioethanol, which is defined as ethanol produced from biomass and/or biodegradable adherents for use as fuel, is a viable alternative to conventional fuel. It can occur from several sources. One source is starchy plants (corn, wheat, barley, oats, rye and starchy potato crops). Another source is made up of plants rich in sucrose (sugars), among which we mention sugar cane, sugar beet and sugar sorghum.

Regarding the annual production of ethanol worldwide, it is observed that the leader in this segment is the United States with a percentage of 53% of world production, followed by Brazil with 30%. At EU level, the cumulative production of the 28 Member States was only 5%, 10.8 times lower than the production recorded by the main bioethanol producer (Table 1).

Also, table 1 shows a decrease in production in 2020 compared to the previous year. These declines can be attributed to adverse weather conditions as well as declining ethanol market demand as a result of global measures to combat the COVID-19 pandemic. Thus, the main producer of bioethanol registered decreases of 11.7% compared to 2019, when the production obtained registered

values of 52.72 mil.kl. And in the case of Brazil, the world's second largest producer of ethanol,there was a decrease in production in 2020, compared to 2019, of 7.7%, with a production of 30.02 mil.kl. Regarding the production of ethanol at the level of the European Union, there is a decrease of 8.9%, registering a production of 4.73 mil.kl.

Table 1. Annual global ethanol production (mil. Gal./mil. Kl)

Region	2015	2016	2017	2018	2019	2020	% of world production	% change 2020/2019
United States							**53%**	**-11.7%**
Mil.gal *	14,807	15,413	15,936	16,091	15,778	13,926		
Mil.kl	56.05	58.34	60.32	60.91	59.73	52.72		
Brazil							**30%**	**-7.7%**
Mil.gal *	7,200	6,750	6,650	7,990	8,590	7,930		
Mil.kl	27.25	25.55	25.17	30.25	32.52	30.02		
EU							**5%**	**-8.9%**
Mil.gal *	1,360	1,360	1,420	1,450	1,370	1,250		
Mil.kl	5.15	5.15	5.38	5.49	5.19	4.73		
China							**3%**	**-12.1%**
Mil.gal *	770	670	800	770	1,000	880		
Mil.kl	2.91	2.54	3.03	2.91	3.79	3.33		
India							**2%**	**+ 1%**
Mil.gal *	190	280	two hundred	430	510	515		
Mil.kl	0.72	1.06	0.76	1.63	1.93	1.95		
Canada							**2%**	**-17.8%**
Mil.gal *	450	460	460	460	520	428		
Mil.kl	1.70	1.74	1.74	1.74	1.97	1.62		
Thailand							**2%**	**-7.4**
Mil.gal *	310	340	390	390	430	400		
Mil.kl	1.17	1.29	1.48	1.48	1.63	1.51		
Argentine							**1%**	**-17.9%**
Mil.gal *	220	240	290	290	280	230		
Mil.kl	0.83	0.91	1.10	1.10	1.06	0.87		
The rest of the world							**2%**	**-4.5%**
Mil.gal *	393	487	454	529	522	500		
Mil.kl	1.49	1.84	1.72	2.00	1.98	1.89		
Total								
Mil.gal *	**25,700**	**26,000**	**26,600**	**28,400**	**29,000**	**26,059**		
Mil.kl	**97.29**	**98.42**	**100.69**	**107.51**	**109.78**	**98.64**		**-**

Source: **RFA analysis of public and private data sources;* https://ethanolrfa.org/statistics/annual-ethanol-production/

In Romania, the bioethanol energy market is in full development, the first production capacity being put into operation since 2008 in Brăila. At national level, bioethanol is obtained from plant cultures that contain large amounts of sugars or components that can be converted into sugars (starch or cellulose). The agricultural energy resources underlying the production of bioethanol are: cereals (corn, wheat, barley, rice), sugar beet, sweet potatoes, sweet sorghum, sorghum grains.

Regarding the potential for bioethanol production at national level, it is noted that in 2019 the wheat surplus was 5.31 million tonnes, the production potential of bioethanol being 2.1 million kilotons. Also, in the case of maize, the production surplus was 6.13 million tonnes, so that the production potential of bioethanol would be 2.5 million kilotons. Thus, it is found that the total production of bioethanol from wheat and corn would be 4.6 million kilotons. This fact can rank Romania close to the total productions registered at EU level in 2019 (Table 2).

Table 2. Bioethanol production potential in Romania

Year	Wheat		Maize		Total bioethanol production (wheat + corn) (mil. kilotone)
	Surplus (mil. tons)	Bioethanol production potential (mil. kilotone)	Surplus (mil. tons)	Bioethanol production potential (mil. kilotone)	
2017	4.60	1.8	3.31	1.4	3.2
2018	5.19	2.0	4.26	1.7	3.8
2019	5.31	2.1	6.13	2.5	4.6

Source: trademap statistical data processing, accessed April 2021

In order to have an overview of the future prospects for renewable energy that Romania should undertake in this paper, using the SWOT analysis methodology, the strengths, weaknesses, opportunities and threats to bioethanol processing in Romania.

A. Strengths

- Romania promotes a favorable policy for the production and use of bioethanol.
- The use of bioethanol reduces the dependence on imports of fossil fuels, contributing greatly to energy independence, reduces air pollution and thus global climate change caused by the greenhouse effect, contributes to job creation and encourages the development of the economy in areas rural.
- Bioethanol can be produced from various raw materials (sugar, starch or cellulose), which allows crop diversification.
- Existing technologies can be used to grow sucrose and starch-rich plants.
- A wide variety of raw materials are used to produce bioethanol from cellulose due to the fact that many plants contain significant amounts of cellulose. The raw materials also come from non-food crops that prevent soil erosion and protect the soil water.
- Crops intended for bioethanol capture CO2 and remove oxygen until harvest.
- Some plant residues resulting from the process of obtaining bioethanol can be reused for heating.
- Bioethanol can be mixed with gasoline in any proportion.
- Bioethanol used as a fuel has a higher octane number than gasoline, with an effect on reducing fuel consumption and increasing electricity.
- Ethanol combustion results in low CO2 emissions.
- Compared to fossil fuels, bioethanol is biodegradable.
- In small amounts, ethanol is not toxic to humans and the environment.

B. Weaknesses

- High raw material costs for crops with high sucrose and starch content, especially through the use of large quantities of fertilizers and disease and pest control substances.
- The process of processing ethanol from cellulose-rich crops is more expensive because it requires higher energy consumption.
- The use of bioethanol on a larger scale can create problems related to deforestation and food security of the population. This may be due to the replacement of agricultural crops for human and animal consumption with agricultural crops for biofuels.
- Quite large financial investments are required for the production of bioethanol.
- Bioethanol used as a fuel cannot be used in a large percentage for old cars and should be avoided in aviation, motor boats or seagoing ships.
- At low temperatures, cars that use pure bioethanol E100 start much harder, which is why ethanol mixes with gasoline in various proportions.

C. Opportunities

- Development of the research and development sector in the field of biofuels.

- The positive effects on the environment of the use of biofuels can lead to the establishment of mechanisms to stimulate the production of raw materials for obtaining bioethanol and tax facilities for both agricultural producers and bioethanol processors.
- Romania may be one of the EU countries exporting bioethanol.
- By supplying the production capacity of bioethanol plants with raw materials from local sources, the opportunity arises to develop additional business in the value chain in rural areas.
- In Romania there is a possibility that agricultural productivity will increase, which may lead to a decrease in production costs for raw materials used in bioethanol processing.

D. Threats

- The raw materials used to obtain bioethanol from starch and sugar come from food crops, which can lead to food insecurity.
- The share of energy for processing ethanol from cellulose-rich crops is higher than the processing of ethanol from crops rich in sucrose or starch.
- The use of large amounts of fertilizers and pesticides in crops used to obtain bioethanol, which can lead to soil and air contamination.
- Given that the legislation on the use of bioethanol is not very precise, it is possible that its distribution will be limited.
- By using raw materials from cellulose-rich crops, there is a risk that these lands will be deforested, with serious consequences for landslides.
- Through the large-scale use of cereals to obtain bioethanol, there is a possibility that their price will increase at a rapid pace.

CONCLUSIONS

In order to mitigate the threats posed by climate change, which continue to pose a danger to human security, sustainable agricultural solutions that are economically and ecologically viable must be promoted.

Being a 100% biological energy source, bioethanol is considered a renewable energy source that provides a sustainable environment by reducing carbon dioxide emissions with an impact on climate change control.

As a result of this study, we can mention the following conclusions:

- Bioethanol has a number of advantages that place it among the main sustainable and renewable energy resources. The main advantage of bioethanol is that it reduces dependence on fossil fuels, which can be replaced with fuels from renewable plant sources.

- Intensify investments in the development and modernization of bioethanol production capacities for better integration of energy from renewable sources.

- Implementation of mechanisms to stimulate the production of bioethanol through legislative interventions to support both agricultural producers of raw materials needed to obtain bioethanol and bioethanol producers.

- The SWOT analysis presents some considerations for the development of the bioethanol processing sector which may be viable arguments for a future strategy of Romania's industrial policies, including energy policy.

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COMPARATIVE ANALYSIS OF AGRICULTURAL HOLDINGS IN ROMANIA BY SIZE CLASSES

ALEXANDRA MARINA MANOLACHE [1]

Abstract

The approach regarding the comparative analysis of the performance of agricultural holdings is represented by the current level of development of the national economy, in order to achieve the evolution of agricultural holdings in Romania. This paper is based on the comparative analysis of statistical data from a quantitative and qualitative point of view, highlighting agricultural holdings and their utilized agricultural area, in order to perform a comparative analysis between the size classes of the area by categories. of use. The purpose of this paper is to identify solutions to increase the number of medium sized farm.

Keywords: farms, areas, agricultural

JEL classification: Q10, Q15

INTRODUCTION

The agricultural holding is a production unit, which within a distinct patrimony uses as main means of production land, plants and / or animals, in order to achieve a regular agricultural production. In the economic literature and in current practice, the notion of agricultural exploitation and those of agricultural unit and agricultural enterprise are used together, often intersecting or even substituting. Agricultural holdings are also classified according to other criteria than the legal status, for example according to the management system practiced, market relations and the form of ownership. Based on the definition of the three concepts in the literature, it follows that their scope and the delimitation of the notion of "agricultural holding" is as follows:

Plant production and animal production

1. Primary processing and capitalization of production
2. Provision of services and scientific and technical assistance
3. Promoting and defending agricultural interests

MATERIAL AND METHODS

As a method of analysis, the data in this paper are based on the structural survey in agriculture, which aimed to highlight how, in Romania, policies are implemented to ensure increased profitability in agricultural holdings in Romania. A number of significant elements are presented in relation to the level, which take into account the size of agricultural holdings, how they have evolved and the need to ensure an increase in these holdings as an area. In this paper, are presented synthetic tables, data series, which reveal how this activity has evolved and, in particular, the number and size of agricultural holdings, moving towards criteria to perform a comparative analysis between the size classes of area by categories of use to identify and ensure the efficiency of the number of medium-sized agricultural holdings.

RESULTS AND DISCUSSION

In the economic literature and in current practice it is used alongside the notion of agricultural holding and those of agricultural unit and agricultural enterprise, often intersecting or even substituting. It follows from the above that the definition of agricultural holdings must state that: it is

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an economic unit; of production; whose basic activity is the exploitation of land, plants and / or animals; in order to obtain agricultural products.

Table 1- Number of agricultural holdings according to legal status and size class

Legal status of agricultural holdings	**Under 0,1**	**0,1-0,3**	**0,3-0,5**	**0,5-1**	**1-2**	**2-5**
Agricultural holdings (Number)						
Agricultural holdings without legal personality	351,529	554,218	295,078	566,307	628,781	657,175
Individual farms	351,274	553,746	294,802	565,945	628,166	653,806
Authorized natural persons, individual enterprises, family enterprises	255	472	276	362	615	3369
Agricultural holdings with legal personality	365	1,178	687	1,207	1,580	2,822
Autonomous kings	0	1	2	4	2	9
Agricultural companies / associations	1	9	0	14	11	23
Trading companies with majority private capital	167	608	384	693	822	996
Trading companies with majority state capital	0	4	3	6	1	10
Research institutes / stations, agricultural schools (high schools)	2	2	1	4	8	11
Municipalities	4	8	9	9	17	35
Other public institutions	12	16	7	17	17	21
Cooperative units	1	2	5	3	2	1
Other types (foundations, religious establishments, schools, etc.)	178	528	276	457	700	1717
TOTAL	**351,894**	**555,396**	**295,765**	**567,514**	**630,361**	**659,997**

Source: Structural Survey in Agriculture (ASA 2016)

For the size class below 0.1-2-5, the following can be observed: depending on the legal status ofagricultural holdings, it is noted that agricultural holdings without legal personality registered a total of 659997, which is in first place, followed by of individual agricultural holdings with a total of 630361 holdings, and on the last place are placed the autonomous utilities, agricultural companies / associations, commercial companies with majority state capital and cooperative units, these being the most disadvantaged, because they registered the lowest number of the 13 agricultural holdings according to their legal status. Depending on the size classes for the number of agricultural holdings, it can be stated that: the size class below 0.1 holds the smallest total with a number of 351894 holdings, followed by the size class 0.3-0.5 with a total of 295765, for the rest of the size classes, respectively 0,1-0,3-05-1, these being very close more precisely with a number of holdings with a total of 555396, respectively 567514, and the highest records were registered at size class 2-5 with a total of 659997, followed by size class 1-2 with a total of 630361 holdings.

Table 2 - Number of agricultural holdings according to legal status and size class

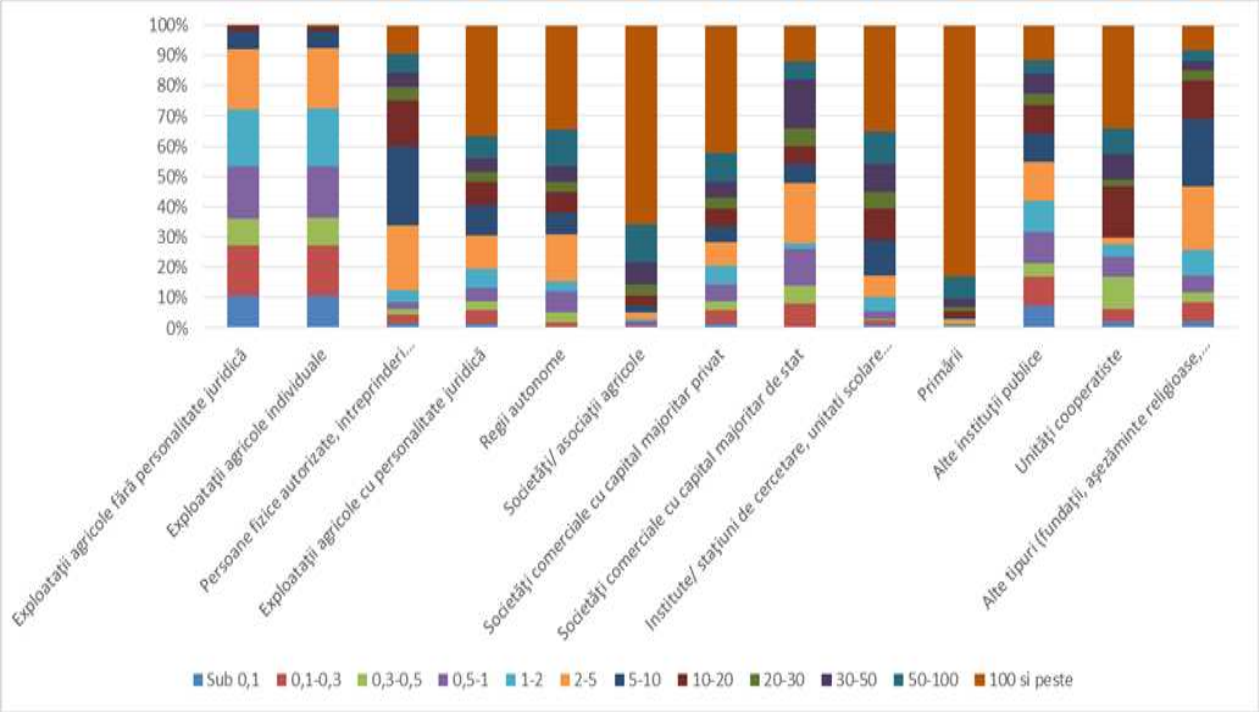
Legal status of agricultural holdings	**5-10**	**10-20**	**20-30**	**30-50**	**50-100**	**100 and over**	**Total**
Agricultural holdings (Number)							
Agricultural holdings without legal personality	191,606	48,265	10,137	6,384	4,134	2921	3,316,535
Individual farms	187,448	45,854	9,451	5,616	3,123	1,441	3,300,672
Authorized natural persons, individual enterprises, family enterprises	4,158	2411	686	768	1011	1,480	15,863
Agricultural holdings with legal personality	2,594	1947	855	1,147	1,879	9,389	25,650
Autonomous kings	4	4	2	3	7	20	58
Agricultural companies / associations	26	37	40	82	144	739	1126

Legal status of agricultural holdings	5-10	10-20	20-30	30-50	50-100	100 and over	Total
Trading companies with majority private capital	684	751	457	707	1198	5,475	12,942
Trading companies with majority state capital	3	3	3	8	3	6	50
Research institutes / stations, agricultural schools (high schools)	19	17	9	15	17	57	162
Municipalities	28	47	42	78	208	2,368	2,853
Other public institutions	15	16	6	11	7	19	164
Cooperative units	0	8	1	4	4	16	47
Other types (foundations, religious establishments, schools, etc.)	1,815	1,064	295	239	291	689	8,248
TOTAL	**194,200**	**502,212**	**10,992**	**7,531**	**6,013**	**12,310**	**3,342,185**

Source: Structural Survey in Agriculture (ASA 2016)

For the size class under 5-10, 100 and above, the following can be observed: depending on the legal status of agricultural holdings, it is noted that agricultural holdings without legal personality recorded the highest values, with a total of 3,316,535, followed by of individual agricultural holdings with a total number of 33,000,672 holdings, and the lowest values were found in the companies with majority state capital with a total number of 50, and on the last place being ranked the cooperative units, size class 50 -100 registered a total of 6,013 holdings, being the smallest value noticed in this size class, and most agricultural holdings were found in the size class 10-20 with a total number of 502,212, this being in top ranking of the analyzed size classes.

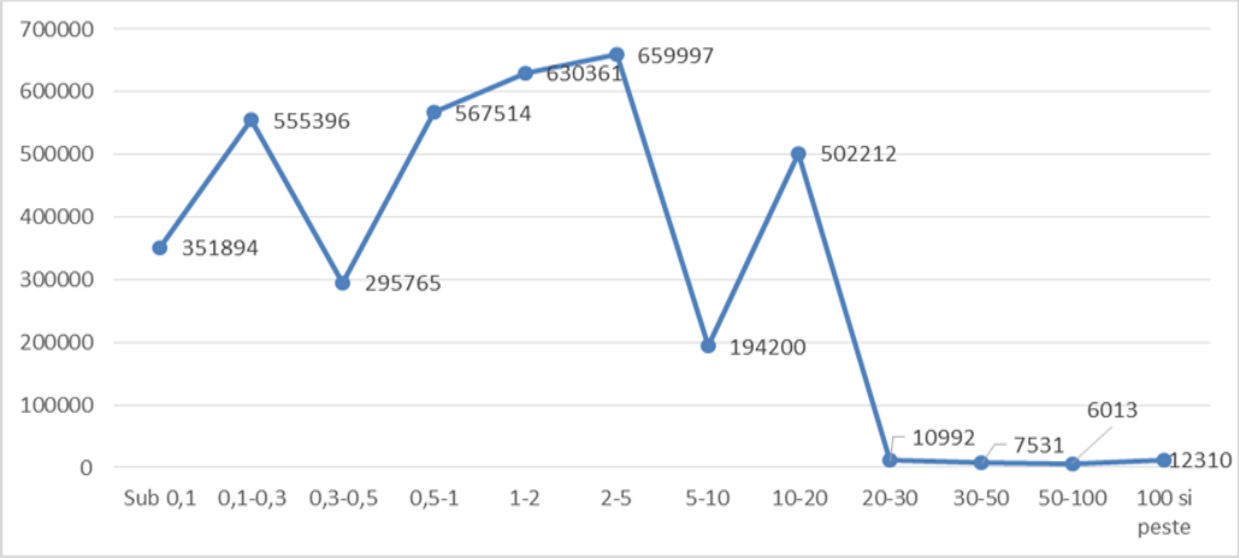
Figure 1. The share of the number of agricultural holdings according to the legal status and size classes



Depending on the legal status, of the total agricultural holdings without legal personality, most holdings are registered for the marine class 2-5 hectares, with a share of 19.8%, with the same share are also found the individual agricultural holdings, for the class of size 2-5 hectares, followed by the size class 1-5 hectares where a share of 19% was registered both on agricultural holdings without legal personality and on individual agricultural holdings, analyzing the authorized physical platforms, individual enterprises and family enterprises , we note that in the marine class 10-20, there was a share of 26.2%, and the fewest farms were noted in the size class 50-100 hectares with a share of

0.1%, followed by the size class 100 and everywhere with a share of 0.1%, both for agricultural holdings without legal personality and for individual agricultural holdings, these being the lowest shares registered from all the size classes analyzed, but not least other types (foundations, religious establishments and schools), where here are determined weights between 0.2% and 0.4% for size classes 30-50 and size class 100 and over.

Figure 2. Distribution of the total number of holdings according to size classes



For the distribution of the total number of agricultural holdings there is a different trend from the normal distribution, the highest frequency of holdings recorded for small holdings representing 659997 holdings, between 2-5 hectares, and the lowest frequency of holdings the size class 30-50 hectares was noted, with 7531 farms, a segment where most farms should be found according to the Gaussian curve, for an intensive agricultural sector.

Table 3. Area of agricultural holdings according to legal status and size class

Legal status of agricultural holdings	Under 0.1	0.1-0.3	0.3-0.5	0.5-1	1-2	2-5
Agricultural area used (hectares)						
Agricultural holdings without legal personality	18337.46	99508.36	114334.32	405657.78	898411.03	2039257.14
Individual farms	18319.89	99436.84	114226.39	405406.97	897521.62	2027208.76
Authorized natural persons, individual enterprises, family enterprises	17.57	71.52	107.93	250.81	889.41	12048.38
Agricultural holdings with legal personality	20.72	219.14	265.34	837.03	2195.81	9362.64
Autonomous kings	0	0.22	0.64	3.41	2.24	28.88
Agricultural companies / associations	0.02	1.61	0	9.64	16.35	72.83
Trading companies with majority private capital	9.96	115.62	149.31	485.89	1149.46	3166.15
Trading companies with majority state capital	0	0.82	1.13	4.03	1.00	33.54
Research institutes / stations, agricultural schools (high schools)	0.09	0.25	0.48	3.39	10.02	37.32
Municipalities	0.19	1.69	3.65	6.09	23.25	121.37
Other public institutions	0.62	2.97	2.51	11.78	24.17	69.22
Cooperative units	0.08	0.34	2.17	1.65	2.86	3.40

Legal status of agricultural holdings	Under 0.1	0.1-0.3	0.3-0.5	0.5-1	1-2	2-5
Other types (foundations, religious establishments, schools, etc.)	9.76	95.62	105.45	311.15	966.46	5829.93
TOTAL	18358.18	99727.50	114599.66	406494.81	900606.84	2048619.78

Source: Structural Survey in Agriculture (ASA 2016)

On the areas of agricultural holdings depending on the legal status, for the size class 2-5 hectares, it can be seen that on agricultural holdings without legal personality a total of 2039257.14 hectares was registered, this being the largest agricultural area used, followed by that of individual agricultural holdings with a total of 20,257,208.76 hectares, these ranking first in the top of agricultural areas according to legal status, decreasing to a total of 2195.81 hectares for agricultural holdings with legal personality for size class 1-2 .

Table 4. Area of agricultural holdings according to legal status and size class

Legal status of agricultural holdings	5-10	10-20	20-30	30-50	50-100	100 and over	Total
Agricultural area used (hectares)							
Agricultural holdings without legal personality	1286788.2	639605.4	242172.4	243266.6	281939.8	656977.55	6926256.09
Individual farms	1257371.8	605859.4	225782.3	212657.3	209754.6	265132.72	6338678.60
Authorized natural persons, individual enterprises, family enterprises	29416.4	33745.9	16390.1	30609.3	72185.2	391844.83	587577.49
Agricultural holdings with legal personality	17568.9	26656.5	20795.5	45372.06	136509.6	5316476.16	5576279.40
Autonomous kings	26.81	57.65	57.87	138.03	513.39	14899.28	15728.42
Agricultural companies / associations	185.14	533.87	973.53	3331.9	10593.09	387878.81	403596.84
Trading companies with majority private capital	4852.7	10792.9	11252.8	28170.12	87378.4	3143488.39	3291011.70
Trading companies with majority state capital	24.38	47.77	71.60	283.86	226.68	2524.57	3219.38
Research institutes / stations, agricultural schools (high schools)	131.13	238.45	203.13	608.96	1160.41	37070.06	39463.69
Municipalities	184.75	701.75	1026.9	3155.8	15283.38	1469367.80	1489876.60
Other public institutions	101.26	221.09	157.01	412.08	494.18	13232.71	14729.60
Cooperative units	0	105.75	22.82	150.9	290.10	4079.69	4659.71
Other types (foundations, religious establishments, schools, etc.)	12062.7	13957.3	7029.9	9120.4	20570.01	243934.85	313993.46
TOTAL	**1304357.1**	**666261.9**	**262967.9**	**288638.7**	**418449.4**	**5973453.71**	**12502535.49**

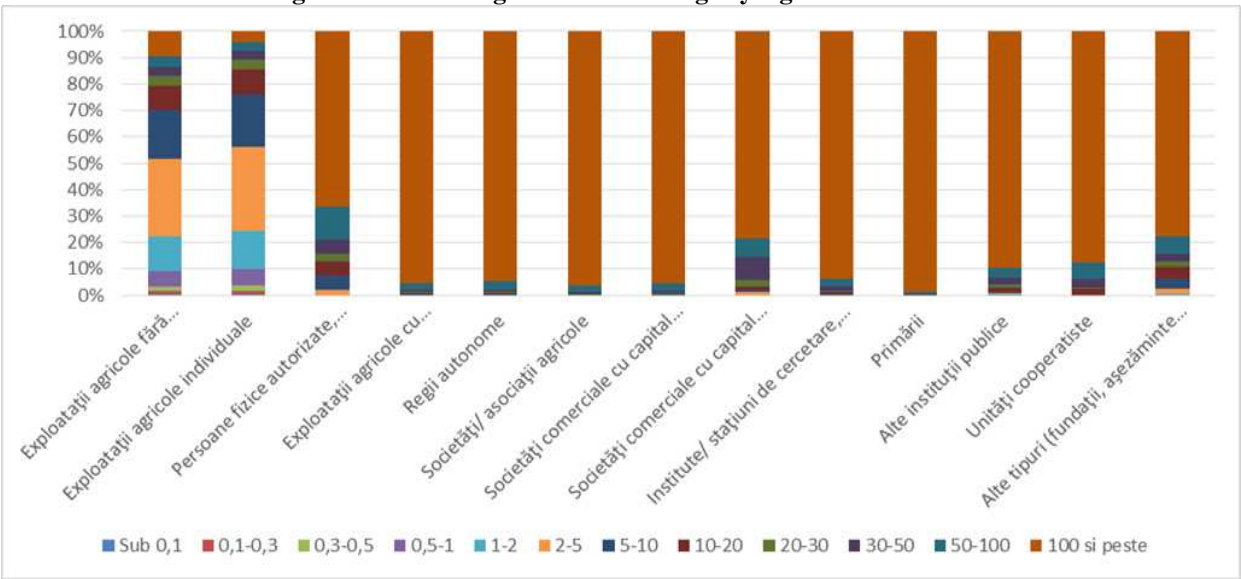
Source: Structural Survey in Agriculture (ASA 2016)

Analyzing the rest of the size classes of agricultural areas, we notice here a decrease for the size class below 0.1 in agricultural companies / associations with a total number of 0.02, and in the autonomous utilities no registered total was found, which represents that in this class size below 0.1 we have the lowest values noticed, being the lowest but also drastic value determined in the 13 areas of agricultural holdings analyzed by size class.

Analyzing the areas of agricultural holdings according to the legal status for the size class 5-10 hectares -100 and over, the following can be stated: both for agricultural holdings without legal personality and for individual agricultural holdings in the size class 5-10 hectares, these holdings registered a total of 1286788.2, respectively 1257371.9 hectares, these being the largest farms in terms of size classes analyzed, leaving the opposite pole with the smallest areas were noted

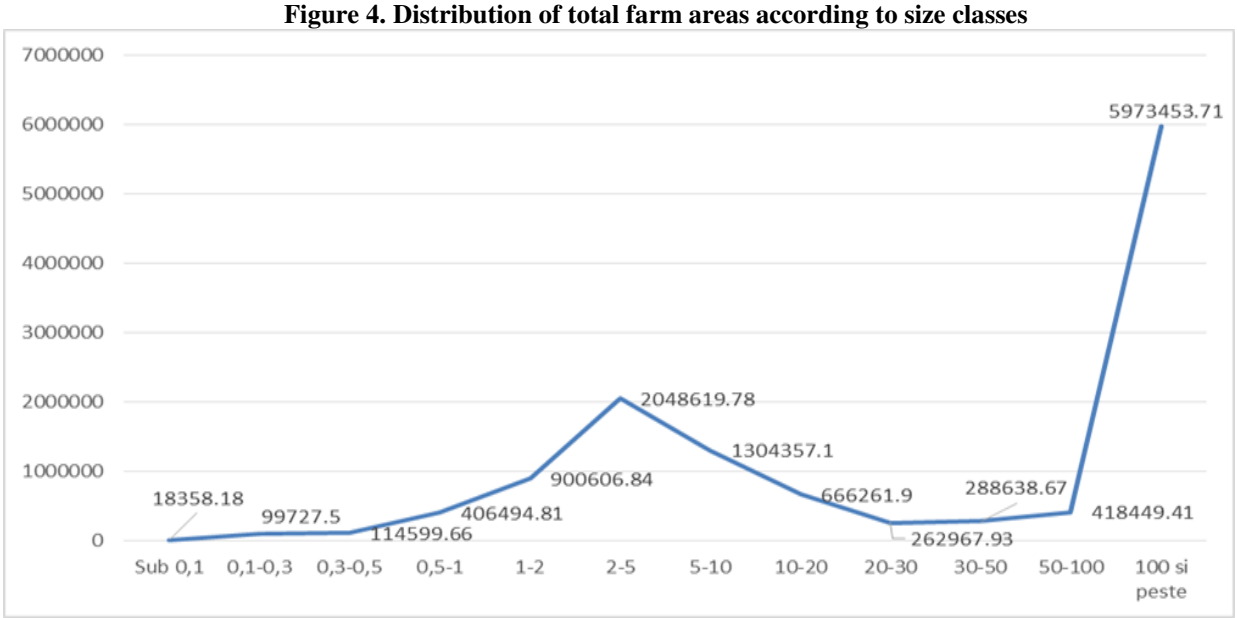
autonomous utilities, where it was registered here a total of 26.81 for the size class 5-10, but also for the size class 10-20 where the total was 57.65 hectares, these being the smallest areas of agricultural holdings depending on the legal status of the analyzed size.

Figure 3. Share of agricultural holdings by legal status and size classes



Depending on the legal status, out of the total agricultural holdings without legal personality, the largest holdings are registered at individual agricultural holdings with a share of 32%, and a share of 28% for agricultural holdings without legal personality, these being the largest shares registered for the analyzed size classes, and the lowest weights were noted for authorized individuals, individual enterprises, agricultural holdings with legal personality, agricultural companies / associations, commercial companies with majority private capital / state but also research institutes / stations , agricultural units with agricultural profile where here their share was between 0.1% and 0.5% for most size classes, due to the fact that agricultural holdings are quite small and few in number, hence the fact that agricultural areas have small number.

Figure 4. Distribution of total farm areas according to size classes



For the distribution of total areas of agricultural holdings, the situation is similar to the distribution of holdings, as is natural, the difference being given by the fact that large holdings hold

from 100 and over 100 hectares, so the frequency of areas in this size class reaches maximum the schedule of 5.97 million hectares, and the minimum frequency reaches 99.7 thousand hectares.

CONCLUSIONS

Just as the enterprise is an economic unit in which the production activity of the various branches of the national economy is carried on, the agricultural holding by definition is a specific economic unit in which certain production activities in agriculture are carried out.

However, the agricultural holding is not only the place where, using as main means of production land, plants and / or animals in order to achieve a certain production, but also the place where a large part of the Romanian nation's family live and work. , which in fact is the basis of the existence of a large part (1/2) of the country's population, which manages most of the territory, which participates directly and directly in maintaining and improving the ecological balance. Thus, the problems of agricultural farms go beyond the strict framework of a certain branch of production, they are closely intertwined with the wider demographic and social issues. The level and mode of development and even the performance of agricultural holdings depend on the development of society as a whole, and specifically on the relationship between the agricultural land resource and the population encumbering it.

The present paper focuses mainly on agricultural holdings, noting that their number has decreased due to the concentration of areas, which is a positive element in the desire to ensure a superior agrotechnical processing of the land.The conclusion on the concentration of agricultural holdings is also based on the need to ensure the optimal conditions for the resumption of irrigation of fertilization, chemicalization and mechanization with the superior agrotechnical means of agricultural works.

Regarding the number of holdings, it can be concluded that for the small size classes there is a very large number of holdings and a very small number for the large size classes.

From the point of view of the areas in operation, there are two types of farms - the very small and the very large, which means a division of the agricultural sector, but there is a complete lack of medium-sized farms.

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RESILIENCE OF AGRI-FOOD SYSTEM IN THE EU CONTEXT - PANDEMIC CRISIS LESSONS AND SECTORAL OVERVIEW

MIRELA RUSALI [1]

Abstract

Covid-19 crisis have revealed the most fragile social and economic aspects worldwide while confronting this overpowering collective challenge, yet having more impact on zones already vulnerable before pandemic broke in the first wave. Covidemia affected the agricultural sector in EU in the extent that it was already challenged by other threats regarding production, or other causing market uncertainties. Moreover, inequalities in access to food have been probable aggravated. The main lesson the pandemic might have given to people and policy makers so far is that health and life are of paramount importance. Still, effects on the global food system were perceived as a distress on food security worldwide, with market closures, supply disruptions, and losses of employment and income. The purpose of the paper stands in understanding the extent and nature of these impacts is essential to building resilience to future shocks. The research contains a synthesis of main impacts of pandemic crisis on agri-food value chain and reactions in EU, following a stocktaking of recent studies and reports provided online; as well, an overview on the state of Romania's manufacturing agri-food sectors in the EU context, based on economic indicators of food manufacturing enterprises, using the most recent statistics from Eurostat and NIS. The results revealed certain gaps and vulnerabilities, underpinning the further needs for targeted policies towards supporting the national food industry resilience as the major driver of socio-economic security, within crisis and post-crisis, as a basis of sustainable agri-food system.

Keywords: agri-food system, manufacturing enterprises, resilience.

JEL classification:, Q13, L66, F6

INTRODUCTION

Currently, food systems face an overwhelming triple challenge: food systems must provide food security and nutrition for a growing population and livelihoods to millions working in food supply chains, all while becoming more environmentally sustainable (www.oecd.org), to which Covid-19 pandemic has placed unprecedented stresses on food supply chains i.e. bottlenecks in farm labour, processing, transport and logistics, as well as momentous shifts in demand. Most of these disruptions are a result of policies adopted to contain the spread of the virus. The evidences so far shows impacts felt widely, but unevenly. Farm operations do not face major Agricultural activities do not have negative effects problems, while small and medium-sized enterprises (SMEs) face significant problems. Governments will have to develop policies to respond to these stresses and varied impacts to avoid supply chain disruptions, higher food prices, and severe economic fallout for millions of employees. (Reardon et al, 2020).

Although the impacts of Covid-19 are still unfolding unpredictably, recent experience shows that food supply chains proved resilience in the face of the stresses, as well the importance of an open and predictable international trade milieu to ensure food arrive where is needed (OECD, 2020). It strikes as well that the biggest risk to food security is with consumers' access to food, more then with food availability, requiring safety nets are essential to avoid an increase in hunger and food insecurity. Consequently, the primary risks to food security reside at the country level, in condition of increasing retail prices, combined with decreasing incomes impacts on reduced quantity and quality of households' food consumption (wordbank.org). However, the role of member states to address any future crises which may affect agri-food sectors in EU is likely to remain central, at least in the short-term considering the reform of the CAP and the MFF 2021-2027 (Montanariet al., 2020).

Disruptions of the agri-food market in the previous decade caused the contestation of global agricultural-alimentary system as the only guarantor of the food security of particular countries, indicating that it is advisable to have not only a certain level of food self-sufficiency but to be based on local systems (Wigie and Kowalski, 2017). The increasing social movement for health care

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underscores consciousness for nutritious and organic food, stimulated awareness that manufacturing food should evolve to increase the reliability and resilience of local communities.

Understanding the extent and nature of these impacts is essential to building resilience to future shocks, requiring appraisal on vulnerabilities of national food system and fitting policies.

MATERIALS AND METHODS

The research contains two main parts: A synthesis of main impacts of pandemic crisis on manufacturing agri-food sectors and reactions in EU, following a stocktaking of recent studies and reports provided online; An overview upon the state of Romanian food manufacturing sector based on analysis of key indicators of the economy of food enterprises, using the most recent statistics from Eurostat and NIS – Tempo online, by sections and divisions of NACE Rev.2 classification.

The analytical framework operates with the following concepts and definitions:

Resilience *is the ability of individuals, households, communities, cities, institutions, systems and societies to prevent, resist, absorb, adapt, respond and recover positively, efficiently and effectively when faced with a wide range of risks, while maintaining an acceptable level of functioning and without compromising long-term prospects for sustainable development, peace and security, human rights and well-being for al (UN, 2017).*

From food-security perspective, which is *the situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy* life (FAO, 2020), a food system should comprisefour dimensions: food availability, economic and physical access to food, food utilization and stability over time. However, the recent challenges demonstrated that the concept of food-security is evolving to recognize the centrality of *agency* and *sustainability*[1], as a right to food for all - the two additional dimensions of food security have been proposed by the High Level Panel of Experts (HLPE) of the Committee on World Food Security (CFS).

RESULTS AND DISSCUSION

1. Main effects of covidemia in the EU food chain

The food processing and manufacturing sector, including beverages, is the largest industrial sector and the largest employer in the EU, in addition to being a key contributor to the EU economy. (FoodDrinkEurope 2020). The impact of the pandemic on the EU agri-food supply chain has been manifold. Generally, it has demonstrated a high degree of resilience, while the value of the output of the agricultural industry declined by 1.4% in 2020 compared to 2019, although, when compared to the 2015-2019 average, it grew by 2.9%. Nonetheless, sectors highly dependent on the food service (e.g. wine, beef and veal) have faced major difficulties. Flowers and plants and sugar have also suffered considerable financial losses (Montanari et al., 2020).

The outbreak of the Covid-19 pandemic has caused serious disruption to food processing and production operators in the EU. At the beginning of the pandemic, food processors and producers were under great pressure as they had to respond to an unexpected increase in consumer demand for certain foods and / or shelf-stable foods, such as ready meals, preserves, flour and pasta. . At the same time, the normal functioning of the agri-food supply chain has been hampered by the sudden closure of the EU's internal borders and the unilateral imposition of traffic and health restrictions (eg border controls and quarantine) by different Member States.

[1] *Agency* refers to the capacity of individuals or groups to make their own decisions about what foods they eat; what foods they produce; how that food is produced, processed and distributed within food systems; and their ability to engage in processes that shape food system policies and governance; *Sustainability* refers to the long-term ability of food systems to provide food security and nutrition in a way that does not compromise the economic, social and environmental bases that generate food security and nutrition for future generations(HLPE, 2020).

The application of such restrictions has led to temporary shortages of certain raw materials and equipment essential for food production, including packaging materials. There has also been a decline in the workforce, mainly due to reduced mobility of people between Member States or even in the same country (FoodDrinkEurope 2021). In addition, staff availability was directly affected by the spread of the Covid-19 outbreak virus reported in processing plants (eg slaughterhouses), leading in some cases to temporary cessation of operations. However, EU processing plants did not experience declines in productivity in other countries (for example, the US reported - 40% slaughtering cattle and pigs in the same period) (OECD 2020b).

The total closure of the food service sector in most countries, due to sanitary reasons - a trade channel that traditionally absorbs a significant part (30%) of food and manufacturing production in the EU - has further aggravated the situation, especially for certain categories of food products (e.g. alcoholic beverages, soft drinks, seafood, potatoes etc.). As a result, food and beverage production decreased by 9% in the second quarter of 2020 compared to the same period of the previous year (Montanari et al., 2020).

2. Policy responses to the effects of covidemia on the agri-food chain at EU level

The EU response was highly effective in preserving the integrity of the Single market. On the other hand, measures adopted under the Common Agricultural Policy (CAP) had mixed results having been implemented partially or inconsistently across Member States.

The costs of the crisis for the EU agri-food sector will be borne primarily by Member States. National financial support, in the form of State aids (estimated 63.9 billion EUR) and other instruments – has been significantly higher than EU support (80 mill. EUR in private storage aids).

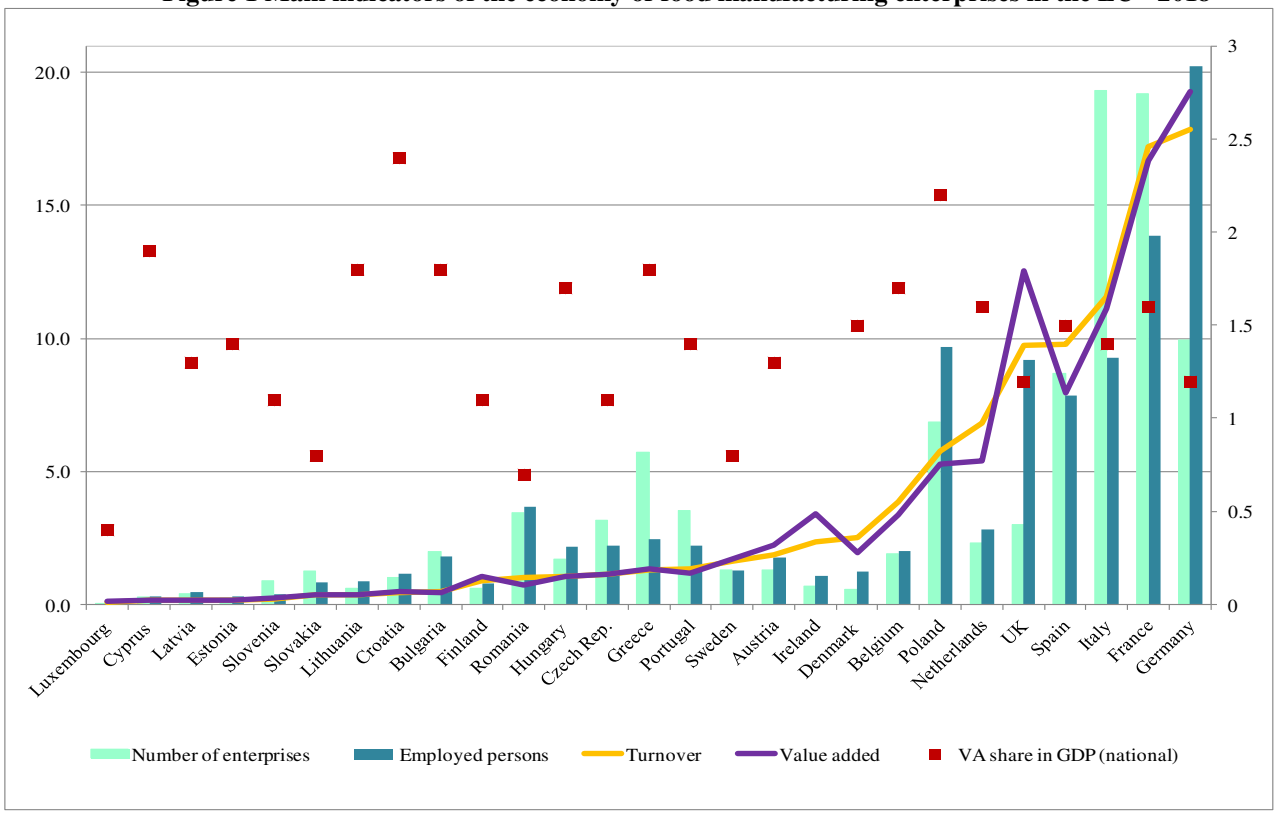
To better respond to future crises, policy responses should be designed following a *foodsystems approach*. Moreover, the reasons behind the limited impact of CAP measures during the pandemic should be better investigated. Consideration should also be given to the decoupling of the CAP crisis reserve from farmers' direct payments to reinforce EU financial capacity during crises. Finally, because of the economic consequences of the pandemic, food assistance programmes for the most deprived are needed.

Of the sectoral measures Romania used only **State-aid schemes** - mechanism used only by Romania, Bulgaria and Luxembourg. Aids consisted of the provision of direct grants at the end of 2020 that is toward the end of grape harvest. In the case of Romania, the grant amounted to 12.4 million EUR. Conversely, a larger group of states, including Austria, Bulgaria, Cyprus, Spain, France, Greece, Croatia, Hungary, Italy, Luxembourg, Portugal, Slovenia and Romania, implemented **specific financial measures** for the wine sector. Most of these measures consisted of **direct subsidies**, although other types of financial support were also provided, including in the context of EU market-management measures.

3. The structure of the Romanian food processing industry and recent evolutions

The indicators presented in Figure 1 describe the profile of the food industry economy in the EU-28, at the level of the year 2018, with a number of 267 thousand enterprises with food processing and manufacturing activities, of which 99.2% are small and medium-sized enterprises, which employed 4.5 million people and generated a turnover of 1037 billion Euros. In the countries included in non-euro area, 19% of the food enterprises in the EU-28 were active, respectively 22% of the employed workforce and generated 11% of the turnover. With a contribution of VA in the food industry equivalent to 0.7% in national GDP, representing half of the EU-28 average, Romania ranks last among non-Euro area countries.

Figure 1 Main indicators of the economy of food manufacturing enterprises in the EU - 2018



Source: Processing of statistics from Eurostat - enterprise statistics for special aggregates of activities NACE R2

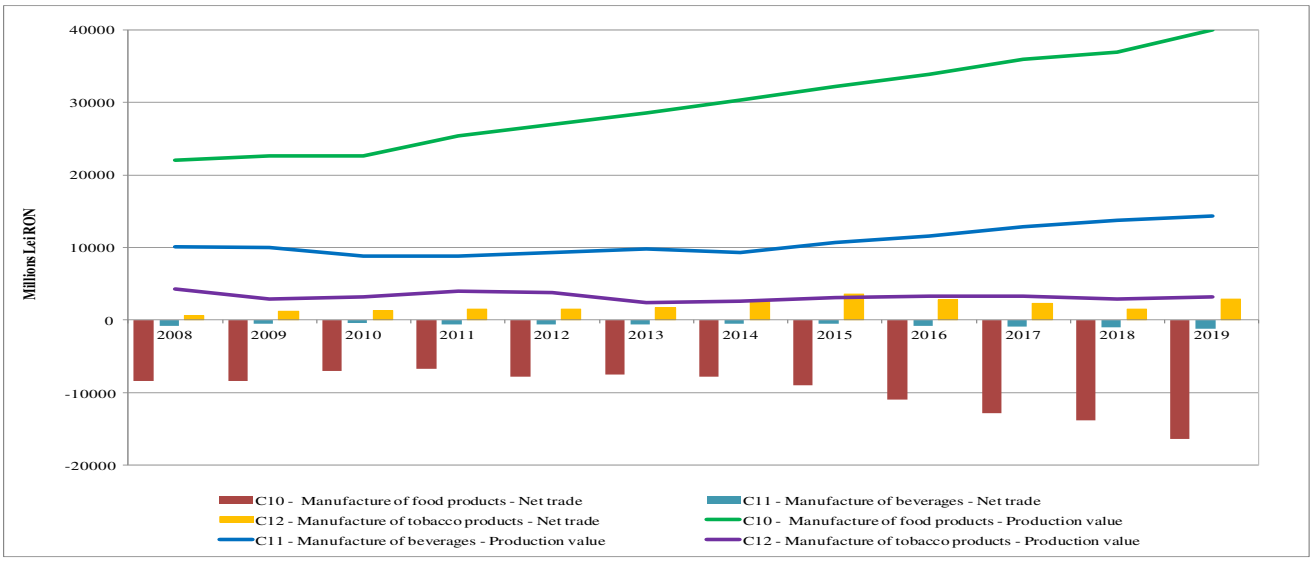
There was a high degree of concentration of value added (VA) of the EU-28 food industry, amounting to 206 billion Euros, estimated at the level of 2018, cumulating, in 5 states, 67% of the total VA obtained in 2018 , respectively: Germany (19%), France (17%), Great Britain (11.8), Italy (11%) and Spain (8.5%). The non-euro area accounted for a cumulative 10.7% of the VA achieved in the food industry sectors at EU-28 level, of which Poland with 5.3% in the EU-28 VA had a major contribution of 48% in the achieved VA by non-Euro zone states, while Romania had a share of 6.6% in VA of the food industry from non-Euro zone.

The importance of the EU-28 food industry, according to the share of turnover in GDP, in 2018, was 7.3% and 9% shares in VA achieved by the manufacturing industry. At the same time, the turnover registered in the Romanian food industry represented 5.6% of the national GDP and 3.9% of the VA acquired by the national manufacturing industry.

Romania has a substantial potential in terms of the number of people employed in the activities of the food industry, 165 thousand, in 2018, representing 3.7% of the EU-28, who worked in 9 thousand enterprises, respectively 3.4% of the EU-28 , ranking 7th among Member States and above the average of the non-euro area, after Poland. However, the economic results that place Romania on the last places compared to the other states, including the non-Euro area except Bulgaria, indicate relative structural gaps and intra-sectoral efficiency problems

With a value added achieved by Romania's food industry amounting to 1.48 billion Euros, in 2018, the apparent labor productivity was only 9 thousand Euro / person. employed in the Romanian food industry, while the EU-28 average was 46 thousand Euro / person. employed, and the average of the non-Euro area, of 22 thousand Euro / pers. employed.

Figure 2. Value of manufacturing and agri-food industry production and net trade (export - import), by divisions NACE Rev.2 – Romania



Source: Processing of statistics from NIS, Tempo – IND130A.

Romania achieved a turnover per enterprise, of 1.12 million Euro, indicating a relative gap (RO = 1) of 3:1 compared to the EU-28 average and 5:1 on labor productivity.

Analysis based on of the latest national statistics in Romania on the value of delivered food industrial production, as presented in Figure 2, indicates an average annual increase of 5.1%, in the period 2008-2019, from RON 22 billion to RON 39.9 billion, but at a slower pace than imports that increased by an average annual rate of 7.8%, from RON 10.2 billion to RON 25 billion.

Although Romania's food exports increased annually by 13.8% on average, from RON 1.8 billion to RON 8.56 billion, imports were 3 times higher in value in the last 10 years, which led to a deficit of -16.4 billion RON in 2019, double compared to the beginning of the analyzed period.

In the manufacturing of beverages sector, the value of Romania's delivered industrial production, in 2019, was RON 14.3 billion and was also deficient in international trade, cumulating -1.15 billion RON. Although Romania's beverages exports increased by an annual average rate of 10.6%, from RON 256 billion in 2008 to RON 862 billion in 2019, the growth of imports had a faster rate of 5, 6%, compared to the increase in production, of only 2.9%.

The volume indices of industrial production by activities of the Romanian industry, base year 2015= 100 , (Table 2), indicate a decrease of production in sections C10-C12, corresponding to the sectors of the agri-food industry, of -3.4 percentage points, from 116% in 2020, compared to 113% in the previous year 2019, while higher compared to the EU-28 which recorded a decrease of -3.2 percentage points in the same period.

It was observed that the production in agri-food industry registered a relative increase compared to the base year, higher in Romania than in the EU-28.

It is also to be noticed that the indices decreases had higher amplitudes at the level of the total manufacturing industry, where Romania had a decrease in production of -12.2 percentage points, while in EU the decrease was -8.9 percentage points.

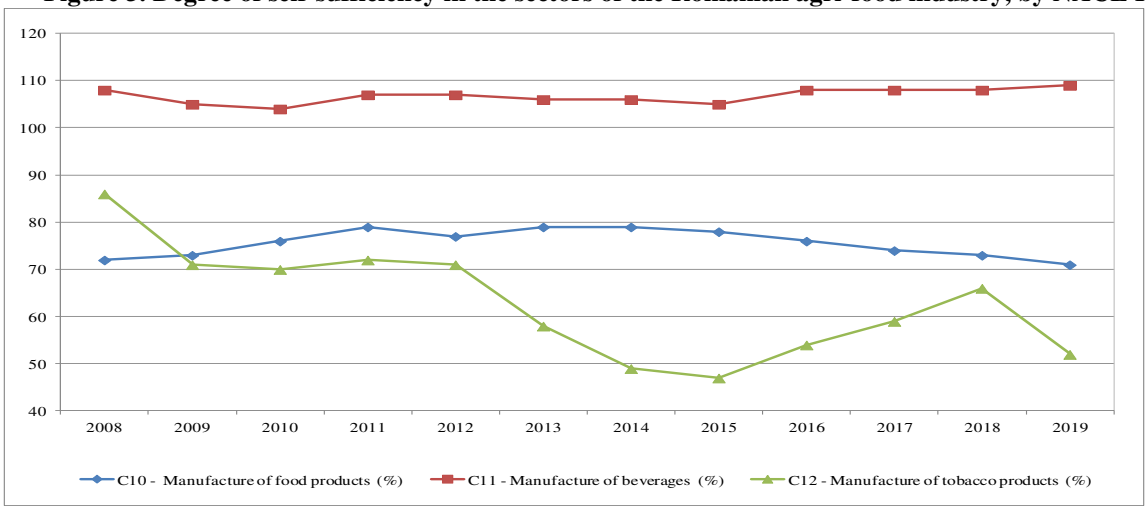
Table 2. Volume index of production in manufacturing and agri-food industry, by sections NACE Rev.2

	C - Manufacturing						C10-C12 - Manufacture of food products; beverages and tobacco products					
	Average 1 (2007-2014)	Average 2 (2015-2019)	Change Average 1 - Average 2	2019	2020	Change 2020-2019	Average 1 (2007-2014)	Average 2 (2015-2019)	Change Average 1 - Average 2	2019	2020	Change 2020-2019
EU - 27 (from 2020)	96	104	7.8	106.5	97.6	-8.9	99	102	3.6	105.1	101.9	-3.2
Romania	81	112	31.4	118.6	106.4	-12.2	90	111	20.8	116.6	113.2	-3.4

Source: Processing of statistics from Eurostat - Calendar adjusted data, not seasonally adjusted data (Index, 2015=100).

At the economic branch level, the agri-food processing industry in Romania presents self-sufficiency only in the beverage manufacturing sector, which maintains for the entire period 2008-2019, as shown in Figure 3. The degree of self-sufficiency was estimated as a share of production in the available domestic consumption. On the other hand, with an average degree of self-sufficiency of 76% in the pointed period and a decrease to 71% in 2019, the food industry sector suffers a chronic deficit of self-sufficiency, of 86% in 2008, to 47% in 2015, following a fluctuating evolution reaching the lowest level, of 52%, in 2019.

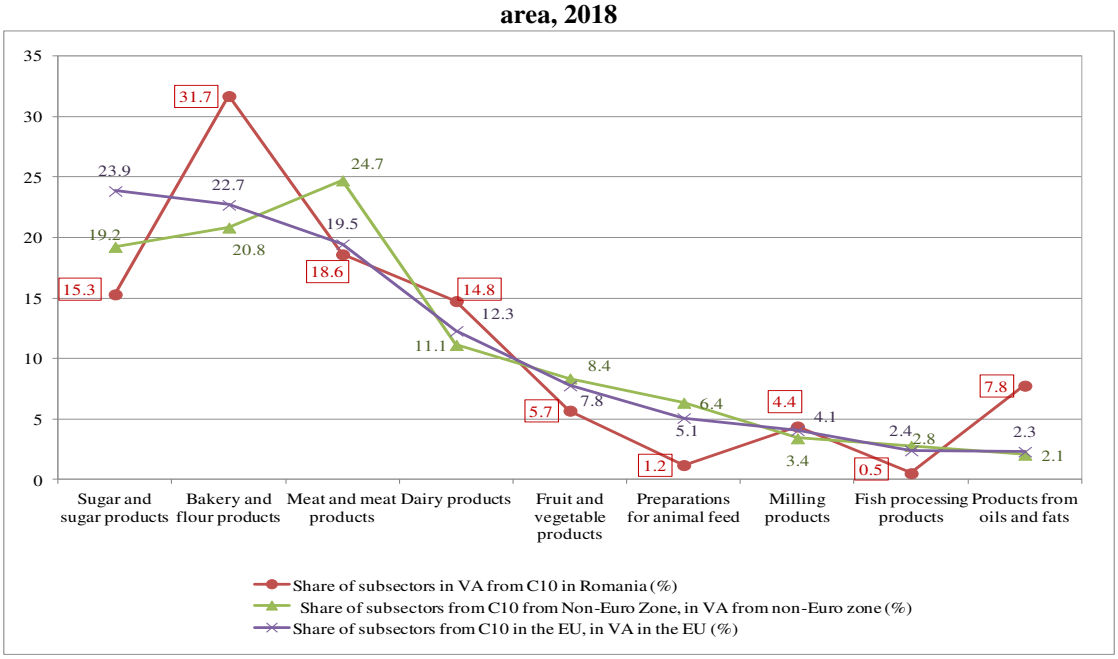
Figure 3. Degree of self-sufficiency in the sectors of the Romanian agri-food industry, by NACE Rev.2



Source: Processing of statistics from NIS – Tempo online.

The analysis at sub-sector level of the contribution of the food industry sectors in the Member States to the value added of the EU-28 food industry (EU-28 = 100), indicated the highest value added, with shares between 24% and 19, 5%, occupied in 2018, the activities of the following sectors: sugar & sugar confectioneries & cocoa products, bakery & flour products, meat & products of meat, and dairy products, 12.3%; together the respective sectors accumulating 78% of the value added achieved in UE-28 (Figure 4)

Figure 4. The importance of the food industry subsectors in VA in Romania, EU-28 and the non-Euro area, 2018

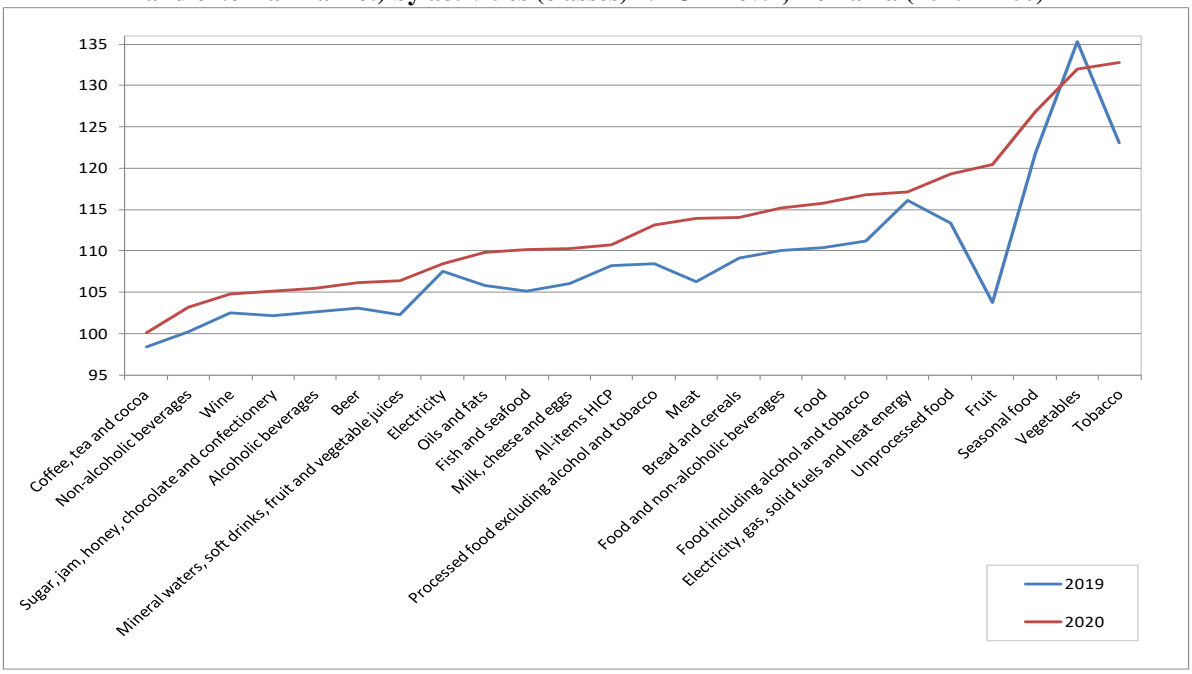


Source: Own calculations and processing of statistics from Eurostat - Annual detailed enterprise statistics for industry.

The same groups of activities of the food processing industry are preponderant as well in value added accumulated by countries in non-Euro area, including Romania, where ranked first was the sector of bakery products, sharing 31.7%, followed by meat & products of meat, 18.6%, sugar & sugar products, 15.3% and dairy products, sharing 14.8% in VA.

The latest statistical information on consumer prices for industrial products in Romania, by activities (classes) CANE Rev.2, indicates an increase in 2020 compared to 2019 in all categories, except vegetables that had the highest price index annual averages of all products, as shown in Figs. 5, of 135% in 2019, decreasing to 132% in 2020.

Figure 5. Indices of average annual consumer prices for industrial production in total (internal market and external market) by activities (classes) NACE Rev.2, Romania (2015 = 100)



Source: Processing of statistics from Eurostat.

Among food products, the highest price volatility, in the year 2020 compared to 2019, was identified in the categories tobacco, vegetables, seasonal foods, fruits, unprocessed foods. However, the evolution of prices for these products, followed by food including alcohol and tobacco and non-alcoholic beverages, bread & cereals, meat and processed foods excluding alcohol and tobacco, was above the level of the Harmonized Index of Consumer Prices (HICP).

On the other hand, below the HICP level, less fluctuating developments were observed in the classes coffee & tea & cocoa, soft drinks, wine, sugar & jam & honey, chocolate & confectionery, alcoholic beverages, beer & mineral waters, soft drinks, fruit & vegetable juices.

CONCLUSIONS

The policy reactions to covidemia in EU and the member states have evidenced some specific patterns for the support provided by member states e.g. state-aid schemes specifically targeting the agri-food value chain, complementary national direct subsidies, additional worker flexibility, among others. However, important differences in the national approaches implemented during the pandemic. For example, the analysis of state-aid schemes and other support measures clearly shows that the financial support to mitigate the impact of the Covid-19 crisis on the EU agri-food chain has come from a complex arrangement of EU and national sources, including the CAP. This makes it difficult to draw a comparison between countries as well as to understand their respective degree of intervention alongside possible or actual risks of market distortions within the Single Market.

The covidemia crisis have revealed the most fragile social and economic aspects worldwide while confronting this overpowering collective challenge, yet having more impact on zones already vulnerable before pandemic broke in the first wave. To these problems and within an uncertain perspectives of the pandemic evolution, policies have to further act having in vision time perspectives according to the priorities: short-term support for key sectors for recovery and resilience, such as agriculture, transport, health and education, as provided for by the European Commission in Communication COM 575/2020 on Member States' recovery and resilience plans in the Annual Strategy for 2021 on sustainable growth; on a regular basis, in the medium term. The limited budget margins and flexibility under the CAP are not fitted to address such disruptions. In this context, tate aids will remain the most important instrument to address unexpected crises possibly under an EU framework similar to that introduced by the EC at the beginning of the pandemic. Nonetheless, additional EU instruments to cope with market crises could also play a significant role if the challenges which have prevented their use during the COVID-19 crisis are better understood and overcome. On the whole, the main lesson which can be drawn from the study is that the implementation of mechanisms ensuring greater coordination and surveillance at EU levelmight be desirable in case of future any crises to avoid uneven recovery processes by the agri-food sector across states.

Consequently, countries should be prepared to activate a complex crisis-strategy mechanism, based on a whole package of concepts, appraisals and policies with specific protocols, procedures and tools able to implement rapid appropriate reaction against shocks alike that provoked by the covidemia and recovery measures.

Assessing the state and trends of the food processing sector in Romania, although indicates a substantial potential in terms of the number of people employed in the sector, above the average of the non-Euro area, after Poland, the economic results place Romania in last place compared to other states exempt Bulgaria. The results signal relative structural imbalances and intra-sectorial efficiency problems and substantial productivity gaps that represent pre-existing vulnerabilities to the outbreak of the pandemic crisis. Given the lessons of the pandemic, to strengthen economic resilience in the agri-food system implies as well a reference component, to return to the level before the shock, but also long-term sustainability.

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NATIONAL RECOVERY AND RESILIENCE PLAN. IMPLICATIONS FOR ROMANIA'S AGRICULTURE

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Abstract

The COVID-19 pandemic crisis has generated a serious economic and social crisis in the European Union. This in return produced a vigorous EU reply that took among other the shape of a strong financial response trough the provisional instrument of the NextGenerationEU financial instrument. One of the key tools is the so-called Resilience and Recovery Mechanism that sees the allocation toward the Member States of important sums of money through grants and loans. The key rule to be followed by the Member States is to provide a National Recovery and Resilience Plan that underlines the measures taken by the State in order to reform its economy following the lines of a green and digital transition. The end outcome is to create a better economy that would withstand future shocks. Even though the emphasis is put on the green transition it also has an impact on the agricultural system. This impact may vary depending on each Member State ingenuity in drafting the targets to be reached in their National Recovery and Resilience Plans. In the case of Romania, we had a very ambitious agricultural component in the early drafts of the National Recovery and Resilience Plan that latter own following yet difficult to discern technical and administrative reasons were downgraded toward a more modest approach, both in scope and financial resources allocated to the agricultural sector, especially for reforestation and educational sector. The end hope is that the measures taken in adjacent sectors would have a positive spill over effect and that the agricultural sector would be the indirect beneficiary of these reforms.

Keywords: National Recovery and Resilience Plan, agricultural sector, Romania, reforms, European Union financing, COVID-19 pandemic

JEL classification: Q00, Z18

INTRODUCTION

Following the pandemic, the Member States of the European Union were dealing with an unprecedented medical and economic crisis that required some extraordinary measures. The first such answer was to put to work the general escape clause of the EU fiscal framework that was supposed toprovide the flexibility "to take all necessary measures for supporting our health and civil protection systems and to protect our economies" in March 2020 (Council of the EU, 2020a). It will be the beginning of a long process of adopting various economic, health and freedom of movement measures that are shaping how the European society works. The 2020 pandemic measures are in effect some of the most important ones taken in the Union history, if only we look at the numbers.

After the initial 2020 financial measures the European Union has started to provide a coherent financial instrument for helping the Member States to cope with the pandemic economic shock – the Next Generation EU (NGEU), the Covid-19 recovery package of approximately 750 billion euros (in 2018 prices) of which 390 bn grants and 360 bn loans (Council of the European Union, 2020b).

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Table 1. The financial effort of pandemic response measures

Measures taken	Allocated amount	Percentage (own calculus)	Total amount
National measures taken using the general escape clause	€ 575 bn	13,69%	€ 4.2 trillion
SURE – EU financial assistance for short-time work schemes	€ 100 bn	2,38%	
Direct EU support, including the Coronavirus Response Investment Initiative	€70 bn	1,66%	
National liquidity measures, including some schemes approved under temporary flexible EU State aid rules	€3 045 bn	72,5%	
European Subsidiarity Mechanism, pandemic crisis support for Member States	€240 bn	5,71%	
EIB – European Investment Bank Group financing for businesses	€200 bn		

Source: *The EU in 2020 (European Commission, 2021a) and author's own calculus*

The economic analysts spoke about the need to have a three phase economic and financial response to the pandemic. The Phase 1 measures are of immediate response measures meant to save companies and national economies*(Emergency liquidity*); Phase 2 is about *Solvency support* while Phase 3 is about economic recovery (*Rebooting the economy*) (the NextGen measures and the Resilience and recovery instruments, of interest for our paper). Phase 2 and Phase 3 are being guided by four key principles: Financial viability; Level playing field; EU societal goals and Share in future profits. As practical measures for Phase 2 we have the EU Equity Fund while for Phase 3 we have EU Recovery Fund (Anderson et al., 2020).

The NGEU is a provisional programme established in 2020 that is supposed to "provide the Union with the necessary means to address the challenges posed by the COVID-19 pandemic. Under the agreement the Commission will be able to borrow up to €750 billion on the markets"(European Council, 2020). The core of the NGEU and our subject of interest is the Recovery and Resilience Facility: €672.5 billion (Council of the European Union, 2021c).

MATERIALS AND METHODS

Having in mind the complexity of the topic and the technical limitations of this document, in order to accomplish the intended results, the research methodology includes a mix of analysis instruments. First of all, we are going to have a desk research on the today state of play by analysing the official and technical documentation available. Secondly we try to have an empirical analysis of the case of Romania – how this process of drafting the NPRR took place, the main risks and opportunities etc. Thirdly we shall try to provide a series of answers and possible policy recommendation. The article willtry to provide answers to questions such as: *What is NPRR and why does it matter? What is it impact on Romania's agriculture? What to expect in the future?* And also would try to identify ways of better using it for the welfare of the agricultural system.

RESULTS AND DISSCUSION

When we analyse the NextGenerationEU (NGEU) we need to have in mind first of all one thing – it is a temporary instrument, whose funds need to be contracted by the Member States until 2023 and then spent by the end of 2026. It is in this context that its centrepiece, the Recovery and Resilience Facility needs to be understood.

This Facility has a mixed component, made of loans and grants available for the Member States (a total of €723.8 billion, of which, loans €385.8 billion; of which, grants €338.0 billion), which aims "to mitigate the economic and social impact of the coronavirus pandemic" and also to"make European economies and societies more sustainable, resilient and better prepared for the challenges and opportunities of the green and digital transitions" (European Commission, 2021). For that purpose, each Member State must create its own Recovery and Resilience Plan (RRP) that would provide the roadmap for accessing the EU funds.

That makes the NRRP more like a business plan, which must follow some basic rules in order to be evaluated and adopted. Thus one of the first rule to be respected is that of the need for double

transitions: green and digital. Thus the recovery and resilience plan needs to include a minimum of 37% of expenditure for climate investments and reforms and a minimum of 20% of expenditure to foster the digital transition. The Commission will assess national plans against these targets (European Commission, 2021b).

It is also required to have some flagship areas that are essential for the green and digital transition and that can provide much needed jobs.

Table 2. Flagships area for investments and reforms

POWER UP	Clean technologies and renewables
RENOVATE	Energy efficiency of buildings
RECHARGE AND REFUEL	Sustainable transport and charging stations
CONNECT	Roll-out of rapid broadband services
MODERNISE	Digitalisation of public administration
SCALE-UP	Data cloud capacities and sustainable processors
RESKILL AND UPSKILL	Education and training to support digital skills

Source: Recovery and Resilience Facility (European Commission, 2021c)

The MFF 2021 – 2027, alongside NGEU, wants to jump start Europe for a speedy recovery and for a greener, digital and resilient European Union. The challenge is thus not only to come back to the pre-crisis moment but to advance toward a better future. „The investment we make through Next Generation EU will not only help kick-start the economies and support workers, companies and regions today. It will invest in the future and make us more resilient so that we emerge stronger and further forward than before. We will accelerate the twin green and digital transition and make sure that people are at the heart of the recovery" (European Commission, 2020d).

For that purpose, within the Recovery and Resilience Facility was established an allocation key that intends to see that the resources (grants component) are mainly allocated to the most affected States. For obtaining these amounts of money each Member State must submit a National Recovery and Resilience Plan (NRRP) that "shall set out the reform and investment agenda of the Member State concerned" (Regulation (EU) 2021/241).

The NRRP acts as a national investment and reform agenda established by the State, given its national particularities and they "should enable Member States to enhance their economic growth potential, job creation and economic and social resilience, and to meet the objectives of the green and digital transitions" (European Commission, 2021a).

Before going toward, the national level there are also a series of aspects to be taken into consideration when we speak about the NRRP and its measures. One such aspect is the fact that the double transition, green and digital, requires several aspects such as: state coordination, developed administrative capacity, a strong political consensus and other aspects of magnitude that require full mobilisation of the state and of the European Union. Also it emphasised strong differences regarding the resilience of various economic sectors as well between the Member States and between various regions inside the national states (Pilati, 2021). We may add the fact that impact of the pandemic was not uniform throughout the EU Member States.

The NRRP, from a theoretical point of view,intends to be a coherent package of public investments and reforms proposed on the basis of the Country-Specific Recommendations 2019-2020. Respecting the timeline and duration of the European mechanism that manages it, the proposed reforms and the public investment projects submitted must be carried out by 2026.

When discussing about the NRRP we need also to have in mind a series of risks facing its implementation. The specialty literature, for instance, has identified a series of key risks facing the implementation of the NextGenEU, risks such as: 1) the multiplicity of targets that can weaken the impact; 2) sustaining imbalances trough subsidies; 3) starting the recovery programme late; 4) lack of an European dimension in the economy and finally 5) the capacity to manage a successful recovery plan (of most importance for Romania, especially). And it also proposed ways to mitigate the risks

and have a successful implementation: 1) the national reforms as a pillar to recovery; 2) EU reforms in order to improve the efficiency of the implementation and its speed; 3) useful labour market policies and finally 4) to enhance and improve the public private partnerships (Nunez Ferrer J, 2021

For Romania the adoption of the NRRP was, in accordance with the official documents and statements, the result of a highly interactive process stat started end January 2021. Were organized both public debates as well as a consultation process were the relevant stakeholders were invited to submit project proposals. Thus a total of 13 public debates were organized with approx. 3 900 persons registered and a total of 1 700 proposals were received out of which 1 470 were the result of public consultations (MIPE, 2021a).

Of particular interest for the field of agriculture were the: a) the 5 February debate 2021 on Agriculture; b) the 11 February 2021 debate on reducing the rural – urban gap and c) the 12 February debate on the topic of Green transition (MIPE, 2021b).

Concerning the Agriculture sector, in the debate the participants submitted specific proposals, such as:

- the establishment of a national network for the storage of agricultural and food products be financed (in the context in which over 70% of the consumed products come from imports, because we have not developed the storage capacity),
- the set-up of centres for collecting and washing wool (MIPE, 2021c).

As regards the Green transition debate the participants submitted specific proposals, such as:

- achieving a forestry strategy and developing sustainable transport,
- supporting the buildings energy efficiency and
- solutions for economic recovery of the Danube Delta,
- revitalizing fish farms and
- restoring flood protection systems,
- solutions for conservation of species and habitats (MIPE, 2021d).

As for reducing the rural – urban gap although the measures have some indirect consequences on the agriculture sector: by improving the life standards in the rural area we can hope to improve the motivation for people to stay there and therefore reduce the pressure on the work force that affects the rural sector.

Some of the punctual demands were:

- interventions for the development of medical services in rural areas,
- investments in thermal rehabilitation,
- investments in improving public lighting (MIPE, 2021e).

The discussion went further on throughout this year (2021) as the line ministries and representative stakeholders envisaged their proposal on how the NRRP can influence for good the agricultural sector.

When we speak about the national debate we need also to briefly outline the European context as well as realise a short comparative outlook with comparable Member States. As early as 2020 think tanks such as Farm Europe envisaged a series of recommendations that needed to be taken into consideration by the European Union institutions as they forged the Recovery Plan. Such proposals were quite variate and among them we can count proposals such as:

- supplementary “resources should be committed between 2022 and 2024” for the rural development;
- providing“dual-purpose investments in farms. (…) reduce the environmental footprint (…) improve the economic situation of farmers.(…)” providing enough investments for“digital or smart farming tools and systems, and on production of bio methane from livestock effluents”;
- “(…) reinforce the co-financing rates for those investments” (Farm Europe, 2020).

Coming closer to home we can mention the case of our neighbouring country Bulgaria. As late as the beginning of September 2021 the Bulgarian plan was focusing “on funding for innovation in agriculture” (Nikolov, 2021)

They switched from the initial plans focused on the restoration of irrigation canals in the country due to the poor administrative track record of the state-owned company responsible for their maintenance.

Table 3. Proposals of the Bulgarian NRRP with impact on the agricultural sector

Amount	Destination	Further details
€275 million	fund to promote the technological and environmental transition of agriculture	➢ projects for broadband internet in rural areas ➢ only registered agricultural producers will be able to apply for projects under the fund.
€14 million	build a system for direct communication between farmers and the administration, called "digitalisation of farm-to-table processes".	➢ this system will help control the use of plant protection products and fertilisers by digitising farmers' diaries. ➢ this software will also control the use of antibiotics in animals' breeding.

Source: Nikolov, 2021

As regards Romania's case, the earlier 2020 draft versions of the NRRP were more generous with the agricultural aspects. Thus the November 2020 version of "PNRR contained a complex project for water management in agriculture (irrigation, drainage / drainage and anti-hail system), worth 6.5 billion euros, a project undertaken in the Government Program, together with the Network for storage, processing and distribution of Romanian products, another project that did not take place in PNRR." (Oros, 2021).

Table 4. Investments and reforms in Romania's NRRP with an impact on the agricultural sector

Type	Name	Short description and outcome
Investment 1	Afforestation and reforestation national campaign, including urban forests	(…) between fields with agricultural crops By 30 June 2026.
Reform 2	Reform of the management system of protected natural areas for the coherent and effective implementation of the European Biodiversity Strategy	(…) to operationalise the current framework for designating nature protected areas, in particular through the establishment of a mechanism to link legislation specific to the various sectors with an impact on biodiversity (…)
Investment 2	Development of infrastructure for manure and other compostable agricultural waste management	The investment shall primarily consist of the establishment of integrated communal systems for manure recovery, composting stations and compost management equipment for large farm communities, biogas systems and the purchase of equipment for the management of agricultural compost. 254 integrated systems for the collection of compostable agricultural waste - by 30 June 2026.
Investment 7	Transformation of agricultural high schools into professionalisation centres	The objective of this investment is to support 57 agricultural colleges, which shall be organised in 5 regional centres corresponding to the 5 agricultural universities established in Romania. Activities funded: - Modernise, renovate and extend school laboratories, workshops and IT laboratories, canteens, accommodation for students. - Purchase biological material, agricultural equipment and machinery for performing agricultural works. - Teachers training based on a specific agriculture-related curricula developed by the Ministry of Agriculture and Ministry of Education. Each agricultural school shall be equipped with an IT laboratory, which shall include simulators and software necessary for theoretical and practical teaching/learning activities.
Investment 14	Equipping of practice workshops in VET schools	The objective of this investment is to equip school workshops within VET education units, including dual training units (and excluding those with an agricultural profile, which are subject of Investment 7). (…)

Source: Romania's NRRP (MIPE, 2021f)

Yet the EU official rejected the irrigations projects as not being green enough and therefore the current NRRP has fewer direct mentions to agriculture as well as fewer relevant projects (Wall-Street, 2021).

Thus following the Plan submitted to the European Commission on 27.09.2021 we can mention the following measures related to the agricultural sector, as you can see in Table 4.

CONCLUSIONS

After the publication of Romania's NRRP at an academic debated organized in Bucharest on 28 September 2021, on the topic of the post-pandemic economic recovery a series of important ideas were mentioned that, in this author opinion, should be taken into consideration. First is that of the need to have a management expectation about NRRP as the citizens' expectations regarding it are very high, and in the case of lower performance in implementing the planned reforms there is a risk that the disappointment of citizens will be very high. That the way in which the investments are done is of outmost importance. The second main idea that is of importance is that Romania, in its capacity as a „very late absorber" is unlikely to reach an 100% contracting rate in the next couple of years and it may face the risk of a financing that emphasizes the formal aspects instead of the quality of investments (EIR, 2021). This is important for us because we already have had a high level of initial expectations for the agricultural sector, not materialized in the final form.

At the time of drafting of this article is premature to say that will the impact of NRRP on the Romanian agricultural sector would be. One first conclusion is that there is a significant difference between the initial perceptions and expectations and the end results of the approved NRRP. The reasons for this gap are rather unclear at the time being, the official and unofficial statements being rather ambiguous and speaking of not enough green projects (especially those in the irrigation sector).

We have also been witness to a public consultation process, early 2021 that proven to be quite a democratic one, as the all the data as well as the rules of participation were publicly available for all the relevant stakeholders. Yet there is still the problem of perception, as all too often the NRRP was either idealised, as a solution for all the national problems or criticised as being inefficient and too costly, due to its loan component.

Regarding Romania's agriculture, the best outcome that was obtained is represented, in this author opinion, by the investment in the educational sector. The results are still uncertain as the investments in education only see their output on medium and long term and they are difficult to quantify. Yet this investment seems to be the best we could get nowadays.

Also the investments in reforestation and agricultural waste management are also of interest as they help our agricultural system to become more sustainable on the long term and also greener. The green and digital transition would have a tremendous impact on Romania's agriculture in the long term and it all depends on our ability to manage this transition if the outcome would be a positive one or if we would be on the losing edge of this bet on the future.

In this author opinion the NRRP has a more significant indirect role in the support of the agricultural reform. Romania's agriculture is plagued by issues such as aging, reduce availability of the workforce, pollution problems, climate change challenges, low automatization and reduce level of the quality of life in the rural area that generates an exodus of the able population to the urban areas. If the NRRP succeeds in the medium term investments plan, an over ambitious one, we can say that the spill over effects would significantly influence the agricultural ecosystem and generate highly positive effects.

Another significant meta-risk is related to the question of governance, more precisely of the idea of good governance, which is essential for implementing the NRRP. In the absence of good governance any plan is subject to failure and we already have had a controversial process of generating the NRRP.

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PUBLIC-PRIVATE PARTNERSHIPS FROM THE PERSPECTIVE OF THE NATIONAL RECOVERY AND RESILIENCE PLAN

ANCUȚA MARIN[1], STELIANA RODINO[2]*

Abstract

Structured in two priority directions (reform and investment) The National Recovery and Resilience Plan is one meant to help communes, local communities in the crisis caused by COVID-19, as such any investment started after February 1, 2020, the date that is considered to be the beginning pandemic crisis, can be funded from this plan, if it complies with European regulations. Community development planning is a natural approach that aims to increase the quality of life and improve living conditions. However, the development of a community cannot be conceived in the absence of a vision of the directions in which the community wants and can develop. PNRR allocates substantial sums for the construction of water networks in rural areas, afforestation and the creation of protected areas, waste management, renewable energy, education, digital transition and last but not least research.The paper presents an analysis of areas where public-private partnerships can be created, especially in rural areas, to access these funds, as well as their importance in the rural economy.

Keywords: public-private partnerships, rural development, National Recovery and Resilience Plan

JEL classification: A19, R11, R12

INTRODUCTION

The development of a community cannot be conceived in the absence of a vision of the directions in which the community wishes and can move. The approach involves planning the development starting from the local resources and the existing opportunities, taking into account the obstacles that stand in the way of capitalizing these resources and ensuring this planning a wide legitimacy and support from the population living in that community.

A strategy for sustainable development must be a coordinated set of processes of analysis, debate, capacity building, planning and investment that seek to integrate the economic, social and environmental objectives of the community.Participatory strategic planning is the approach taken in developing the strategic plan through the cooperation and collaboration of community members.The Local Action Group (LAG) is a form of partnership set up in a rural area that brings together representatives of the public, private and civil society sectors from that territory, created in order to implement rural development methods.

The size and population of the territory covered by a LAG are variable, so that such a multisectoral cross-section of a local community can be between 5,000 and 150,000 inhabitants. LAGs are regulated by European Regulations as local, non-governmental development structures, whose main objective is the development of the areas where they are implemented.The EU's long-term budget provides € 1.8 trillion to support the reconstruction of Europe in the wake of the COVID-19 crisis.

It will strengthen flexibility mechanisms to ensure that it can meet unforeseen needs. It has been designed to respond not only to current realities but also to future uncertainties.The National Recovery and Resilience Plan is currently the subject that should interest any Romanian, any public or private organization, because this program can produce social, economic, political, ecological and legislative changes with major impact, given the amounts that can be attracted in Romania. According to the National Recovery and Resilience Plan, European money will represent a total investment of 29.2 billion euros and will be divided into two formats:

- in the form of grants - non-reimbursable loans - 14.2 billion euros,

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- in the form of loans - 15 billion euros.

The general objective of NRRP is the development of Romania by carrying out essential programs and projects that support resilience, the level of preparedness for crisis situations, adaptability and growth potential, through major reforms and key investments with funds from the Recovery and Resilience Mechanism.

MATERIAL AND WORKING METHODS

The research method used in this paper is "bibliographic analysis". It aims to extract the official data existing in the field of research of the paper. The data collection was done by accessing the data from the National Institute of Statistics, the Ministry of Agriculture and Rural Development, information bulletins published on the MADR website, Publications of the Romanian Government (government decisions, methodological norms for applying government decisions, etc.).

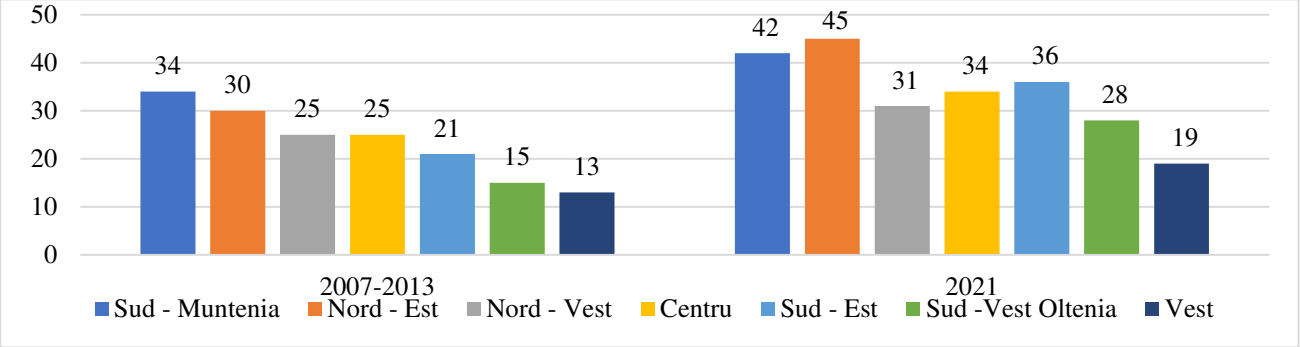
RESULTS AND DISCUSSIONS

In the period 2007-2013, 163 Local Action Groups were set up in Romania, thus covering an area of over 142 thousand km2 and over 6.77 million inhabitants out of a total of approximately 19 million inhabitants in Romania. Analyzing the situation of the LAGs according to the development region, the South-Muntenia Region stands out, with 34 LAGs, covering 21.6 thousand km^2 and over 1.3 million inhabitants.

In second place is the North-East Region with 30 LAGs covering 26.16 thousand km2 and over 1.53 million inhabitants, and in third place, in equality, are the North-West Region and the Center Region with 25 LAGs, covering 20.10 thousand km2 and over 960 thousand inhabitants, respectively 24.3 thousand km^2 and 0.9 million inhabitants.

In 2021, the number of Local Action Groups reached 235, with 72 (44.17%) more than in the previous period analyzed, covering an area of approximately 212 thousand km2 and 9.69 million inhabitants. At the level of development regions, the situation has changed, with the North-East Region now in first place with 45 LAGs, covering 35,000 km2 and over 2.11 million inhabitants. It is followed by the South-Muntenia Region with 42 LAGs covering 32.5 thousand km2 and 1.97 million inhabitants. On the third place is the South-East Region with 36 LAGs, covering 31.6 thousand km2 and 1.23 million inhabitants (Figure 1).

Figure 1. Total number of LAGs by development regions



Source: MADR data processing

Regarding the situation of the LAGs according to counties, in the period 2007-2013, Dâmbovița County stands out with a number of 12, which covered an area of over 3,263 km^2 and a population of approximately 350 thousand inhabitants. Olt and Vrancea counties are on the second position with 7 LAGs each, covering areas of 4,190 km^2 and 5,154 km^2 respectively and having 264 thousand inhabitants (Olt County), respectively 304 thousand people (Vrancea County). On the third place are three counties: Argeș, Iași and Mureș, with 6 LAGs each.

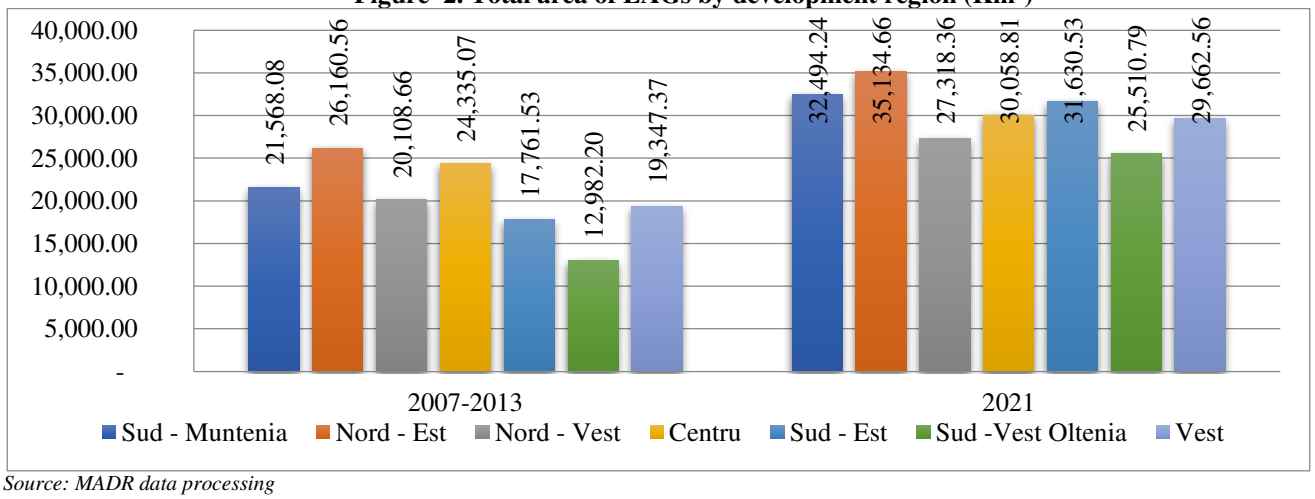
Argeș County covers 5,418 km^2 and a population of over 275 thousand people, Iași County covers 3,690 km^2 and a population of approximately 311 thousand people, and Mureș County covers 3,572 km2 and a population of 197 thousand people. At the bottom of the ranking are three counties: Brăila, Gorj and Mehedinți. Brăila County covers 848 km^2 and a population of over 35 thousand people, Gorj County covers 872 km^2 and a population of about 37 thousand people, and Mehedinți County covers 1,572 km^2 and a population of 49 thousand people.

In 2021, the number of Local Action Groups in Iași County is 12, covering 5,455 km^2 and over 448 thousand people. In second place is Mureș County with 11 LAGs, covering 6,257 km^2 and over 303.5 thousand people. In the ranking, tied for 3rd place, with 10 LAGs are Dâmbovița and Suceava counties covering areas of 4,530 km^2 and 7,934 km^2 and having 464 thousand inhabitants (Dâmbovița County), respectively 419 thousand people (Suceava County). In conclusion , analyzing the number of LAGs from the two periods, we find that their number increased by 72 (44.17%).

The area included in the LAGs increased by 69,547 km^2 (48.88%), and the number of people by 2,923,945 people (43.18%). The average area included in the LAGs increased by 27 km2 (2.91%) in 2021 compared to the previous interval, while the average population included in the LAGs decreased by 561 people (1.35%). In the period 2007-2013, the largest area is occupied by the Gal in the North-East Region, followed by those in the Central and South-Muntenia Region.

The average surface of a LAG varies between 634 Km^2 in the South-Muntenia Region and 1,488 Km^2 in the West Region. The calculated average was 926 Km2 for a LAG. In 2021, the North-East Region is in first place, followed by the South-Muntenia Region and the South-East Region. The average surface of a LAG varies between 774 Km^2 in the South-Muntenia Region and 1,561 Km^2 in the West Region. The calculated average was 953 Km^2 for a LAG (Figure 2)

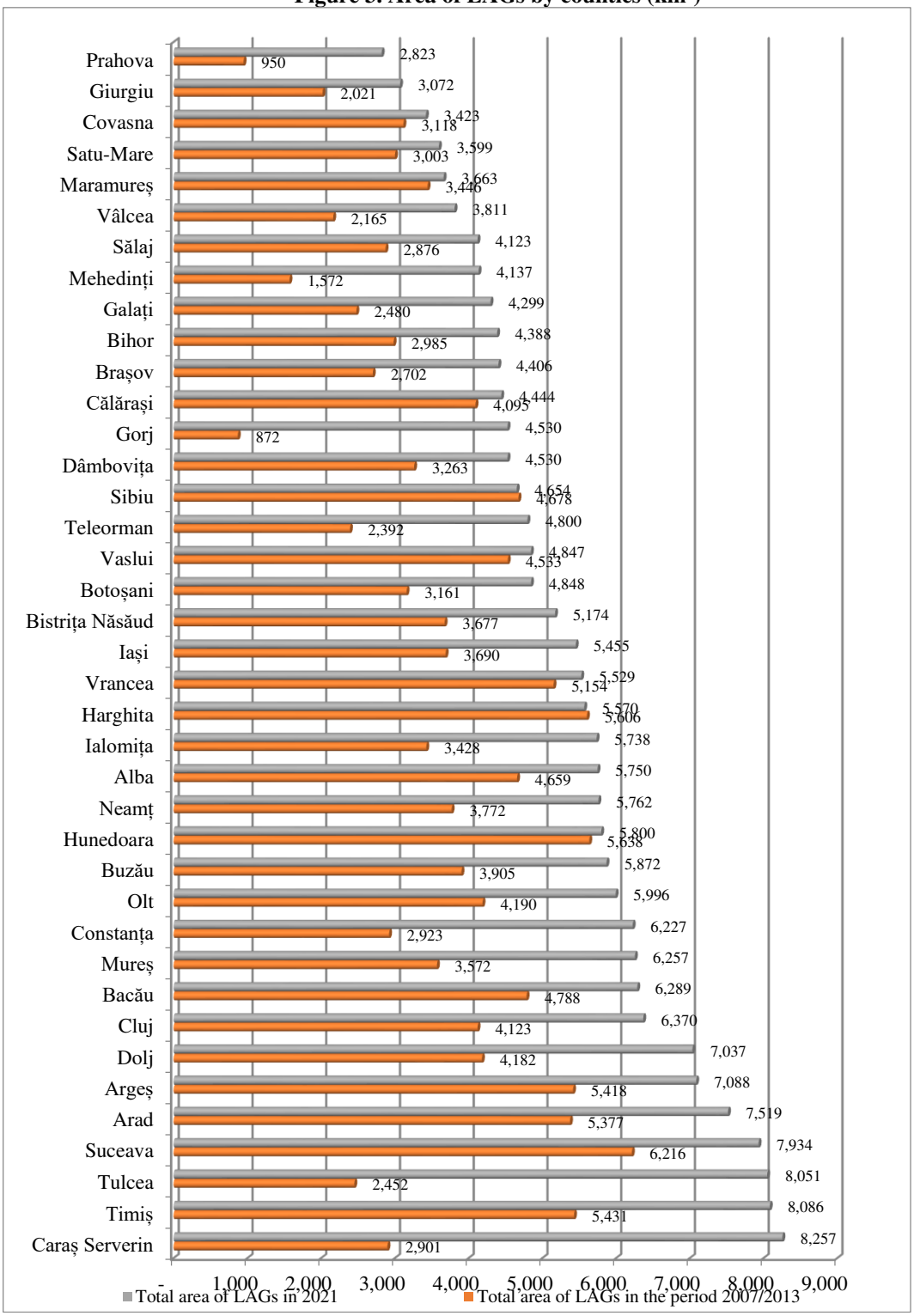
Figure 2. Total area of LAGs by development region (Km^2)



Source: MADR data processing

Regarding the situation of the areas occupied by LAGs according to counties, in the period 2007-2013, Suceava County stands out with 6,216 Km^2, followed by Hunedoara with 5,638 Km^2 and Harghita with 5,606 Km^2. As I said, at the bottom of the ranking is Brăila County with an area of 848 km^2. However, most counties fluctuate around the calculated average of 3,557 km^2. In 2021, the ranking is totally changed, on the first 3 places being located the counties of Caraș-Severin (8,257 km^2), Timiș (8,086 km^2) and Tulcea (8,051 km^2). In 2021, at the end of the ranking are the counties of Brăila (1,653 km^2), Prahova (2,823 km^2) and Giurgiu (3,072 km^2). However, most counties fluctuate around the calculated average of 5,295 km^2 (Figure 3).

Figure 3. Area of LAGs by counties (km²)

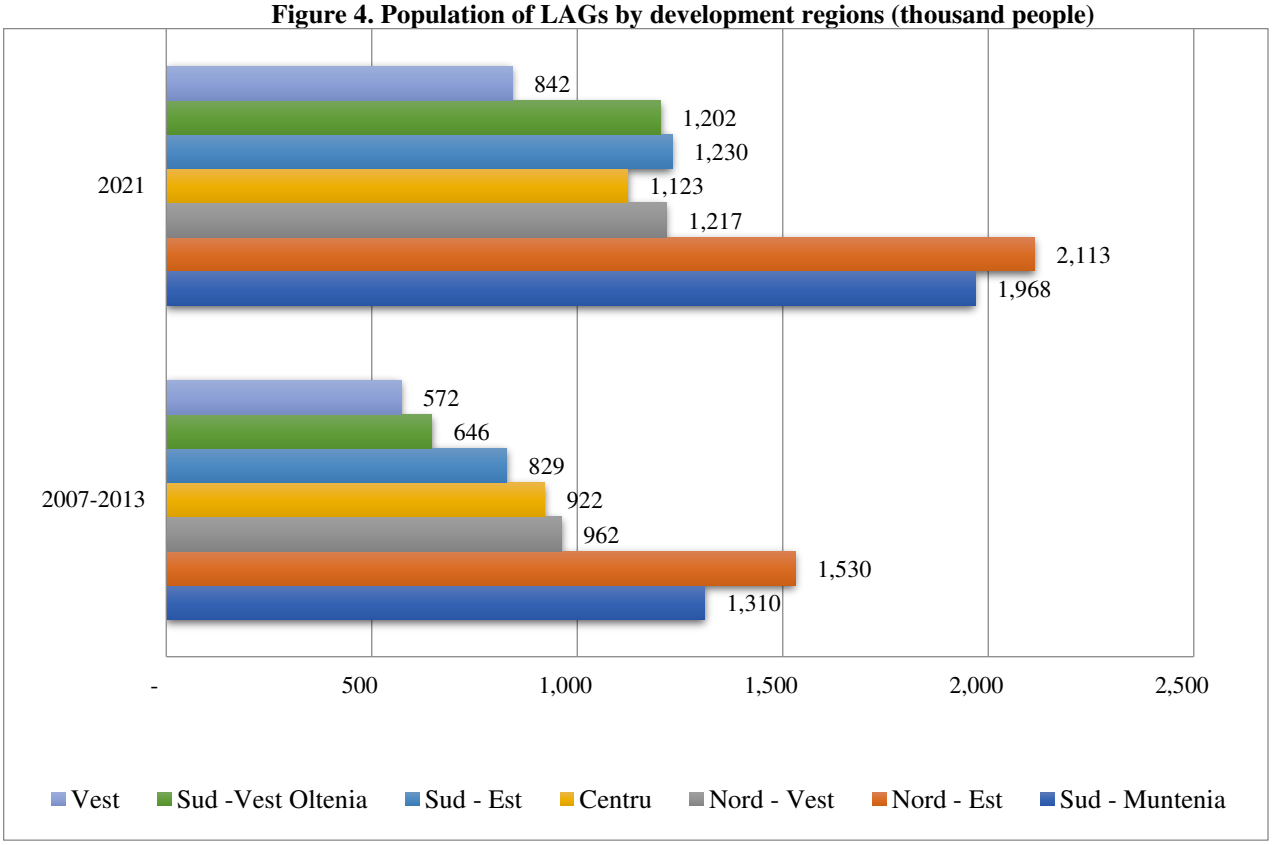


Source: MADR data processing

In the period 2007-2013, the number of persons in the LAGs was 6,770 thousand persons, and in 2021 9,695 thousand persons, with 2,925 thousand persons (43.2%) more. By development regions, in the first analyzed interval, on the first place was the North-East Region (1,530 thousand people), followed by the South-Muntenia Region (1,310 thousand people) and the North-East Region (962 thousand people). In 2021, the ranking is the same, differing only the number of people in LAGs: North-East Region (2,113 thousand people), South-Muntenia Region (1,968 thousand people) and South-Muntenia Region (1,230 thousand people) (Figure no.4).

By counties, in both analyzed periods, on the first place was Dâmbovița County with 348,768 persons in the period 2007-2013, respectively 463,584 persons in 2021, and on the last place Brăila County with 35,169 persons in the period 2007-2013, respectively 63,354 persons in 2021 However, most counties fluctuate around the calculated average of 169,265 people in the period 2007-2013, respectively 242,364 people in 2021 (Figure 5).

Figure 4. Population of LAGs by development regions (thousand people)

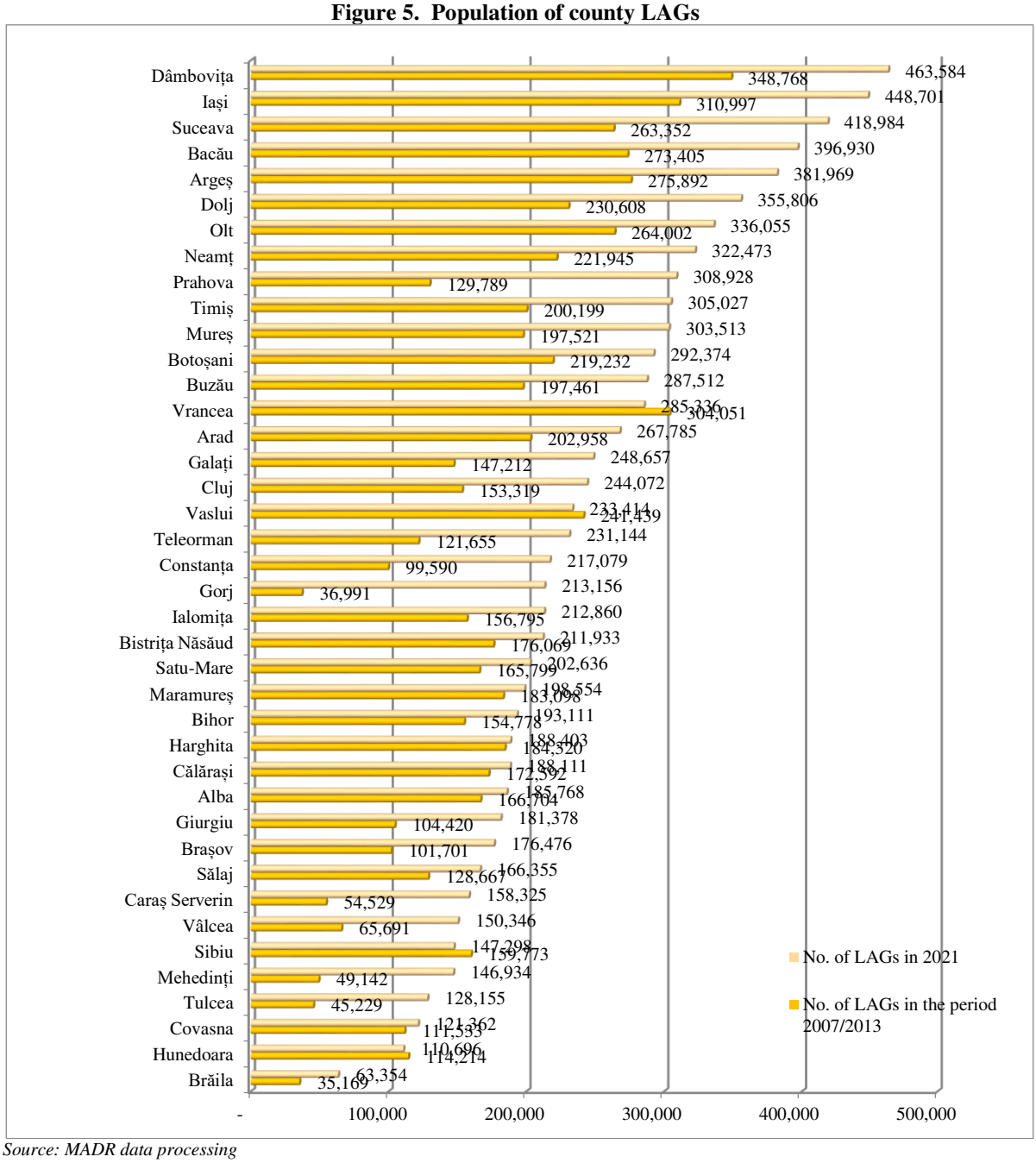


Source: MADR data processing

One explanation for the increase in the number of LAGs is the fact that in the period 2007-2013 each Local Action Group had at its disposal a project launch budget of 2,850,000 euros from which they launched funding lines. The previously available public financial aid was about 370 million euros. In the period 2014-2020, the figure increased to approximately 650 million euros, which will be distributed through Local Action Groups on various types of projects.

As it is known, the main objective of the LAG is the development of the respective area, through the elaboration and implementation of the projects offered by the LEADER program, the elaboration and implementation of integrated rural development strategies, having as starting point the needs identified locally and the endogenous potential. projects to be funded, preparation and provision of specialized assistance to local legal entities and individuals who want to participate in projects under the NRDP, actions to promote public-private partnerships, supporting the balanced use of local resources.

Figure 5. Population of county LAGs



Source: MADR data processing

This means that, in consultation with important local actors, the financing priorities of the territory are set. Each Group proposes a number of 6-7 priority financing lines for the area, whether we are talking about farm development, investments in tourism, non-agricultural services, the installation of young farmers, the development of associations and cooperatives. The establishment of these priority funding lines depends very much on what the LAG Steering Committee establishes, through public consultation. Each LAG adapts its own strategy to specific local conditions.

Romania's National Recovery and Resilience Plan (PNRR) is designed to ensure an optimal balance between the European Union's priorities and Romania's development needs, in the context of the recovery after the COVID-19 crisis that significantly affected the country, as it affected the entire European Union and the whole world.

The general objective of PNRR is the development of Romania by carrying out essential programs and projects that support resilience, the level of preparedness for crisis situations, adaptability and growth potential, through major reforms and key investments with funds from the Recovery and Resilience Mechanism.

The specific objective of the PNRR is also linked to that of the mechanism, detailed in the Regulation, namely to attract the funds made available by the European Union through NextGenerationEU in order to reach the milestones and targets for reforms and investments.

PNRR is structured on 15 components that cover all the 6 pillars provided by the Regulation.Following the consultation of the economic and social partners, it was considered necessary for the LAGs to benefit from additional allocations from the funds available for the transition period, which will be used to implement the strategies and cover local needs for the period 2021-2022.The distribution to the LAGs of the additional allocations from the transition funds will ensure the maintenance of a sustainable development at local level, ensuring continuity until the implementation of the future strategies starts. LAGs have the opportunity to channel support to address specific issues in the territory covered, in particular those arising from the pandemic and economic crisis.These will be used by the LAGs as support for the staff, animation and operating expenses necessary to carry out the activity in order to manage these funds, in order to achieve the objectives of the SDL. The efficient conduct and ensuring the continuity of the LAGs' activity is an important aspect in the next period.

In order to ensure sustainable socio-economic development, in the context of the COVID-19 health crisis, there is a need for continuity in the work of LAGs as well as the preparation of strategies for the next programming period. Thus, the funds earmarked for SM 19.1 and SM 19.4 contribute to the achievement of the EURI objectives.

In this context, following the consultation of the economic and social partners interested in the implementation of the measure, it became necessary to make some changes to the M19 file, as follows:

1. Funds from the EURI will be directed both to the preparation of strategies for the next programming period (MS 19.1) and to the running and running costs of the LAG for the 2014-2020 programming period (MS 19.4), and funds from the the multiannual financial framework will be used for the implementation of current local development strategies (MS 19.2). Thus, it is desired the continuity of interventions at the level of LEADER territories in order to ensure a sustainable socio-economic development, especially in the current context caused by COVID-19.
2. LAGs will benefit from additional allocations from funds available for the transition period. The distribution of these funds is based on the area and the population concerned, to the LAGs that meet certain performance criteria and demonstrate the ability to manage additional funds. The distribution mechanism and criteria will be detailed in the national implementation framework.
3. LAGs authorized for operation in the period 2014-2020 may benefit from preparatory support for the purpose of developing the SDL for the next programming period. The source of funding for this type of support is LEADER funds for the transition period. Both new partnerships and existing LAGs can benefit from this support. LAGs implementing the SDL for the 2014-2020 programming period can benefit from this type of support provided that the double funding measures are complied with.

According to the provisions of the CPR on LAGs, there are no more restrictions on the number of inhabitants, therefore, using the same funding mechanism as the previous preparatory support, the allocation of 0.1 euro/inhabitant for animation costs is maintained, but offers the possibility of financing a larger territory, the limitation to 15,000 euros being only from a financial point of view, the animated territory can have a number of inhabitants greater than 150,000 inhabitants. Thus, the preparatory support for the elaboration of the SDL for the next programming period, coming from the transition funds, will be granted up to the maximum amount of 30,000 Euro non-reimbursable public value for SDL submitted by the partnership.

CONCLUSIONS

Sustainable development has become an important component of local and regional development strategies, and local development programs proposed to international funders are evaluated according to this feature and must be closely related to the Regional Development Process and priorities. and the directions established in the National Development Plan.

From those presented in this material, several conclusions resulted:

LAGs are the best known form of public-private partnership in rural areas. They currently cover 89% of the country's surface (211,811 km^2) and 51% of the population (9,695,000 people).

Most of the LAGs are in the North-East Region (45), and within it Jud. Iasi with 12 LAGs.

As a surface, the LAGs from the North-East Region occupy the most (approximately 35 thousand km^2), and within it Jud. Suceava occupies the first place with 7,934 km^2.

As a population, the LAGs in the North-East Region lead in the top with approx. 2,113 million inhabitants. However, Jud. Dâmbovița has the largest population in Gal, respectively 464 thousand people.

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THE FUTURE OF THE ECOLOGICAL FARM: TEN OPINIONS AND EVALUATIONS. RESULTS OF APPLYING DELPHI METHOD

VIOLETA FLORIAN[1], MIHAI ALEXANDRU CHIȚEA[2], MARIOARA RUSU[3], IOAN SEBASTIAN BRUMĂ[4], LUCIAN TANASĂ[5]

Abstract

If we can decipher the content of opinions and evaluations of those involved in ecological agriculture then we could know the subjective fundamentals/resorts of the modernization and ecological development's process at the level of the rural communities. The study mainly aims at identifying the opinions on the ecological farm's evolutions, and, as general objectives: knowing the projections regarding employment in ecological farm, employment in agriculture's support services, determining the way in which the consequences of using ecological practices on the supply chain and impact on rural communities are perceived. The scientific approach on the ecological subjectivity has turned to a structured communication method, Delphi, in three stages. The study was implemented in a rural area defined by concernments and ecological agricultural activities – Dornelor Basin, Suceava county and it has identified the content, persistence, flexibility and statements' meaning (positive/negative) of opinions regarding the future of the ecological farms.

Keywords: ecological farm, opinion, evaluation, Delphi method.

JEL classification: Q01, Q57

INTRODUCTION

Analyzing the opinions and evaluations of actors involved in ecological agriculture can decipher the subjective mechanisms of the functioning of a productive system that support the return to nature by using some environmentally friendly methods and techniques. The necessity of such a scientific approach focused on the subjectivity of those involved in ecological agriculture is determined by the responses to the social request, to produce and offer healthy goods/products while respecting the conditions imposed by environmental protection and knowledge of specific behaviors of those involved in this type of agricultural activity. The timeliness of the subjective ecology's studies is endorsed by the necessity of understanding and supporting the farms that use environmentally friendly practices, by elaborating and implementing adequate measures for both their modernization and ecological development. The theoretical defining of the functioning and structuring mechanisms specific to ecological farm is incomplete if aside economic factors the ones of sociological and psychological nature would not be added (Dessart F.,J., 2019). In order to formulate a scientific responsion to the holistic approach necessity, "*In the social sciences, there have been numerous studies on reasons for farmers to convert to organic farming (e.g, Fairweather, 1999; Padel, 2008) and for consumers to purchase organic foods*"*(e.g., Brand, 2006; Holt, 2006). "*(Darnhofer, I., et all, 2010:68). In this way, the relevance of the sociological and psychological factors is emphasized: "*Several non-economic factors were found to play an important role in farmers' decision to actually convert or to plan to convert to organic farming…. The farmers' attitudes to the environment strongly influenced the probability of (potential) conversion and environmental concerns were widely present as motives for organic farming. These findings confirm that adoption of organic farming is not only a question of economic prospects, but also involves lifestyle choices or other ideals.*" (Koesling, M et all, 2008:93). The dynamic of the profound

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transformation of agriculture's ecosystem induced by farmers that use ecological practices (Kressmann G., 2021) requires knowledge of both local context's characteristics and of those specific to actors involved in ecological production (Gravel A., 2016). Researches on subjective ecology are generated by social psychology's fundaments, by social representations that constitute the foundations of opinions, attitudes and by behaviors based on attitudes. In this psychological chain, the opinion has its own importance because it represents the consequence of an interindividual process (Stoerzel J., 1978). As a recognition of understanding the importance of subjective factors, the European environmental policies and support measures demanded by the development of ecological agriculture have included behavioral factors into official documents, in the associated impact evaluation:" *To achieve better results in delivering environmental and public goods, the CAP likely needs to be based not only on regulations and financial incentives (as it is now), but also on incentives leveraging the non-financial, behavioural factors that have a bearing on farmers' uptake of more sustainable practice"* (Dessart,F., J.,et all 2019).

MATERIALSAND METHODS

Study Area - *Dornelor* Basin is located in the south-west part of Suceava county and it includes 12 territorial administrative units (Vatra Dornei, Dorna Candreni, Poiana Stampei, Coșna, Iacobeni, Ciocănești, Cârlibaba, Dorna Arini, Panaci, Șaru Dornei, Crucea și Broșteni) covering a total area of 221,517 ha, out of which 51,590 ha of agricultural area (23.3%) and 169,927 ha of nonagricultural area.

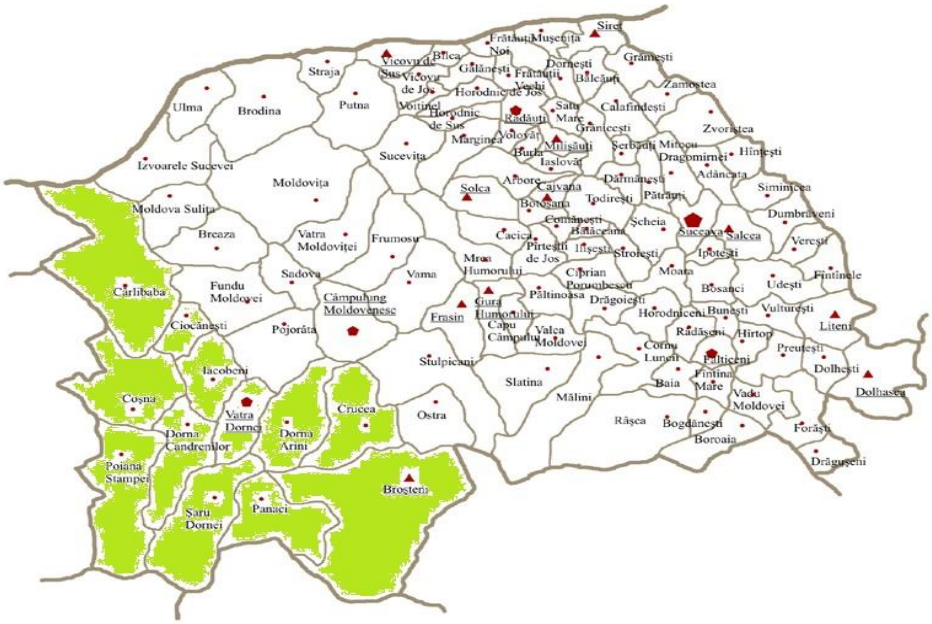


Figure 1. Map of Dornelor Basin, Suceava county

Source: own processing based on https://harti.wansait.com/2011/suceava-ro-administrative-map-harta-administrativa/

The pastures and hays from Dornelor Basin cover 96% of the agricultural area, aspect that confer a mixt character to local agriculture, based, mainly, on raising dairy animals (cows, sheeps, goats).

The method usedwas Delphi, following these stages*:*the first, was getting acquainted with the method and supplying information regarding the characteristics of ecological and conventional farms from the area; in this first stage, Delphi questionnaires for round I were sent to the 10 experts; in the second stage, a report containing the anonymized responses of expert was drafted and sent along with

the questions from Delphi round II; a second report was drafted and sent along with the Delphi round III. The questionnaires were applied on-line, also with face-to-face support.

Participants- as regards the gender structure, 70% of the respondents were women and 30% men. Most participants had more than 10 years of experience, working in research, public administration, extension, agricultural activities, food processing, retail and NGO sector.

Table 1. Participants' Characteristics- Demographical and occupational - Suceava county, Romania

		Rounds		
		1	2	3
Gender	Male	7	7	6
	Female	3	3	3
	Other			
	Prefer not to say			
Work Experience	< 5 years			
	5 - 10 years	2	2	2
	10 – 20 years	3	3	2
	> 20 years	5	5	5
Area of experience[a]	Researcher	2	2	2
	Civil servant	2	2	2
	Extension officer (both public or private)	3	3	3
	Farmer	1	1	1
	Representative of farmers organisation			
	Food chain– input supplier			
	Food chain– food processor	1	1	1
	Food chain– wholesaler or retailer	2	2	2
	Land agent			
	Non-governmental organisation	1	1	
	Other; please specify: /_____/			

Source: adaptation afterWentholt, Rowe, Konig, Marvin, & Frewer (2009). Note: a – participants were allowed to choose multiple areas of experience to reflect their expertise.

Data Processing and Analysis **–** based on the fact that the questionnaire contained different types of questions, the analysis focused on both quantitative and qualitative aspects. Quantifying the existing correlations between variables was based on Kendall's W coefficient, as exemplified in Cafiso, Di Graziano, & Pappalardo (2013).The null hypothesis is that participants have independent opinions from one another. Rejecting this null does not mean that participants agree but that at least two of the participants agree with one another. Kendall's W will take a value of 0 for no agreement and 1 if all experts perfectly agree with each other such that: $0 \leq W \leq 1$.

Kendall's W can be calculated by the following formula:

$$W = \frac{12 * S}{m^2 * (n^3 - n) * m * \sum_{j=1}^{m} T_j}$$

where: S- sum of squared coefficients for n, number of objects, R_i - is the sum of ranks of each object, i, across all, m number of experts, $\bar{R}$ is the mean rank value for each object across all the experts, T_j allows for a correction in the case of a rank being tied where t_i is the number of ranks that are tied across object i, and g_j is number of different objects that have ties. For the present study, the Kendall's W has been calculated with the help of SPSS software, based on the experts' opinions collected in the case study area.

RESULTS AND DISSCUSION

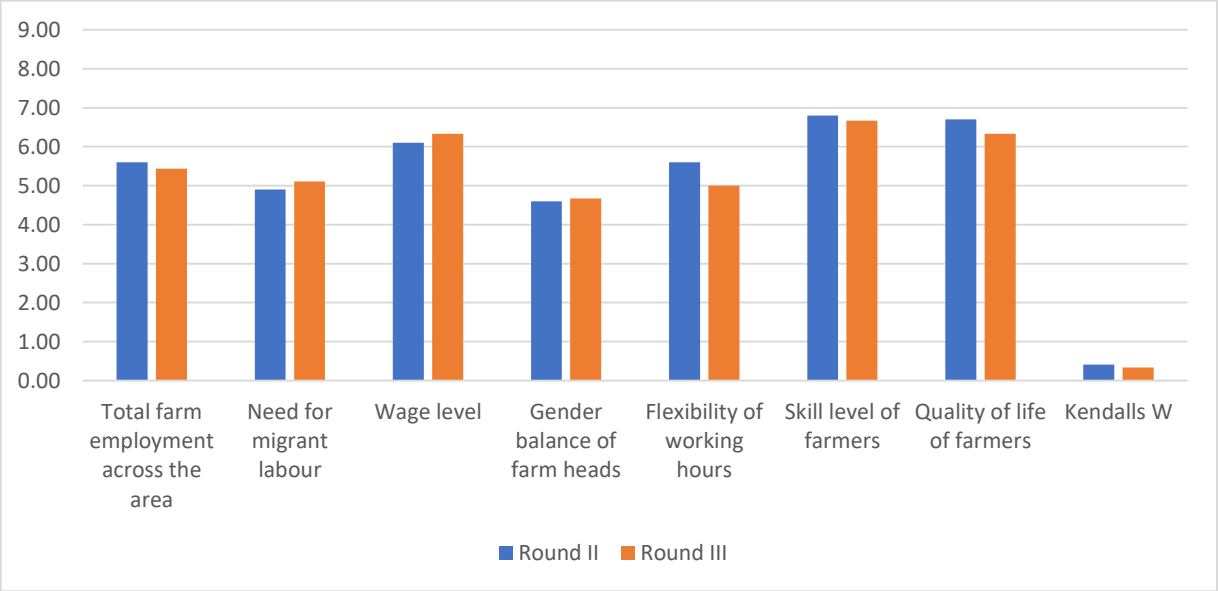
The study of opinions and evaluations regarding the dynamic of different components/aspects of ecological agriculture/ecological farms revealed their consistency and special intensity and directions' likeness (positive/negative).

Opinions and evaluations regarding the effects of ecological agriculture's development on employment

The analysis of the effects induced by ecological agriculture's development on employment was performed by evaluating the following aspects: *total farm employment across the area, need for migrant labor, wage level, gender balance of farm heads (% women and men), flexibility of working hours, skill level of farmers, quality of life of farmers.* The opinions and, implicitly, evaluations on *skill level of farmers, quality of life of farmers and wage level* were the most pronounced following the coherent social representations that participants had; the average value of responses (over 6 during the entire exercise, on a 1 to 9 scale) highlights the participants' interest on these aspects and enunciation of coherent, consistent opinions. The restructuring of opinions regarding some aspects is nor significant, but indicates the "subjective propensity" that participants had to slightly refine/adjust their opinion.

The direction of opinion regarding the *quality of life of farmers* registered the highest negative adjustment between the second and third round of Delphi (-0.37, at the level of the average values of responses). *The skill level of farmers,* the best evaluated aspect (with an average value of 6.8 in the second round of Delphi exercise) was reevaluated, the general opinion registering a negative adjustment (6.67 – the average value on round III). The consolidation of an opinion, the one regarding the *wage level* (an increase of 0.23 between the two rounds) is part of the positive evolution process, of pronounced affirming an opinion, that can generate strongly favorable attitudes for adopting/supporting environmentally friendly practices. The process of reconstructing the opinion is clearly visible in case of *need for migrant labor* aspect: from a clearly formulated opinion, without being a strong one (less than 5 points in round II), to a crystalized one (with 5.11 point in round III).

Figure 2. Opinions' dynamic on evaluating employment's effects - What would be the impact on the following?



Source: own calculations based on experts' opinions

Note: 1 represents a large decrease and 9 a large increase. For Kendall's W, the value ranges from 0-1, where 1 represent a total agreement and 0 total disagreement.

The opinion regardingthe *gender balance of farm heads* does not have an important relevance in the structure of those referring to employment's effects; thou, it is noticeable the slight positive change, following the knowledge of all participants' evaluations.

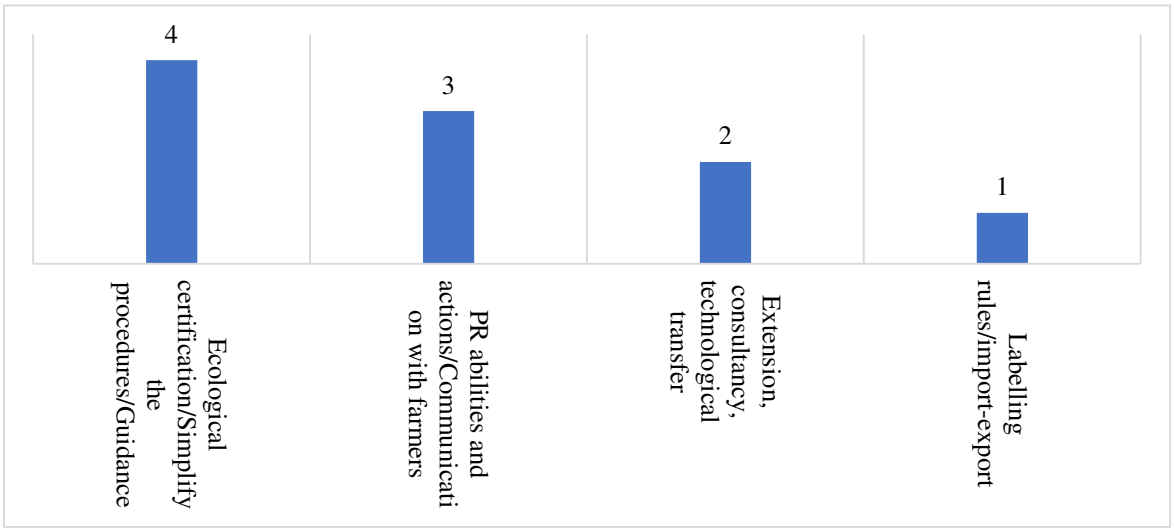
In the final evaluations' hierarchy, the most important are those regarding the *skill level of farmers, wage level and quality of life of farmers.* The in-depth analysis of evaluations regarding employment's effects, induced by the use of ecological practices, has identified the complexity of opinions' construction: for example, the opinion on the necessity of development/skills upgrade has a significant pathway: it appears as an enunciated opinion, without having profoundness, consistency: *"Registering in the ecological agriculture system automatically presumes the attunement of adequate skills" (participant in round II Delphi),* then, following, a structural process carried out based on key elements (such as knowledge, information) – "*The need for skills of labor force would increase, more information being needed*" or "*Ecological certification of the farm's activity entails some superior knowledge, in the sense of understanding and applying the strict measures imposed by legislation*" (participant in round II Delphi).

Opinions regarding employment's effects at the level of support services/industries for agriculture

The opinion regarding the potential effects of adopting an ecological agricultural system , in the case study area, on the dynamics of advisory services has been analyzed in a bidimensional way; the opinion on the envisaged future of advisory services, from a quantitative perspective, registered a high level of homogeneity; all participants considered that is necessary to increase the number of advisory centers: "*the advisory service is required to grow directly proportional with the number of farms and, especially, with their size, the problems that can appear (financial etc.) being different based on their size level* " (participant in round II Delphi).

The opinions have an ample content when it comes to the qualitative development of these services. Projecting the additional skills needed by the agricultural consultants was accomplished on multiple plans/domains: "*...I believe that from the additional skills needed by the consultants, the ecological agriculture requires: technical knowledge adequate to ecological livestock farming, specific juridical problems, feasibility studies, marketing, management and training*" (participant in round II Delphi).

Figure3. The hierarchy of additional skills- based on experts' opinion

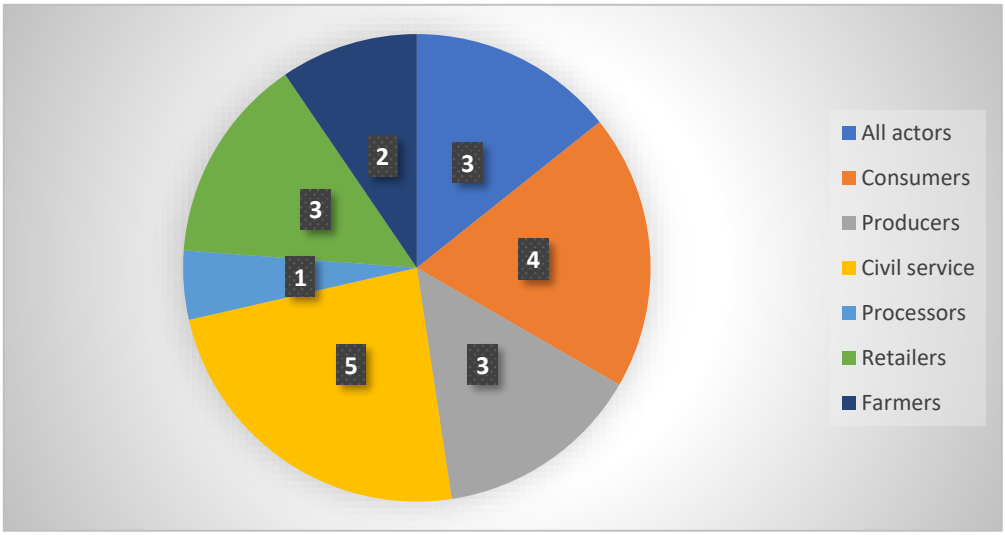


Source: own calculations based on experts' opinions

Extending the study to opinions regarding the skills of actors involved in the food chain allowed the analysis and identification of subjective positionings, coherently stated, with various intensities; the stated opinion is focused on the necessity to change/modify the skills of all involved

actors: "*All actors in the food chain have to acquire skills specific to the ecological system, both producers, as well as processor and retailers*" (participant in round II Delphi).

Figure4. Opinions regarding the need to change the skills

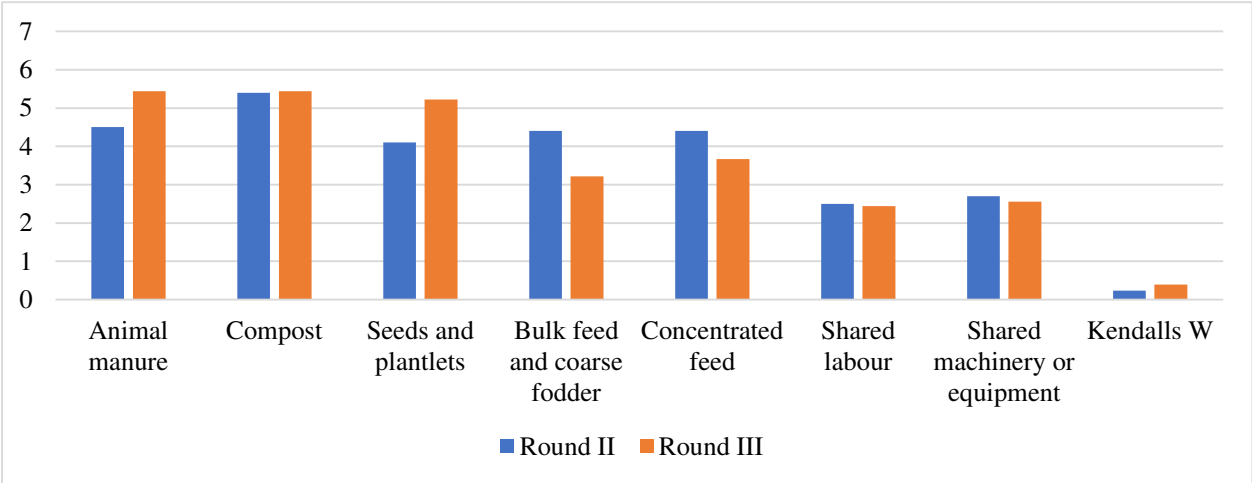


Source: own calculations based on experts' opinions

Opinions regarding supply chain effects

Participants' opinion regarding the effects on the supply chain concentrates on the beneficial/positive impact on the trade between farms (inputs), that could lead to: an increase commercial trade, a closer collaboration between farms, a positive dynamic of labor force. In this way, the participants consider that the premises for the development of agricultural activities and reaching higher economic benefits are ensured: "*There would be a positive impact, as it would* ***increase trade between farms****; as only the use of ecologically certified products is accepted, there would be more in-kind exchanges between ecological farms to equilibrate their input-output balance"*(participant in Delphi Round II); "*Adopting the ecological farming system automatically leads to an increase in trade with agricultural inputs between farm"* (participant in Delphi Round II);

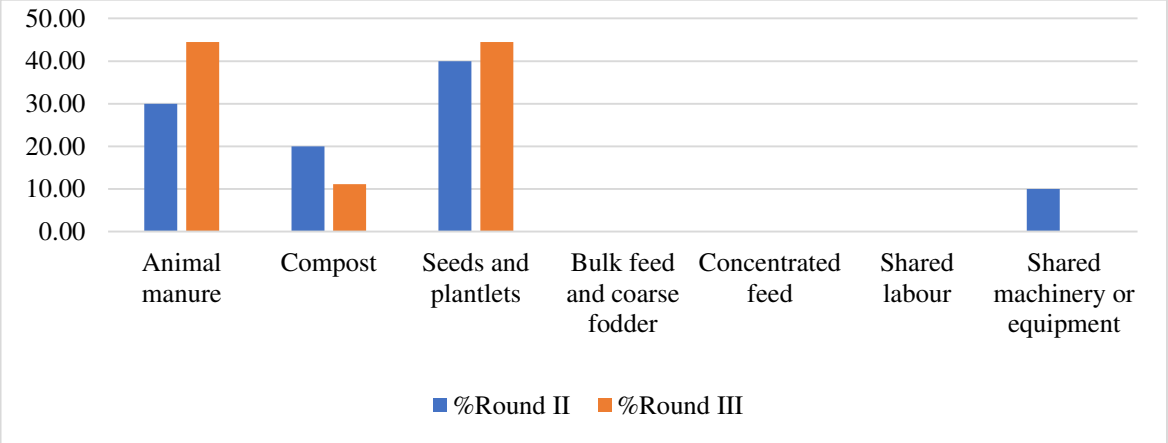
Figure 5. Opinions' dynamic on which input will have the biggest change in trade levels between farms



Source: own calculations based on experts' opinions

Note: 1 being having least change and 7 having most change. For Kendall's W, the value ranges from 0-1, where 1 represent a total agreement and 0 total disagreement.

Figure 6. Share of respondents who have chosen this input as the one that will have the biggest changein trade levels between farms



Source: own calculations based on experts' opinions

This scenario of the development of the trade in inputs between farms, supported by most respondents, would determine, in their opinion, a change in the trade with organic fertilizers (compost and animal manure) in the first place, as well as in the trade with inputs for animal feeding (bulk feed and coarse fodder, concentrated feed). The stated opinions have traverse: a) an evident consolidation process (in case of animal manure, seeds and plantlets and compost); b) an intensity's reduction process (shared labor, shared machinery or equipment); c) a de-structuring process (bulk feed and coarse feed, concentrated feed). At the same time, there was an evident process of increasing agreement between experts regarding the inputs that will have the biggest change in trade levels, the Kendall's W coefficient rising from 0.231 in round II to 0.389 in round III of Delphi exercise.

CONCLUSIONS

Knowing the subjective dimensions allows, on one side, the use of mechanisms that can facilitate/multiply the adoption of ecological practices, ecological development based on own patterns, on the social farmers' universe, and on the other side it represents a social guarantee of the efficient implementation of ecological policy's measures and ecological modernization programs.

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SUSTAINABILITY OF THE ROMANIAN RURAL AREA - AN APPROACH FROM A DEMOGRAPHIC AND SOCIAL PERSPECTIVE AT THE LEVEL OF THE SOUTH-MOUNTAIN REGION

SORINEL IONEL BUCUR [1]

Abstract

As a basic element of the sustainable development of an area, the demographic component plays an essential role, being considered, most of the time, as representing its backbone. The stock of demographic resources, as well as their structure is a starting point in elaborating any alternative for sustainable development, not only from an economic but also a social perspective. The changes in the structure of the rural population, to which is added the dynamics of economic activities, also influence the social policy measures to be implemented, both at national and local level. In this context, the present approach aims to make an analysis of the demographic and social system at the level of the South-Muntenia region.

Keywords: rural area, sustainability, demography, social policies.

JEL Classification: R10,R23, R29.

INTRODUCTION

The issue of local development, regardless of the environment of residence (urban or rural) has over time been the object of study of both public institutions with responsibilities in this regard, but also of specific research conducted by research institutions or civil society. Such studies, whose objectives have derived in most cases, from projects, strategies and development plans at the national level, come to bring to the forefront of each approach, a SWOT analysis, as a basis for outlining strategies at the local level.

In shaping local development strategies, the stock of resources plays an important role, among them being the demographic resource related to each local community, considered as the backbone of any economy. In relation to these considerations, the demographic system, whether viewed at national or local level, has over time been the subject of multiple discussions related to the need to ensure an adequate demographic structure that responds to economic and social challenges in a sustainable manner.

MATERIAL AND METHOD

The evaluation of the demographic system at the level of one of the largest development regions - the South-Muntenia region - is based on the public information provided by the national statistics, through the Tempo - Online database. From a methodological point of view, the approach uses established statistical methods, such as structures and comparisons, with the identification of existing gaps either interregional or intra-regional, depending on the availability of statistical data. In order to ensure the uniformity of the data, the analysis period is 2007-2021, limited by the existing statistical support at regional level.

RESULTS AND DISCUSSION

Addressing demographic issues has been the subject of numerous studies and research over time, both internationally and nationally, the importance of the demographic system, but also its quality, being considered key elements for achieving the goals of any sustainable development. (MDRMAP, 2014).

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According to specialists (Gheţău, 2007), in Romania, the maintenance of the current demographic policy will only have the effect of maintaining the negative demographic behavior, respectively of a low birth rate and a continuously decreasing fertility rate.

Without minimizing the importance of traditional studies in the demographic field, it should be noted that while traditional models of economic growth were until recently oriented towards the development and amplification of created wealth, new approaches to sustainable growth focus on predominantly qualitative criteria. growth must serve predominantly human, social and environmental dimensions (Ştefea, P and others).

Without further detailing the theories and studies in the field of demography, returning to the present approach, it should be noted that, lately, more and more specialized works are paying special attention to the demographic factor. Moreover, it is becoming increasingly important at the local level, in the attempt of the authorities / institutions and civil society to develop sustainable development models, starting from the existing stock of resources.

Speaking of the South-Muntenia region, it should be noted that it brings together seven counties with different demo-economic, geographical and spatial characteristics (Bucur, 2020), ranking third among the eight development regions in terms of performance recorded economic growth. However, speaking about one of the pillars of a sustainable, sustainable development, respectively about the demographic potential, things are different, both from the perspective of the stock of demographic resources, but also of the pressure exerted by certain demographic categories on the labor force.

Speaking about demographic resources, it should be noted that in the period 2007-2021, the population of the South-Muntenia region, both in total and locally, recorded a divergent evolution by area of residence.

Table 1. Population dynamics of the South-Muntenia region in 2021 compared to 2007, by areas of residence (%)

Region/couty	Urban	Rural
South-Muntenia	-5.01	3.26
Argeş	-5.24	4.92
Călăraşi	-3.73	3.51
Dâmboviţa	-1.48	5.94
Giurgiu	0.87	6.94
Ialomiţa	-5.05	2.77
Prahova	-6.13	3.12
Teleorman	-11.98	-5.40

Source: Own calculations on the Tempo – Online database, NIS, 2021.

Thus, if the urban population registers a visible decline, with percentages ranging between -12% (Teleorman) and a slight increase of 0.9% (Giurgiu), in rural areas we are witnessing after the date of accession to the European Union an increase of demographic resources with an oscillation range between 2.77% (Ialomiţa) and 6.94% (Giurgiu), the only county that registers on a negative slope being Teleorman (-5.4%) (Table 1).

In fact, the South-Muntenia region is characterized by a high degree of rurality, over 50% of the region's population being in rural areas. At local and county level, the rural population oscillates practically between 49.7% (Prahova) and 67.8% (Dâmboviţa), all the seven component counties being on an ascending slope from the perspective of the rural population (Table 2).

Table 2. The share of the rural population in the total population at regional and county level during the period 2007-2021 (%)

	2007	2010	2011	2016	2020	2021	2021/2007
South-Muntenia	52.0	52.9	53.2	54.8	56.2	56.5	4.5
Argeș	45.2	46.3	46.7	48.3	49.6	50.1	4.8
Călărași	54.9	55.4	55.8	57.4	58.7	59.0	4.1
Dâmbovița	63.1	64.1	64.5	66.2	67.5	67.8	4.8
Giurgiu	62.5	63.1	63.4	64.8	65.9	66.3	3.8
Ialomița	47.4	47.9	48.2	49.5	50.9	51.3	3.9
Prahova	45.2	46.1	46.5	47.8	49.3	49.7	4.5
Teleorman	57.1	57.9	58.3	59.7	61.0	61.4	4.3

Source: Own calculations on the Tempo – Online database, NIS, 2021.

The issue of the sustainable and sustainable development of rural communities in the South-Muntenia region is hit, first of all, by the existence of a deteriorated demographic structure, an aging population and a high pressure of the elderly population on the working age, but also of a disproportionate base in relation to the other categories of population.

Thus, for example, the rate of economic dependence, established as a ratio between the population over 65 years and that between 15-64 years, has increased both in the region and in the component counties, which reflects the deterioration of capacity. working age population in the effort to support the elderly population, amid the more pronounced growth of the latter category compared to the population between 15-64 years.

From this perspective, even if in dynamics, three of the seven component counties (Argeș, Prahova and Teleorman) exceed the regional average of increasing the economic dependency rate, at county level, Giurgiu and Teleorman counties were above the average annual value of the region, with percentages ranging between 29.3% (Giurgiu, 2007) and 36.2% (Teleorman, 2021) (Table 3).

Table 3. The evolution of the rate of economic dependence at the South-Muntenia region in the period 2007-2021 (%)

	Sud-Muntenia	Argeș	Călărași	Dâmbovița	Giurgiu	Ialomița	Prahova	Teleorman
2007	22.4	20.1	9.3	21.4	29.3	23.2	22.6	31.9
2010	22.5	20.6	11.4	21.2	27.9	23.4	22.8	31.8
2011	22.5	20.6	12.0	21.0	27.3	23.2	22.9	31.4
2016	23.9	23.4	10.3	22.7	27.4	24.0	24.7	33.6
2020	25.9	26.5	10.3	24.8	27.6	25.9	27.5	35.8
2021	26.4	27.1	10.2	25.2	27.7	26.2	28.0	36.2
2021/2007 (percentage points)	4.0	7.0	0.9	3.8	-1.6	3.0	5.4	4.4

Source: Own calculations on the Tempo – Online database, NIS, 2021.

The aging index of the population, calculated as a percentage ratio between the population over 60 years old and the one between 0-14 years old, is on the same increasing trend but with much higher intensity. Thus, in 2021 compared to 2007, the aging index of the rural population of the South-

Muntenia region and the component counties was on an increasing trend with percentages between 11.2% (Giurgiu) and 67.9% (Prahova) (Table 4).

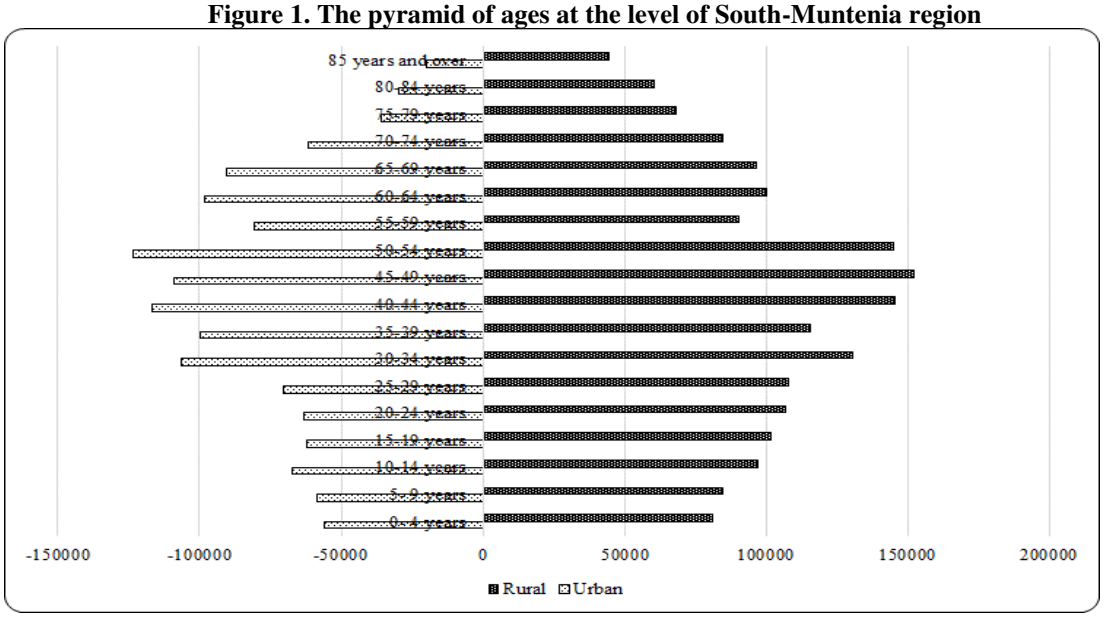
Table 4. The evolution of the demographic aging index at the level of the South-Muntenia region during the period 2007-2021 (%)

	South-Muntenia	Argeș	Călărași	Dâmbovița	Giurgiu	Ialomița	Prahova	Teleorman
2007	137.3	127.3	128.4	118.2	153.0	120.4	139.8	186.1
2010	144.9	139.9	131.0	126.5	158.5	123.5	146.0	199.6
2011	147.3	143.6	132.3	128.7	159.6	124.9	148.9	203.2
2016	164.7	168.0	143.5	146.2	167.5	136.2	170.0	222.7
2020	176.1	182.1	152.7	160.0	170.2	144.0	184.1	233.3
2021	178.8	184.8	155.6	162.4	170.1	145.9	188.1	237.3
2021/2007 (%)	30.3	45.2	21.2	37.3	11.2	21.2	34.5	27.5

Source: Own calculations on the Tempo – Online database, NIS, 2021.

As mentioned above, the involutions in terms of the rate of economic dependence and the demographic aging index are the result, among other things, of the significant increase in the elderly population, especially the over 80s, as well as some pyramids of ages unbalanced in all the analyzed counties (Figure 1).

Figure 1. The pyramid of ages at the level of South-Muntenia region



Source: Own calculations on the Tempo – Online database, NIS, 2021.

Thus, in the rural area of the South-Muntenia region compared to the urban environment, the share of the population by age categories constantly exceeds the values registered in the urban area, highlighting an aging population.

The evolutions registered in the indicators presented above are the effect, among others, of the significant oscillations regarding the birth rate, fertility and mortality rate registered in the post-accession period at the level of the South-Muntenia region and of the component counties.

Thus, within 19 years, the birth rate has been on an upward trend, both regionally and locally. By areas of residence, the analyzed period highlights a significant decline in the region as a whole,

so that in rural areas the birth rate decreases by percentages ranging between -1.5% (Teleorman) and -19.6% (Prahova) (Table 5).

Table 5. The evolution of the birth rate at regional level, by areas of residence, during the period 2007-2020 (no. live births / 1000 inhabitants)

		2007	2010	2011	2016	2020	2020/2007 (%)
Total	South-Muntenia region	9.1	9.1	8.4	8.7	7.6	-16.5
	Argeș	8.9	8.9	8.1	8.6	7.8	-12.4
	Călărași	10.4	10.1	9.3	9.5	8	-23.1
	Dâmbovița	9	9.7	8.8	9	8	-11.1
	Giurgiu	9.1	9.4	9.3	9	7.9	-13.2
	Ialomița	10.9	10.6	9.9	9.6	8.2	-24.8
	Prahova	9	8.6	7.9	8.4	7.1	-21.1
	Teleorman	7	7.5	6.9	7.4	6.3	-10.0
Rural	South-Muntenia region	9.1	9.2	8.6	8.8	8.1	-11.0
	Argeș	8.6	8.9	8.4	8.7	8.3	-3.5
	Călărași	10.4	10	9.7	9.4	8.7	-16.3
	Dâmbovița	9.4	10	9.3	9.3	8.6	-8.5
	Giurgiu	9.3	9.5	9.4	9.3	8.2	-11.8
	Ialomița	10.3	10.7	9.9	9.6	8.7	-15.5
	Prahova	9.7	8.8	8.1	8.6	7.8	-19.6
	Teleorman	6.8	7.2	6.6	7.3	6.7	-1.5

Source: Own calculations on the Tempo – Online database, NIS, 2021.

As an indicator that expresses the sustainable regeneration capacity of a nation, the general fertility rate, calculated as representing the number of newborns compared to the number of fertile women (aged 15-49 years) registered a significant decline both in the whole region, as well as of the component counties.

Although economic theory and literature estimate that the number of newborns / fertile women should be around 2.2 children, the demographic reality of the seven counties confirms that the number of newborns does not exceed, on average, one child (Table 6).

Table 6. The evolution of the general fertility rate at regional level, by areas of residence, in the period 2007-2020 (no. live births / 1000 women of fertile age 15-49 years)

		2007	2010	2011	2016	2020	2020/2007 (%)
Total	South-Muntenia region	36.4	37	34.2	35.4	33.1	-9.07
	Argeș	34	35	32	34	33.5	-1.47
	Călărași	42.2	41.2	37.8	38.3	34.7	-17.77
	Dâmbovița	35.5	38.6	35.1	35.8	33.7	-5.07
	Giurgiu	39	39.7	38.8	36.9	34.5	-11.54
	Ialomița	44.1	43.4	40.7	39.4	35.8	-18.82
	Prahova	35.4	34.5	31.6	34	31.4	-11.30
	Teleorman	31.7	33.7	30.8	33.1	30.3	-4.42
Rural	South-Muntenia region	41.1	40.7	37.9	37.4	36.2	-11.92
	Argeș	38.2	39.1	36.6	36.4	36.8	-3.66
	Călărași	47	44.5	42.8	39.9	38.3	-18.51
	Dâmbovița	39.8	41.6	38.5	37.8	36.7	-7.79

		2007	2010	2011	2016	2020	2020/2007 (%)
	Giurgiu	44.1	43.3	42.5	39.9	37	-16.10
	Ialomița	48.3	49.2	45.2	41.5	39.1	-19.05
	Prahova	41	37.2	34	35.5	34.2	-16.59
	Teleorman	35,7	36,8	33,1	34,9	33,4	-6,44

Source: Own calculations on the Tempo – Online database, NIS, 2021.

Compared to 2007, in 2020, the number live births/fertile women decreased in the whole region by 9.07%, so that, in rural areas, the decrease is about 12%. It is worth mentioning that in the rural area the most accentuated reduction is registered in Ialomița county (-19.05%), followed at a short distance by Călărași, Prahova and Giurgiu. The deterioration of this indicator cannot be broken from the general context of the economic and social situation characteristic of each rural area.

Thus, the changes that occurred after 1989, both economically and socially, over which the rigors of the community space overlapped, without there being, at national level, an adequate policy for the protection of the population, had as an effect the deterioration of demographic indicators.

This process is even more visible in the counties in the plain areas where, due to the existence of mono-activities in the sphere of the agricultural sector, the adaptation to the new economic and social realities has hit both the existing features of each area and sometimes even the opposition to change.

Calculated as the number of death births per 1000 live births and deaths in a year, the mortality rate registered a different evolution on the total of the region, compared to that in rural areas. Thus, if in the whole region, Teleorman county occupies the first place in terms of increasing the mortality rate, in rural areas we see in the last 19 years a significant increase of this indicator in three of the seven counties (Dâmbovița, Giurgiu and Teleorman), for the counties of Călărași, Ialomița and Prahova to register an improvement of the mortality rate (Table 7).

Table 7. Evolution of the mortality rate at regional level, by areas of residence, in the period 2007-2020 (number of death births per 1000 live births and deaths in one year)

		2007	2010	2011	2016	2020	2020/2007 (%)
Total	South-Muntenia region	5.1	4.2	5.2	4.1	4	-21.6
	Argeș	5.2	3.5	5.6	4.3	3.2	-38.5
	Călărași	7.5	6.3	5.9	2.7	4.1	-45.3
	Dâmbovița	2.9	1	2.7	3.8	4.4	51.7
	Giurgiu	3	3	4.9	3.2	2.4	-20.0
	Ialomița	6	6.2	6	6.7	5.1	-15.0
	Prahova	6.4	5.8	6.9	4.9	3.6	-43.8
	Teleorman	3	3.8	3.5	2.1	6	100.0
Rural	South-Muntenia region	5.1	4.6	6.1	4.3	4.5	-11.8
	Argeș	4.5	4.3	5.7	6.3	4.5	0.0
	Călărași	8.2	7.6	5.8	3.3	6.2	-24.4
	Dâmbovița	2.6	0.6	3.3	4.2	4.3	65.4
	Giurgiu	1.7	3.3	5.6	4.6	2.7	58.8
	Ialomița	6.6	5.8	7.6	3.4	4.6	-30.3
	Prahova	7.4	7.2	9.7	4.7	4	-45.9
	Teleorman	4.3	5.2	4.6	2.2	5.8	34.9

Source: Own calculations on the Tempo – Online database, NIS, 2021.

A favorable evolution is found in the infant mortality rate. The literature (Bădescu, 2008)defines four cascades of infant mortality, respectively:

• the first waterfall with a rate level of 4-6 dead children / 1000 newborns;
• the second waterfall with a rate level of 6-9 dead children / 1000 newborns;
• the third waterfall with a rate level of 9-15 dead children / 1000 newborns;
• the fourth waterfall with a rate level of over 15 dead children / 1000 newborns.

From the analysis of the available statistical information, it should be noted that over the whole period 2007-2020 there is a visible trend of improvement of this indicator, both in the region as a whole and in areas of residence. At the level of the rural area, the infant mortality rate decreased during the analysis period with percentages that vary between -18.4% (Prahova) and -65.4% (Teleorman) (Table 8).

Table 8. Evolution of the infantile mortality rate, by areas of residence at the regional level in the period 2007-2020 (number of death births under one year/ 1000 live births in one year)

		2007	2010	2011	2016	2020	2020/2007 (%)
Total	South-Muntenia region	11.4	10.9	10.3	7	5.6	-50.9
	Argeș	14.4	11.2	9.1	7.2	5.5	-61.8
	Călărași	13.4	15.1	10.9	12	7.3	-45.5
	Dâmbovița	8	8.2	7.8	5.7	4.6	-42.5
	Giurgiu	12.6	12.3	13	9.7	4.7	-62.7
	Ialomița	9.9	10.6	12.7	8.8	6.9	-30.3
	Prahova	9.2	9.3	10.5	4.4	5.5	-40.2
	Teleorman	14.9	13.5	11	5.9	5.2	-65.1
Rural	South-Muntenia region	13.1	12.4	11.1	7.9	6.2	-52.7
	Argeș	17.9	13.3	10.3	8.4	7.9	-55.9
	Călărași	13.2	17.9	11.1	12.3	5	-62.1
	Dâmbovița	9.1	8.3	7.1	4.8	5.3	-41.8
	Giurgiu	11.2	14.4	15.7	11	4	-64.3
	Ialomița	11.4	12.3	15.2	11.5	9.3	-18.4
	Prahova	12	10.7	11.3	5.6	6	-50.0
	Teleorman	18.8	14.6	11	7.2	6.5	-65.4

Source: Own calculations on the Tempo – Online database, NIS, 2021.

Compared to 2007, when all seven counties were included in the third waterfall, in 2020, infant mortality placed one county in the first waterfall (Giurgiu), six counties in the second waterfall and only one in the third waterfall (Ialomița).

In the context of important structural changes in the demographic structure, any attempt to develop a sustainable development strategy must have as an essential starting point the existing stock of demographic resources. Even in these conditions, the current employment rate must not be overlooked, nor the pressures on the workforce for at least two reasons, namely the number of pensioners, but also the granting of social assistance.

In this context, over 19 years, the total employment rate, calculated as a share of the employed population in one age group in the total population in the same age group, declined in the whole population aged 15 and over, even if, at certain intervals, there is a slight tendency to increase. However, unlike the whole region, in the rural area we are witnessing in the period 2007-2020 a significant decline in the employment rate on all age groups, with percentages ranging between -2.4% (35-54 years) and - 7% (15 years and over) (Table 9).

Table 9. Evolution of the total employment rate at the total and rural regional level (%)

	2007	2010	2011	2016	2020	2020/2007 (%)
Total						
15 - 24 years	30.9	24.9	23.1	23.9	28.2	-2.7
25 - 34 years	78.3	75.7	70.2	70.3	74.3	-4
35 - 54 years	76.8	77.2	72.8	77.3	80.2	3.4
25 - 54 years	77.4	76.8	72	75.3	78.7	1.3
55 - 64 years	45.8	44.1	37.1	41.5	47.5	1.7
15 - 64 years	62.5	61	56.4	59.9	64.4	1.9
15 years and over	53.7	51.2	47.1	48.3	50.2	-3.5
Rural	2007	2010	2011	2016	2020	
15 - 24 years	38.6	27.6	25	27.1	32.4	-6.2
25 - 34 years	78.6	72.9	65.5	66.3	72.3	-6.3
35 - 54 years	79.2	78	71.3	75.3	76.8	-2.4
25 - 54 years	79	76.4	69.5	72.7	75.6	-3.4
55 - 64 years	58.5	56.3	43.8	47.5	52.6	-5.9
15 - 64 years	66.9	63.1	55.9	59.6	63.7	-3.2
15 years and over	56.7	52.4	46.3	47.6	49.7	-7

Source: Own calculations on the Tempo – Online database, NIS, 2021.

The evolutions registered in demographic profile, including the level of employment, registered a much more accentuated rhythm than that of the number of pensioners or of the number of families for which social benefits are supported.

Thus, although the period 2007-2020 is characterized by a decline in the number of state social insurance pensioners, in the South-Muntenia region there are a number of 711854 pensioners, Prahova and Argeș counties being on the first two positions in this point of view. Basically, the number of employees per pensioner increased from 6.9 (2007) to no less than 7.6 (2020), representing an increase of approx. 10.6%.

Moreover, although the number of families receiving social benefits is decreasing, it should not be overlooked that in 2020, in the South-Muntenia region were in payment a number of 29320 families, 26% of them being registered in Teleorman County, followed at a short distance by Argeș, Dâmbovița and Prahova (Table 10).

Table 10. Evolution of the average number of social benefits paid (families) at the level of the South-Muntenia region and local (county) (no.)

	2011	2016	2020	2020/2011 (%)
South-Muntenia region	35,205	47,155	29,320	-16.7
Argeș	6,372	8,305	5,446	-14.5
Călărași	4,067	5,141	2,863	-29.6
Dâmbovița	6,685	8,620	4,713	-29.5
Giurgiu	3,152	4,294	2,316	-26.5
Ialomița	2,903	4,144	2,632	-9.3
Prahova	4,575	5,633	3,740	-18.3
Teleorman	7,451	11,018	7,610	2.1

Source: Own calculations on the Tempo – Online database, NIS, 2021.

CONCLUSIONS

The evolutions of the current demographic system of the rural area of the South-Muntenia region do not give it sustainability. As an essential pillar of the development of a given nation or local area, the demographic system must be a real priority among the decision-makers.

The high degree of uncertainty regarding the improvement of the demographic structure of the population, in the context of the existence of totally unbalanced age pyramids, the deterioration of demographic indicators, the increase of life expectancy are elements that will generate additional pressure on labor, but also on labor costs. social assistance.

In the context of the involutions registered in the demographic system of the South-Muntenia region, we consider necessary the implementation of measures aimed, first of all, at increasing the birth rate, correlated with support measures for mothers for faster reintegration into activity, as well as ensuring the necessary support. childcare, in particular through the development of the childcare system through nurseries or homes.

The simple financial support given to mothers who give birth to more children, either in the form of higher allowances, or the reduction of the retirement age, does not solve the problem in the context in which the level of economic development and the ability to support a larger family of children differs significantly from one community to another, depending on the level of income obtained.

On the other hand, the creation of new jobs, through financial support provided from public or private resources, or even as a result of the public-private partnership, will be able to ensure a higher degree of employment among young people. This aspect is all the more important as the increase in life expectancy generates an increasing pressure on the working age population, as an alternative to support, among others, the funds allocated to the pension system.

Closely related to the demographic system, but also as part of social policy, the need to implement measures to protect the elderly, but also the current policy of granting social assistance has proved completely ineffective.

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AGRICULTURAL COOPERATIVES – FARMERS' CHANCE TO GET INTEGRATED IN THE VALUE CHAIN

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Abstract

Through cooperation, agricultural producers have access to markets, information, technology, credits and various training activities. Cooperation also provides them access to the decision-making process, and what is most important, supports them legally in negotiating contracts with suppliers of agricultural inputs and equipment. The present study attempts to make an analysis of this form of association, starting from a foray into the literature on cooperation, going through a review of legislative facilities that appeared after almost 20 years from the Romanian revolution of December 1989 and ending up with a most accurate picture of the existing situation, based on official data. The results of the study show that 1696 agricultural cooperatives were registered in Romania in July 2020, out of which 12% were not operating, being under various liquidation forms. From the cooperatives registered by the end of 2019, only 42.5% submitted a balance sheet, which means that only these cooperatives had an economic activity and less than half of them made profit.

Keywords: agricultural producers, agricultural cooperatives, Romania

JEL Classification: Q10, Q13

INTRODUCTION

Agriculture is the activity in which cooperation, under most different forms, has been most necessary than in any other field of human activity.

Starting from the most primitive forms up to the present moment, cooperation has led to advantages for those that have chosen this form of carrying out their activity. "Cooperation, like any economic system, stemmed from the need to find a solution to an old desideratum of mankind: a better and easier life, with profit" (Bold, I., in Istudor, N., Popescu, G., 2017, p.19).

The main reasons why farmers are attracted by cooperation are: "their low productivity, low investment capacity and poor access to markets" (MARD, 2015) and because "the weak bargaining power and the dependency situations of farmers deepen the existing imbalance in the agri-food chain" (Silvia Zaharco, 2014, p. 56).

The producers, from their own initiative, get associated into this economic organization form called agricultural cooperative. Thus, "the cooperative's power does not result from the size of its land or members' landed property, but rather from the intensity of relationships between cooperative and its members", and the success of cooperative is given by "the unit of interests of cooperative members" (Popescu, G., in Istudor, N., Popescu, G., 2017, p.15).

Consequently, "cooperation may represent a plea for agriculture modernization, by configuring a cooperative architecture, to help increase performance and efficiency of farmers' activities" (Hera, C., in Istudor, N., Popescu., G., 2017, p. 4), cooperation being considered "a modern organization and agri-food marketing method" (Istudor, N., în Istudor, N., Popescu, G., 2017, p. 11)

In Romania, according to the current legislation, there are three main types of association forms, namely:

- ***Agricultural associations with/without legal personality*** and other forms of association in agriculture, regulated by Law 36/1991 on agricultural associations and other forms of association in agriculture and Law 176/2019 amending and complementing this law);
- ***Agricultural cooperatives***, regulated by the Agricultural Cooperation Law 566/2004, Law 164/2016 amending and complementing the Agricultural Cooperation Law, as well as establishing measures for its application and by Law 265/2020 amending and complementing the Agricultural Cooperation Law);

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- ***Producer groups and organizations***, regulated by Government's Ordinance 37/2005 on the recognition and operation of producer groups and organizations for the marketing of agricultural and forestry products based on Law 338/2005, with the latest update by Government's Ordinance 32/2015.

A brief description of each of them is necessary to highlight the differences between them. The agricultural associations allow the association of agricultural producers under two forms:

- agricultural associations without legal personality – simple association forms, based on associations between two or several natural persons, who, on the basis of an agreement, share their knowledge and labour input to carry out an activity of general interest, with the aim of farming the land, raising animals, supplying, storing, conditioning, processing and sellingproducts, providing services, as well as other activities (Law 36/1991, Art. 2).
- agricultural associations with legal personality – "private entities, with variable capital and a variable and unlimited number of associates, having as object of activity the exploitation of farmland, tools, animals and other inputs brought to association, as well as making investments of agricultural interest" (Law 36/1991, Art.5), which are entered in the Register of Agricultural Associations with Legal Personality. The latest update of Law 36/1991 was in the year 2019, stipulating that "the agricultural association with legal personality can become (commercial a.n.) company" that shall be entered in the Register of Trade and shall be removed from the Register of Agricultural Associations (Law 176/2019, Art.2).

The agricultural cooperative is an organization of agricultural producers that brings benefits to its members, providing them with the organization of production, purchasing, sale and services. Thus, the agricultural cooperative is an autonomous association, with unlimited number of members, which carries out an economic, technical and social activity in the private interest of its members. The agricultural cooperative carries out commercial activities, producing goods and services in agriculture, aiming to: ensure the necessary conditions for obtaining economic benefits by all members of cooperative; meeting the supply needs of cooperative members with necessary agricultural inputs; obtaining agricultural commodities in conformity with market requirements; creating conditions for processing agricultural products; sale of obtained production. The cooperative is owned and run by all its members.

According to the agricultural cooperation law, the agricultural cooperatives are established and function with minimum 5 persons (Art.5, Law 566/2004, modified and completed by Law 21/2019) and are of two types:

- first degree agricultural cooperatives are legal entities consisting, as appropriate, of natural persons, authorized natural persons, individual enterprises and/or family enterprises, defined according to Government Emergency Ordinance (GEO) 44/2008 on the development of economic activities by authorized individuals, individual enterprises and family enterprises, approved with amendments and completions by Law 182/2016;
- second degree agricultural cooperatives are legal entities consisting of juridical and/or natural persons, authorized natural persons, individual enterprises and family enterprises, defined according to GEO 44/2008, approved with amendments and completions by Law 182/2016, as appropriate, for the purpose of horizontal and vertical integration of economic activitycarried out by these and authorized in accordance with the law.

The agricultural cooperative is registered at the Trade Register Office (attached to the law court in whose territorial area it has its headquarters) and becomes a legal entity from that date.

The agricultural cooperative can carry out economic activities permitted by the Agricultural Cooperation Law, which are the following:

- agricultural service cooperative, which provide services for agricultural producers in cooperative system;
- purchasing and sales cooperative, which organize both the procurement of materials and technical means necessary for agricultural production and the sale of agricultural products;
- cooperative for processing agricultural products;

- manufacturing and small industry cooperative in agriculture;
- cooperative for the exploitation and management of agricultural, forestry, fisheries land and of livestock herds;
- cooperative for financing, mutual assistance and agricultural insurance.

The producer groups and organizations are agricultural producers' association forms with legal personality. The legislation (Gov. Ordinance 37/2005, Art.1, paragraph 2) provides that the following legal entities can be recognized as producer groups or producer organizations: a) commercial companies (according to Law 31/1990); b) agricultural associations with legal personality and other association forms in agriculture (according to Law 36/1991); c) associations and foundations (according to Gov. Ordinance 26/2000); d) agricultural cooperatives (according to Law 566/2004); d) any other legal association forms (authorized natural person, family association, according to Law 300/2004).

Obtaining recognition or preliminary recognition (transitional period of maximum 5 years for which producer groups in the fruit and vegetable sector obtain this status) as a producer group or organization is regulated by activity sectors, according to the following normative acts:

- for the fruit and vegetable sector, a preliminary recognition as a producer group is first obtained or a recognition as producer organization (according to Order 684/2007);
- for the agricultural, livestock and forestry sector, the recognition as producer group is obtained according to Gov. Ordinance 37/2005, approved by Law 337/2005);
- for pisciculture and aquaculture, the recognition as producer organization can be obtained according to Order 772/2007.

The members of associative forms, regardless of the organization form to which they belong – associations, cooperatives or producer groups get associated on a free and voluntary basis and have democratically established rights.

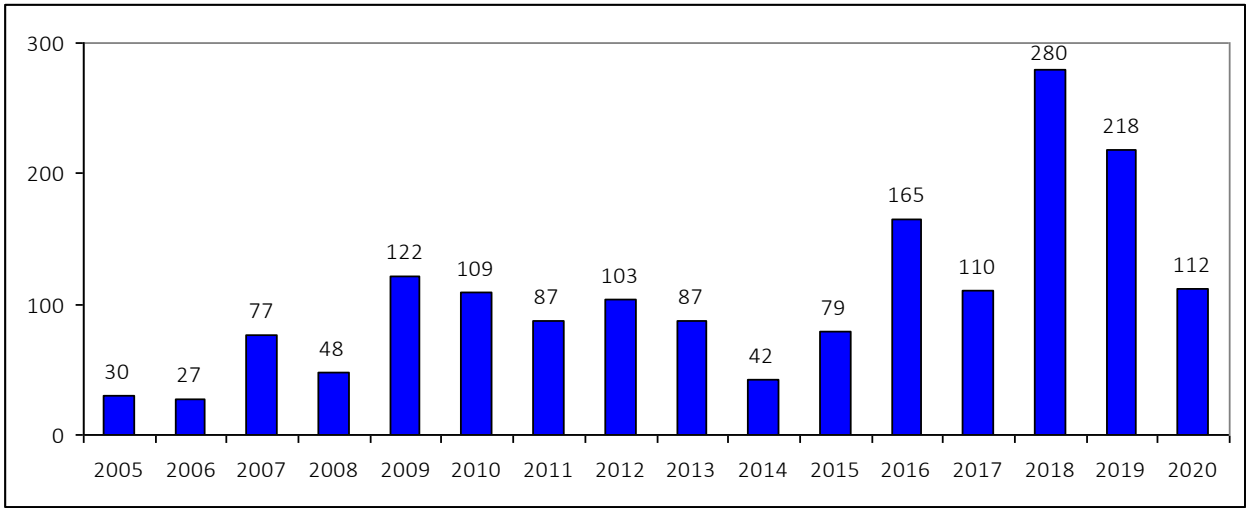
MATERIAL AND METHOD

The present study is an analysis of the evolution and structure of agricultural cooperatives in Romania, from the appearance of legislative measures until July 2020, on the basis of data provided by MARD – National Register of Agricultural Cooperatives created on the basis of data and information supplied by the National Trade Register Office.

RESULTS AND DISCUSSIONS

Since 2005, after the appearance of the legislative measures that allowed the establishment and operation of agricultural cooperatives until July 2020, a number of 1696 agricultural cooperatives were established in Romania. From one year to another, the number of established cooperatives differed, the highest number of newly established agricultural cooperatives (280) being registered in 2018, as a result of the implementation of NRDP 2014-2020, which provided support to the establishment ofagricultural cooperatives through several axes.

Figure 1. Evolution of the number of newly registered agricultural cooperatives annually, in Romania

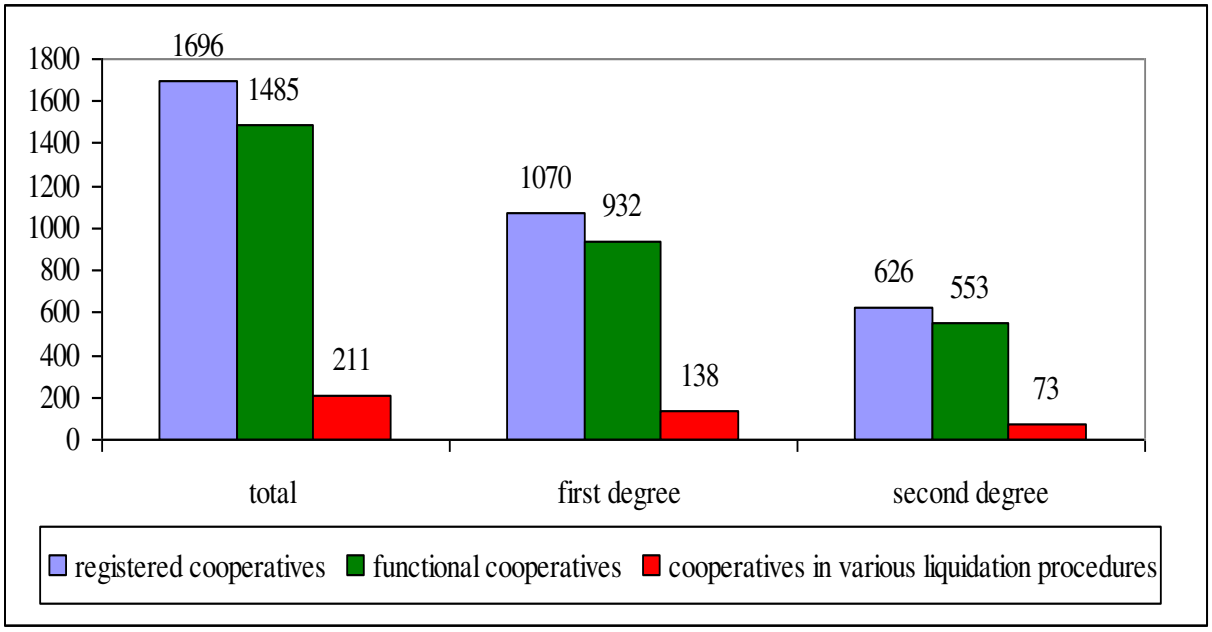


Source: MARD, (2020), National Register of Agricultural Cooperatives in Romania

In the year 2020, 1696 agricultural cooperatives were registered, out of which 1070 were first degree cooperatives and 626 were second degree cooperatives that is mixed cooperatives (that also have juridical persons in their componency). Yet part of these cooperatives were in various dissolution, liquidation, insolvency or deregistration procedures. Thus, in the year 2020, a number of 1485 agricultural cooperatives were functional, of which 932 first degree agricultural cooperatives and 553 second degree agricultural cooperatives.

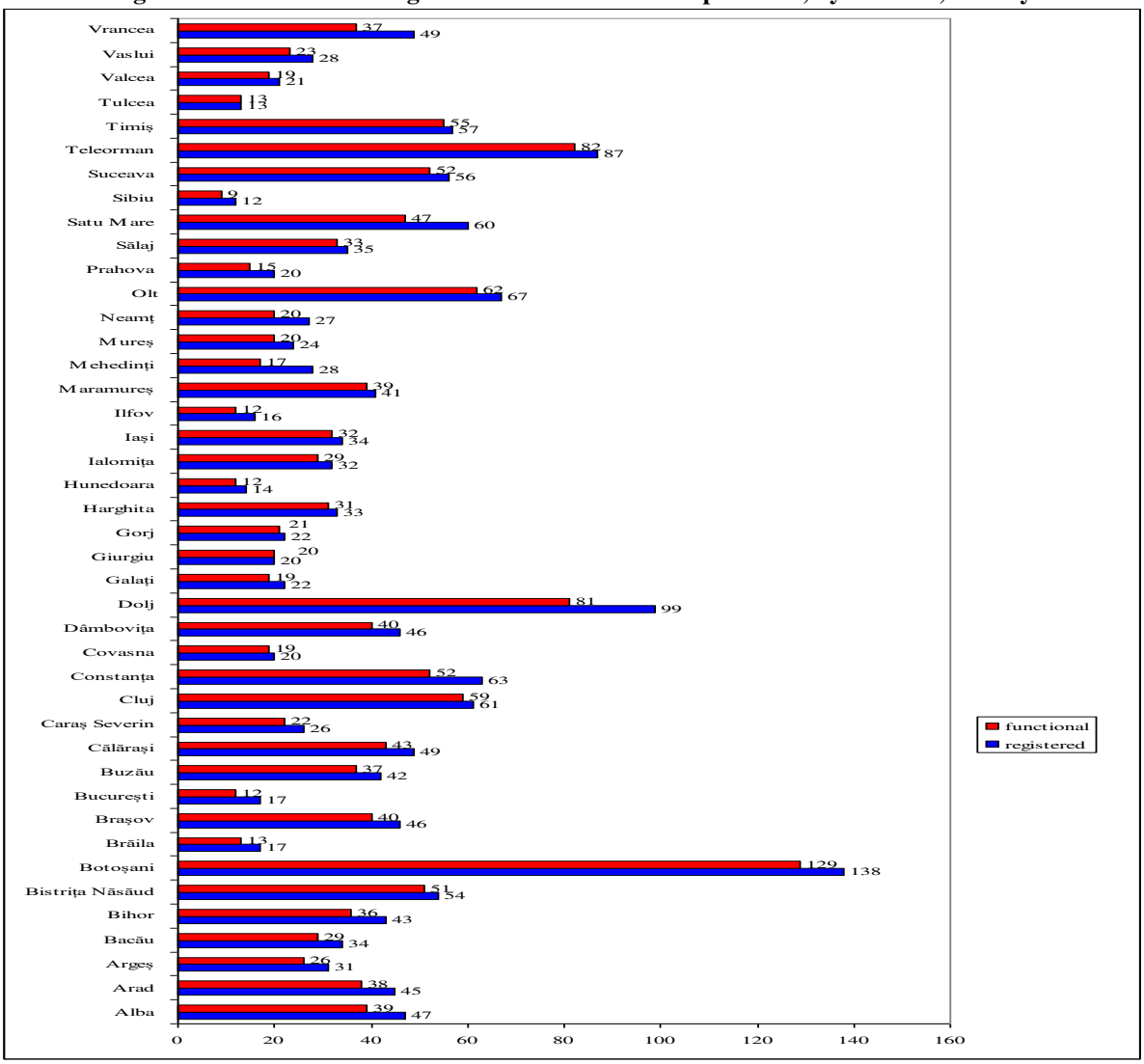
Figure 2. Situation of agricultural cooperatives in September 2020

- number -



Source: authors' calculations based on MARD data, 2020

Figure 3. Distribution of registered and functional cooperatives, by counties, in the year 2020



Source: authors' calculations based on MARD data, 2020

In the top of the counties with the most agricultural cooperatives, both registered and functional, Botoșani county ranks first, followed by Dolj and Teleorman.Sibiu county lies at the opposite pole, with the lowest number of registered agricultural cooperatives (12) and the lowest number of functional agricultural cooperatives (9).It should be noted that at the level of each county in Romania, there is a smaller or larger number of functional agricultural cooperatives, which means that farmers choose this form of association for carrying out their activity, becoming more interested in working together andbenefit together from the results of their work.

At the end of the year 2019, out of the total number of registered cooperatives, namely 1584, only 673 submitted their balance sheets. Which means that only 42.5% of the total number of registered cooperatives had economic activity, the cumulated turnover being 1.6 billion RON. It is worth noting that out these cooperatives, 354 had zero profit and only the remaining 319 ended the year with net profit. More than half of the cooperatives that submitted balance sheet had zero profit (52.6%) and less than half had net profit (47.4%). Taking into consideration the total number of cooperatives registered at the end of the year 2019, it can be said that less than 20% of these had profit, and hence only these are eligible for bank loans.

Of the total number of cooperatives that submitted balance sheet in the year 2019, only for 391 of these there are available data on their turnover. Thus:

- 59 cooperatives had zero turnover, which means that they did not gain incomes from commercial operations;

- 188 had up to 500,000 RON turnover;
- 33 had 500,000 – 1,000,000 RON turnover;
- 73 had 1,000,000 – 10,000,000 RON turnover;
- 36 had 10,000,000 – 100,000,000 RON turnover;
- 2 cooperatives had a turnover of over 100,000,000 RON (Integrated Agricultural Cooperative *Țara Mea*, with the headquarters in Vaslui, with 147,645,790 RON turnover, having as main activity the wholesale of fruit and vegetables and Aaylex Agro Agricultural Cooperative with the headquarters in Buzău, which had the highest turnover of all, i.e. 166,234,958 RON, with poultry raising as main activity; both are second degree cooperatives).

Most cooperatives that submitted balance sheets in the year 2019 had as main activity the growing of cereals, leguminous crops and oil seeds, followed by those engaged in mixed farming activities (crops + livestock). In both cases half of the cooperatives had zero profit, and the other half had profit. These were followed by the agricultural cooperatives having as main activities the wholesale of fruit and vegetables and wholesale of cereals, seeds, fodders and unmanufactured tobacco.

Table 1. Distribution of cooperatives that submitted balance sheet in the year 2019, according to NACE code*)

NACE code	Number	out of which:	
		Zero profit	Net profit
Growing of cereals, leguminous crops and oil seeds	104	52	52
Mixed farming (crops + livestock)	72	36	36
Wholesale of fruit and vegetables	66	38	28
Wholesale of grain, unmanufactured tobacco, seeds and animal feeds	59	26	33
Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods	37	23	14
Raising of dairy cattle	32	16	16
Raising of sheep and goats	30	12	18
Raising of other animals	28	22	6
Growing of vegetables and melons, roots and tubers	25	18	7
Wholesale of dairy products, eggs and edible oils and fats	23	7	16
Support activities for crop production	21	12	9
Support activities for animal production	20	11	9
Raising of swine/pigs	18	13	5
Meat processing and preserving	13	8	5
Raising of other animals	12	8	4
Growing of bush trees, strawberries, nuts and other fruit trees	11	5	6
Processing and preserving of fruit and vegetables	9	6	3
Manufacture of fresh dairy products and cheese	8	2	6
Raising of poultry	8	3	5
Wholesale of live animals	8	4	4
Warehousing and storage	7	5	2
Growing of pome fruits and stone fruits	6	3	3
Wholesale of meat and meat products	6	5	1
Non-specialized wholesale of food, beverages and tobacco	5	3	2
Retail sale in non-specialized stores with food, beverages and tobacco	5	5	0
Total **)	633	343	290

**) a cooperative has a primary NACE code and a number of other secondary NACE codes, that can reach dozens;*

***) of the 673 cooperatives that submitted balance sheets, only 633 are included in the table, the remaining 40 consisting of one or two cooperatives with the same NACE code.*

Source: authors' calculations based on MARD data, 2020

Out of total cooperatives that submitted balance sheets in the year 2019, only 231 had employees, 1270 in total. Csomortáni Szövetkezet Agriculttural Cooperative, with the headquarters in Harghita county, first degree cooperative established in the year 2019, with meat production and preservation as main activity, had the most numerous employees (282), followed by Agroprod Crasna Agricultural Cooperative, based in Satu Mare county, second degree cooperative established in the year 2009, with the main activity poultry meat processing and preservation, with 197 employees.

CONCLUSIONS

The association of agricultural producers in agricultural cooperatives opens up new opportunities for economic development by attracting local, zonal or regional benefits and using collective power to increase the prosperity of members, their families and communities to which they belong.

The number of agricultural cooperatives in Romania increased from year to year, and the main determinants that make farmers get organized into agricultural cooperatives are the following: easier access to European funding, better negotiation of prices of agricultural raw products, a more stable market and higher selling prices for their production. Even though the number of agricultural cooperatives has increased significantly in the latest years, the financial data reveal their low performance.

It is very important that the next programming period and future policies shall focus more on strengthening the association environment for agricultural producers to be mostly interested in joining various cooperation forms.

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AGRICULTURAL COOPERATIVES IN THE NORTH-EAST DEVELOPMENT REGION OF ROMANIA - ECONOMIC PERSPECTIVES

KRISZTINA MELINDA DOBAY [1]

Abstract

The role of agricultural cooperatives in supporting farmers has become increasingly important in the context of crises and unforeseen economic fluctuations, helping to improve their position in the value chain. If at the level of the European Union about 34% of farmers are part of agricultural cooperatives, in Romania only 1% are members in associative entities. The data indicate that the largest number of agricultural cooperatives is located in the North-East Region (a quarter of the total), especially in Botoșani County. However, analyzing the information on their economic activity, we found that a large part of them either never filed a balance sheet or submitted statements that they did not carry out economic activities. Of those who filed a balance sheet, half declared zero turnover. However, 57 agricultural cooperatives registered a profit for 2020 in the analyzed Region. In this paper, we aimed to identify the most profitable fields of activity for agricultural cooperatives in the North-East Development Region of Romania.

Keywords: agricultural cooperative, regional analysis, turnover, profit, North-East Development Region of Romania.

JEL classification: Q13, H32, R1

INTRODUCTION

Cooperatives defined as autonomous and voluntary associations, made up of several persons pursuing economic, social or cultural objectives, represent a type of enterprise with a dual economic and social purpose, their activity being governed, in general, by the principles of the International Cooperative Alliance since 1995 (ICA, 2017): free and voluntary association of members, economic democracy (control and management), autonomy, transparency, solidarity (self-help), cooperation between cooperatives, concern for the community (Talmaciu et al., 2017). Due to their dual nature, they are organizations that can significantly contribute to the sustainable development of farms and rural communities in general (Sutherland et al., 2014; Bezus & Bilotkach, 2018; Candemir et al., 2021).

In the European Union agricultural cooperatives have a long tradition and the experience of member countries is quite different. According to recent studies (Đurić et al., 2021), one-third of the approximately 250,000 cooperatives registered in the U.E. is constituted by agricultural cooperatives, with national market shares ranging from more than 70% to less than 1%, the average being 40% (Bijman, 2016).About the success achieved by agricultural cooperatives compared to other competitors in different fields and sectors of activity, by their better positioning in the supply chains with agri-food products, interesting works have been written over the years (Juan et al., 2012; Höhler & Kühl, 2014), most authors mentioning sectors such as dairy (Hanisch et al., 2013; Bijman & Iliopoulos, 2014; Bijman, 2018), vegetables and fruits (Guzmán & Arcas, 2008; Bijman et al., 2012), viticulture (Bijman et al., 2012), olive oil (Bijman et al., 2012), etc.Moreover, there are studies that mention the role of agricultural cooperatives in supporting farmers in the context of crises and unforeseen economic fluctuations (Smith & Rothbaum, 2013; Kontogeorgos, 2016; Fusco & Migliaccio, 2018; Francesconi et al., 2021).

The issue of association and cooperation in agriculture is an extremely important one for Romania as well, and our efforts in order to study and understand the national, regional and local specificities date back many years.Thus, we studied cooperative models and systems in the world, the history of cooperation in Romania, how marketing cooperatives can be set up and operate, then we participated, in 2002, in the elaboration of the initial draft of the Cooperation Law (Dobay &

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Apetroaie, 2021).Subsequently, we studied various forms of formal and informal association in agriculture in two counties in Romania (Iași and Ialomița), following their evolution for almost two decades (Dobay & Sabates-Wheeler, 2003; Agarwal et al., 2021).

In recent years, more and more Romanian specialists believe that the development of the cooperative system can be one of the directions for increasing incomes and improving the quality of life of agricultural producers by enlarging their bargaining power (Micu et al., 2015; Bercu et al., 2020; Florea et al., 2020; Toderiță & Popescu, 2020; Toderiță et al., 2020; Dobay & Apetroaie, 2021). In order to see if these expectations regarding the economic potential of agricultural cooperatives are justified, we analyzed data on the dynamics and evolution of some indicators regarding their activity at the level of the North-East Development Region of Romania.

MATERIALSAND METHODS

To carry out this study we consulted the relevant literature and then, to collect data, primary and secondary, as well as various information on associative forms in the Region, we used the complete research method, that is quantitative and qualitative analysis.

Thus, in order to analyze the evolution of agricultural cooperatives in the North-East Region of Romania, we proceeded as follows: we extracted from the database of the National Trade Register Office (NTRO) all the registrations of agricultural cooperatives in the counties of the Region; we consulted the website of the Ministry of Public Finance (MPF) to identify the agricultural cooperatives in each county, that is to find out the full name, unique identification code, NACE[1] for economic activity, year of establishment, years of economic activity, etc. (using the keywords“agricultural cooperative” as a common name for nominal identification); we queried the Topfirme.com website for detailed information and to have a double check for data on turnover, registered profit, average number of employees and registered income; we centralized and processed the data at county and regional level; subsequently, we verified and updated the data by consulting the National Register of Agricultural Cooperatives (NRAC) on the website of the Ministry of Agriculture and Rural Development, September 2021 version.

RESULTS AND DISSCUSION

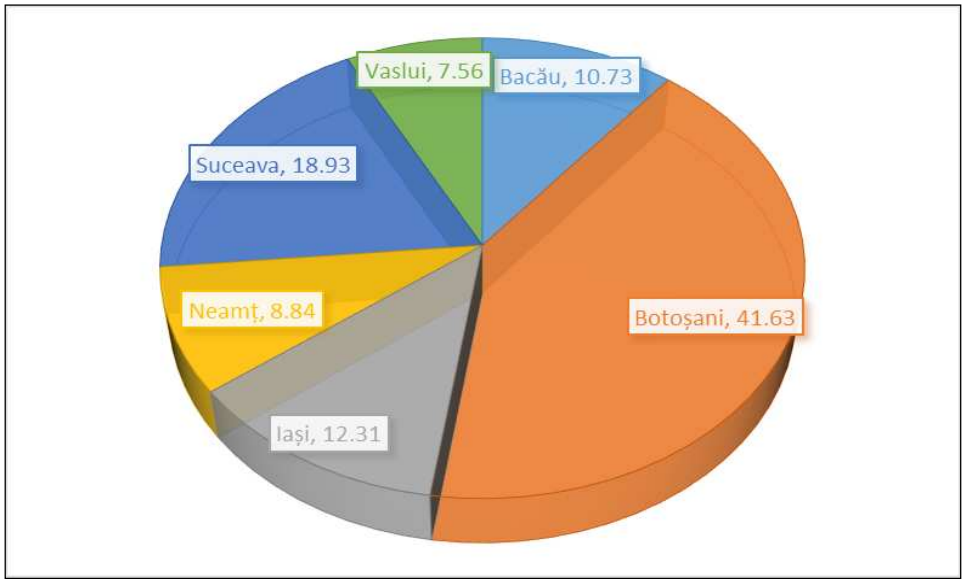
Statistical data show that in the North-East Development Region of Romania there are about a quarter of the total agricultural cooperatives registered at national level. Of the 317 cooperatives existing in 2020, 41.63% are in Botoșani County (Figure 1).

In 2016 we analyzed the situation of agricultural cooperatives, according to the methodology described above (Talmaciu et al., 2017), and we found that half of those registered in the Region were not active, that is they did not submit a balance for 2015, they stated that they did not carry out activities, had decisions for dissolution with liquidation or had suspended their activity.

Regarding the 50 active agricultural cooperatives in Botoșani County, most (38%) had as field of activity occupations related to animal husbandry (Talmaciu et al., 2017). Also, in the case of Suceava County (the second county in terms of number of agricultural cooperatives in the regional ranking), half of the active agricultural cooperatives had as main field of activity either sheep and goat breeding, or activities in mixed farms. These findings strengthened the conclusion of another study conducted in Romania according to which, in general, association and cooperation in agriculture is achieved especially when a greater volume of work and coordination is needed, as is the case of activities related to animal husbandry (Agarwal et al., 2021).

[1]Statistical classification of economic activities in the European Community

Figure 1. Distribution on the counties of the North-East Region of the 317agricultural cooperatives in 2020 (%)



Source: own calculations after NRAC and NTRO

In 2020, in order to analyze the evolution and activity of agricultural cooperatives in the North-East Region of Romania from January 1st2010 to September 30th2020, according to the same methodology used in 2016, we extracted again from the NTRO database all registrations of agricultural cooperatives in the counties of the Region; we consulted the website of the Ministry of Public Finance for the identification of agricultural cooperatives in each county, that is to find out the full name, the unique identification code, the NACE for the economic activity carried out, the year of establishment, the years of economic activity, etc .; we queried the Topfirme.com website to have a double check, and for Iași County we filled in the data with the support of the Iași County Directorate for Agriculture, which provided additional information such as: contact details, current situation of activities cooperatives, projects funded at the level of Local Action Groups (LAGs), etc., and then we processed and centralized data and information at the level of counties and Region (Dobay & Apetroaie, 2021).

The findings were as follows:

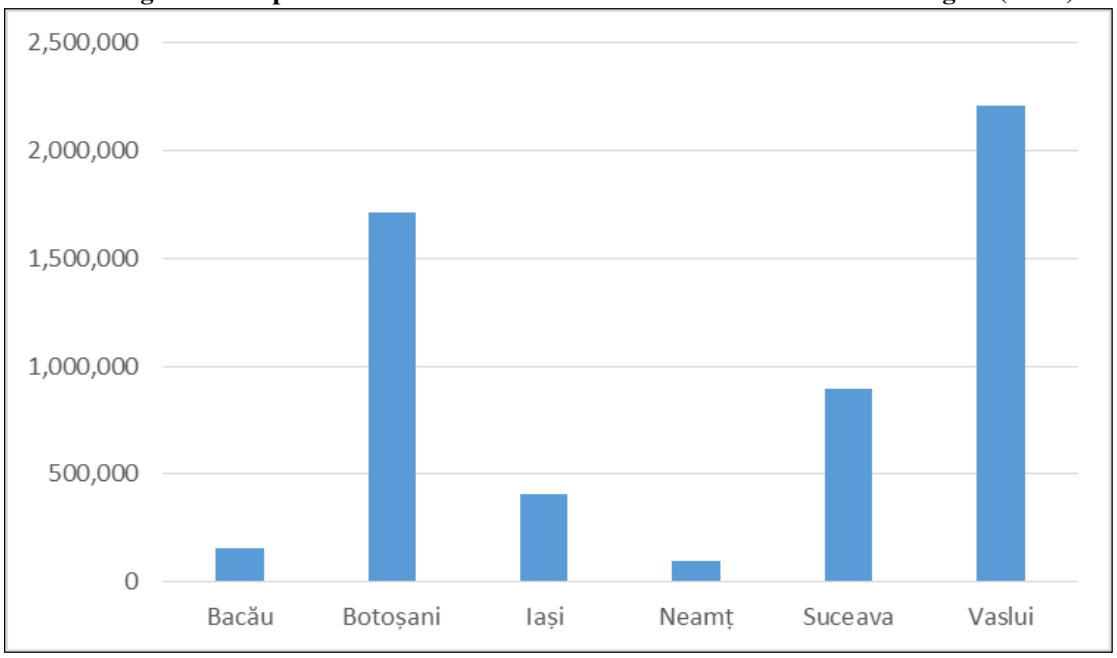
- according to the NTRO database, during the reference period, 278 agricultural cooperatives were registered in the Region, most of which (59) were established in 2010, 2018 (36) and 2019 (30);
- based on the data collected from the website of the Ministry of Public Finance, through a bottom-up approach, looking for information at the level of each county in order to identify by name each agricultural cooperative, one by one, identification completed later by information provided by the Iași County Directorate for Agriculture, we reached a number of 197 agricultural cooperatives sampled by Region, of which 35% had not operated, had not submitted a balance sheet or declared that they had not hadany activity, the share being on the decrease compared to the analysis carried out in 2016 when it was 50%;
- at the level of the 197 cooperatives studied, we noticed that the total turnover for 2017 amounted to 158 million lei, in 2018 increased to 236 million, and in 2019 decreased to 189 million lei (Dobay & Apetroaie, 2021);
- there were situations in which agricultural cooperatives had recorded income even if they had no turnover and for the 197 cooperatives analyzed for 2019, the value of the declared revenues was higher than that of the turnover (192 compared to 189 million lei).

On November 23, 2020, Law 265/2020 for the amendment and completion of the Law on Agricultural Cooperation 566/2004, published in the Official Gazette 1113/2020, came into force.It states that in order for an agricultural cooperative to be considered active, it must have had turnover

or employees at any time during the reference period.Also, the National Register of Agricultural Cooperatives (NRAC) is elaborated, updated, administered and published by the Ministry of Agriculture and Rural Development on the institution's website, based on data provided by NTRO.We consider that it was an initiative that brought more transparency and clarity regarding the monitoring of the activity of agricultural cooperatives and provided an easy-to-use tool for this purpose. In the case of this study, it allowed a double verification of the information gathered through the bottom-up approach, according to the methodology presented above, with the data extracted from NRAC (September 2021 for the activity of cooperatives for the last three years, 2018-2020).

For 2020, out of the 317 cooperatives of the Region analyzed based on data extracted from the National Register of Agricultural Cooperatives, 35.34% submitted a balance sheet. The turnover reported by Region was 237,414,149 lei, representing 15% of the one reported at national level, and more than half of the regional one was in Vaslui County (155,692,351 lei) (Figure 2). 57 cooperatives registered profit for 2020, 26 of them being first-degree cooperatives and 31 second-degree ones.

Figure 2. Net profit recorded in 2020in the counties of the North-East Region (RON)



Source: own calculations after NRAC and MPF

The net profit of the Region amounted to 5,480,243 lei, respectively 13.9% of the total in the country (Table 1).

From Table 1 results that if we calculate the difference between total profit and total loss, even in a very simple way, the resulting differences are positive in each county, denoting that, on the whole, the activity of agricultural cooperatives in the analyzed Region is profitable.Also in order to have a quantifiable and comparable perception of the economic potential of agricultural cooperatives, we calculated the profit per cooperative and by fields of activity (Table 2).

As it results from the analyzed data, the most profitable fields of activity were those regarding the processing, preservation and wholesale trade of fruits and vegetables.

The average profit per cooperative calculated for all 15 fields of activity for which profit was registered was 98,264 lei, and for the 7 cooperatives with activities related to horticultural products there was an average profit of 151,910 lei.From this estimate it follows that they seem to be the most profitable fields of activity in the Region.

Table 1. Agricultural cooperatives in the North-East Region - economic activity reported for 2020

County	*Number of cooperatives*	*With submitted balance sheet*		*Turnover (RON)*	*Net profit (RON)*	*Loss (RON)*	*Calculated differences*
		No.	*%*				
Bacău	34	11	32.36	3,693,395	158,820	127,288	31,532
Botoșani	132	47	35.61	27,593,160	1,713,345	1,119,963	593,382
Iași	39	16	41.03	30,885,268	407,579	353,984	53,595
Neamț	28	3	10.72	4,426,026	95,246	0	95,246
Suceava	60	27	45.00	15,123,949	896,929	479,493	417,436
Vaslui	24	8	33.34	155,692,351	2,208,324	12,847	2,195,477
Total North-East Region	317	112	35.34	237,414,149	5,480,243	2,093,575	3,386,668

Source: own calculations after NRAC and MPF

Table 2. Net profit recorded by fields of activity,in 2020, in the North-East Region

NACE	*Field of activity*	*Number of cooperatives*	*Net profit (RON)*	*Average profit per cooperative (RON)*
1039	Processing and preserving fruits and vegetables	1	675,044	675,044
4631	Wholesale trade of fruits and vegetables	6	2,329,957	388,326
0111	Cultivation of cereals (excluding rice), leguminous and oilseed plants	10	890,896	89,090
0141	Dairy cattle farming	5	387,329	77,466
4621	Wholesale trade of cereals, seeds, fodder and unprocessed tobacco	7	456,142	65,163
0150	Mixed farm activities (growing of crops and raising of livestock)	10	357,580	35,758
0146	Pig farming	2	64,785	32,393
4611	Intermediation in trade in agricultural raw materials, live animals, textile raw materials and semi-finished products	1	32,148	32,148
0145	Sheep and goat farming	5	155,564	31,113
0113	Cultivation of vegetables and melons, roots and tubers	4	109,778	27,445
0124	Cultivation of seeds and stone fruits	1	6,989	6,989
4633	Wholesale trade of dairy products, eggs, edible oils and fats	1	4,581	4,581
4632	Wholesale trade of meat and meat products	1	3,994	3,994
0161	Ancillary activities for crop production	1	3,455	3,455
1051	Manufacture of dairy products and cheese	2	2,001	1,001

Source: own calculations after NRAC and MPF

At the level of the analyzed Region, 19 agricultural cooperatives registered a net profit higher than 50,000 lei for 2020 (Table 3). Of the 19 cooperatives, 11 are second-degree agricultural cooperatives.

Table 3. Top agricultural cooperatives with a net profit of more than 50,000 lei for 2020 in the North-East Region

Nr. crt.	*Data înmatriculării la ONRC*	*Denumireacompletă*	*Tip cooperativă (gradul)*	*Județul*	*CAEN*	*Profit net (RON)*
1	11.07.2016	CooperativaAgricolăIntegrată „ȚaraMea”	2	Vaslui	4631	2.063.569
2	17.02.2009	CooperativaAgricolă „Gold Fruct”, Udești	1	Suceava	1039	675.044
3	25.07.2018	CooperativaAgricolă „ColineleBucovinei”	2	Botoșani	0111	331.592
4	02.07.2018	CooperativaAgricolă „Soybean and Mays Prod”	2	Botoșani	0111	329.479
5	29.04.2010	CooperativaAgricolă „Conceasca”	1	Botoșani	4621	283.898
6	26.07.2017	CooperativaAgricolă „Moldova Nord Grup”	1	Iași	4631	247.092
7	04.06.2018	CooperativaAgricolă „LuncaMorii”	1	Botoșani	0141	220.240
8	12.06.2020	CooperativaAgricolă „AristotelCrâșmaru”	1	Botoșani	0145	127.544
9	14.04.2016	CooperativaAgricolă a Crescătorilor de Animale din Pungești	1	Vaslui	0141	126.687
10	24.06.2019	CooperativaAgricolă de gradul II „Rădăcini”	2	Neamț	4621	94.520
11	20.02.2020	CooperativaAgricolă „CâmpuriAurii”	2	Bacău	0150	90.283
12	30.05.2017	CooperativaAgricolă „Dacia noastră”	2	Botoșani	0113	88.008
13	22.08.2018	CooperativaAgricolă „Sadoveanu”	1	Iași	0111	74.162
14	04.07.2018	CooperativaAgricolă „Hogs Farm Land”	1	Botoșani	0146	61.100
15	15.10.2018	CooperativaAgricolă de gradul II „Cooperativa din Deal”	2	Iași	0150	58.421
16	23.10.2015	CooperativaAgricolă „BazaSiloz Cereal Grup”	2	Botoșani	0111	56.681
17	21.06.2017	CooperativaAgricolă „Grup Top Agro”	2	Suceava	4621	56.001
18	29.07.2019	CooperativaAgricolă „Fermele de Nord Moldova”	2	Botoșani	0150	52.340
19	18.07.2018	CooperativaAgricolă de gradul II „Agrosfera”	2	Suceava	0111	51.507

Source: own calculations after NRAC and MPF

Regarding the distribution by counties of the most profitable cooperatives, as presented in Table 3, the results showed that:

- out of the 19 cooperatives that registered a net profit higher than 50,000 lei for 2020, 9 are from Botoșani County, 3 from Suceava, 3 from Iași, 2 from Vaslui and 1 from Neamț;
- in Vaslui County there is the most profitable cooperative whose field of activity is the trade in vegetables and fruits;
- in Botoșani County the cooperatives are profitable that have as field of activity: cultivation of cereals, leguminous and oilseed plants; wholesale trade of cereals, seeds, fodder and unprocessed tobacco; dairy cattle farming; sheep and goat farming; pig farming;

cultivation of vegetables and melons, roots and tubers; mixed farm activities (growing of crops and raising of livestock);
- in Suceava County the processing and preservation of fruits and vegetables was profitable, namely the wholesale trade of cereals, seeds, fodder and unprocessed tobacco and the cultivation of cereals (excluding rice), leguminous and oilseed plants;
- in Iași County the wholesale trade of fruits and vegetables was profitable, namely the activities in mixed farms (vegetable culture combined with animal breeding);
- in Neamț County the field with the highest profit was the one regarding the wholesale trade of cereals, seeds, fodder and unprocessed tobacco.

CONCLUSIONS

In the context of unforeseen economic crises and fluctuations, cooperatives can play an undeniable role in generating profit for their members by better positioning in the value chain. Our data showed that,at least for 2020, at the level of each county of the North-East Development Region of Romania the total net profit recorded by cooperatives was higher than the reported losses. The dynamic analysis of agricultural cooperatives as well as other forms of association and cooperation in agriculture and food industry shows clear signs of recovery, knowing the fact that existing fiscal facilities and opportunities influence their development. The 57 agricultural cooperatives that registered a profit for 2020, have on average only 4 years of operation, hence the new generation of members is certainly oriented towards the economic goals of agricultural cooperatives.

In many countries around the world agricultural cooperatives are an important part of the food system and the supply system, respectively, and have an important contribution to the transition to sustainability. From this point of view, we consider that an attempt to map and analyze their economic potential at regional level is an absolutely necessary first step in understanding how the current system can be streamlined and transformed.

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FAMILY FARM - SOLUTION FOR SUSTAINABLE DEVELOPMENT OF RURAL AREA

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Abstract

At present, in Romania there is no clear definition of the concept of family farm, and at the level of the European Union, the definition of family farms differs significantly depending on the characteristics of each country. At the same time, there is no classification of these types of farms, depending on the economic dimension, so that no solutions can be identified to support these types of farms, which can have a significant contribution on the development of rural areas. The purpose of the paper is to define the family farm and to determine their economic dimension, depending on the number of members involved in the activity of the farm. Depending on the minimum / average wage per economy, the lower and upper limits of classification of farms among family-type farms were determined.

Keywords: family farm, rural development, Romania, sustainable

JEL: Q10, Q12, Q14, Q19

INTRODUCTION

The classification of agricultural holdings according to the type of agricultural activity and the economic dimension is based on the concept of Standard Production. The Standard output of an agricultural activity (in the vegetable or animal sector) is in fact the average value expressed in lei or euro (monetary units) of gross output, determined on the basis of the prices of agricultural products sold directly to consumers. Standard production is calculated for each type of plant and animal production activity and is determined for each region and for each crop or species.

Also based on the total Standard Production of the agricultural holding, the economic dimension is determined, being expressed in euros. The agricultural activity of a holding is established according to the standard production of each crop or animal species.

An agricultural holding is a form of organization made up of all the units used for agricultural activities and managed by a farmer, located in the territory of the same Member State of the European Union.

The size of a farm is mainly the area of land or the number of animals owned and is expressed in physical quantities (hectares, head of animals).

Depending on the economic dimension, farms and agricultural holdings are classified and defined as follows:

- less than 1,999 euros - subsistence farms that produce entirely for their own consumption;
- 2,000-7,999 euros - semi-subsistence farms that ensure their own consumption and a small part of the agricultural production that sells it;
- 8,000-49,999 euros - small commercial farms that sell more than 50% of the agricultural production they make;
- 50,000-999,999 euros - medium-sized commercial farms / agricultural holdings that sell their entire agricultural production;
- over 1,000,000 euros - large commercial farms / agricultural holdings that sell their entire agricultural production.

In Austria, most farms can be identified as family farms as a basis for agricultural production and the supply of public goods subsumed in terms of multifunctionality.

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Due to different regional and environmental circumstances, family farms in Austria have a wide range of agricultural structures and strategies.

Preliminarily, with regard to the term family farm, it should be noted that the strong differentiation of family farm types is caused by different natural production conditions, market liberalization, structural change and change in social values. This is also due to the fact that some of the key criteria of family farms like family-based labor, family means of production, close relationship between household farm and business farm, high degree of elasticity and durability, succession guaranteed farm within the family.

Family farming in Austria is engaged in the concept of multifunctionality. In addition to the production function, the generation of public goods as a service to society, residents and tourists in rural areas is an essential contribution of agriculture to maintaining prosperous rural areas. Family farms help to maintain the minimum settlement and infrastructure that contributes to the conservation of the landscape and biodiversity and to the strengthening of the local economy through cooperation with regional actors and entrepreneurs. Consequently, Austrian agriculture is considered to be an integral part of the regional economy.

Definition of small farms found in the Polish agricultural sector, according to the 2010 agricultural census, about 1.4 million farms under 5 ha and with an economic size of 4 production standards (SO) or less. This represents 63% of private farms in Poland.

Although the number of these farms is declining, their share is still very high. The analysis of this group showed that most of these small farms do not meet the main criteria for the balanced development of agriculture, which is to contribute to national food needs according to their area and the size of their production base.

As a result, they offer fewer real jobs and the share of agricultural production in their total income decreases.

Generally, a family has an area that can be reduced for garden and farm, as well as a larger area to produce food or other products for both sale and consumption, it can be next to the orchard or located elsewhere. community. These areas together constitute a farm. The family divides its working time and resources between these two areas, each of which is used differently and the two together must meet the food and economic needs of the family.

Small family farming is defined as a type of production in which the internal unit and the productive unit are physically integrated and in which the family contributes to the predominant fraction of the labor force and where the production is directed to both self-consumption and the market. There are three types of family farming:

- Subsistence family farms (where production is generally self-directed);
- Family farming in transition (sale and self-consumption);
- Consolidated family farming (has sufficient support in production and has access to markets).

The aim of the paper is to define the family farm and to determine their economic dimension, depending on the number of members involved in the activity of the farm, in order to encourage the increase of the number of farms of this type, which contribute to the sustainable development of localities. rural environment. Depending on the minimum / average wage per economy, the lower and upper limits of classification of farms among family-type farms were determined. This study is part of the project entitled "Research on ways to make economic efficiency of agricultural holdings in Romania", approved within the Internal Research Plan of the Research Institute for Agricultural Economics and Rural Development.

MATERIALS AND METHODS

The family farm should be an economic activity that supports rural communities. Based on them, rural localities can be harmoniously developed, thus reducing the discrepancies between urban

and rural areas, as well as rejuvenating the rural population, by stopping the exodus of the rural population to urban areas or other countries.

This chapter can be a starting point for defining and determining the family farm, being necessary to conduct additional studies to substantiate the following hypothesis presented.

According to law no. 37/2015 on the classification of farms and agricultural holdings, regulates the unitary framework for the implementation of programs financed from the national budget and community funds, and commercial farms that sell more than 50% of agricultural production, have an economic dimension between 8,000 and 49,000 SO (most likely, family farms can be included in this range).

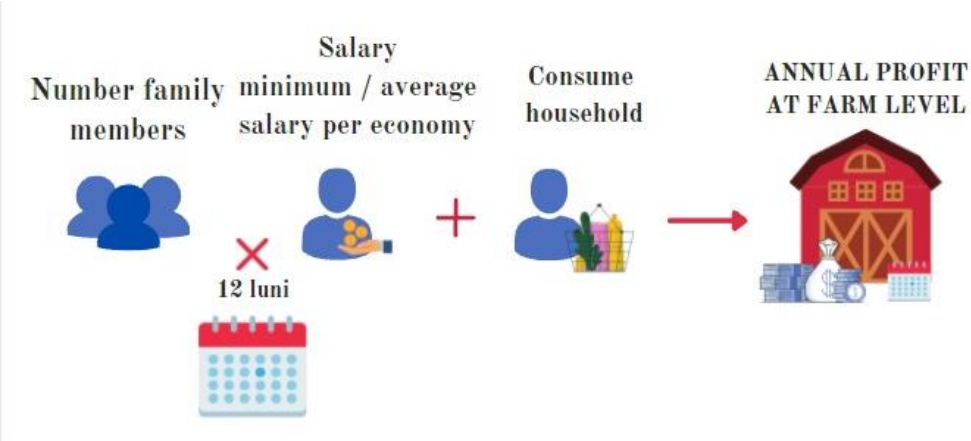
At European level, the family farm is given special importance, and has a different definition from country to country, depending on the particularities of each. At European level, the name "family farm" or "family farmer" can be defined in several ways, referring to the share of agricultural work, the form of ownership and control, as well as the legal status (who is at risk). business).

For example, in Austria the family farm comes in a variety of forms depending on the natural, social and cultural situation, as well as the economic situation and the respective objectives of a farm. The FAO has also established the following definition for this type of farm starting from: "Family farming (also family farming) is a means of organizing agricultural, forestry, fisheries, pastoral and aquaculture production that is managed and operated by a family and based mainly on the family work of both women and men. The family and the farm are linked, evolve and combine economic, environmental, reproductive, social and cultural functions. "

In Spain, "family farming" is a means of organizing agriculture, forestry, pastoral and aquaculture production that is managed and operated by a family, and based mainly on family work, including both women and men.

In order to build viable family farms, it is necessary to build an appropriate legislative framework, which defines these farms according to certain criteria and is drawn up according to the predominant profile of the farm.

Figure 1. How to set the minimum income for a family farm



Source: own processing;

A possible definition of the family farm could be transposed as: "the family farm is a means of organizing agriculture, as a whole, owned by one or more persons, the activities of the farm are carried out by family members, and the commercialization of production ensures the main source of income at the family level. At the same time, most of the food consumption comes from our own farm ".

In order to comply with the above definition, the family farm should reach a minimum income / family member, which corresponds to the standard of living found in our country. For this purpose,

according to the formula presented in the figure below, an annual income at farm level was established, taking into account the following aspects (Figure 1.):

- Number of household members,
- Minimum / average salary per economy,
- Farm profile,
- Household consumption.

In order to determine an economic size of a family-type farm or taking into account the following assumptions:

- H1 – Determining a minimum income on the family farm depending on the number of members;
- H2 – Determining a maximum income for the family farm based on the number of members;
- H3 – Classification of family farms, according to economic size;

To determine the viable economic size of a family farm, the following elements were taken into account:

- Composition of the family farm (number of members),
- Minimum net salary per economy for 2020,
- Average net salary per economy for 2020,
- Average monthly expenditures for food and beverages consumed in rural areas, for 2019
- Average exchange rate for 2020 NBR (1 euro = 4.8371 lei).

The family farm has a minimum of 2 people, but can be up to 8 people, being 3 times higher than the existing average. According to INS data, at the level of 2020, the number of households in rural areas was 3.509 million, and the population in rural areas was 8.87 million inhabitants, determining an average of 2.5 inhabitants / household.

The minimum wage in the economy in Romania is 2300 lei gross, representing 1386 lei net.

The average salary in the economy in Romania is 5429 lei gross, representing 3176 lei net.

The average monthly expenses for food and beverages consumed in rural areas, according to the INS, amount to approximately 211 lei / month / person.

The share of farm income (result / profit) in total production was determined in Romania, according to statistical data found on Eurostat, at 37.5% (including subsidies).

To determine the economic dimension, the latest available data were taken as parameters to reflect the most accurate situation of the farms.

RESULTS AND DISCUSSIONS

Using the calculation method presented above, the economic size of an economically viable family farm was determined to ensure a decent living for family members, as follows:

Table 1. Determining the economic dimension of the family farm

No. crt.	Family members	Minimum salary / average salary *	Average monthly expenses for food and beverages consumed	Months	Farm profit (Col. 1 * (2 + 3) * 4	SO VALUE (Col. 5 / exchange rate)	Example - area cultivated with wheat (Col 6 / SO wheat)
0	1	2	3	4	5	6	7
1	2	1386	211	12	38328	21130	34
2	2	3176	211	12	81288	44814	73
3	3	1386	211	12	57492	31695	52
4	3	3176	211	12	121932	67220	109
5	4	1386	211	12	76656	42260	69

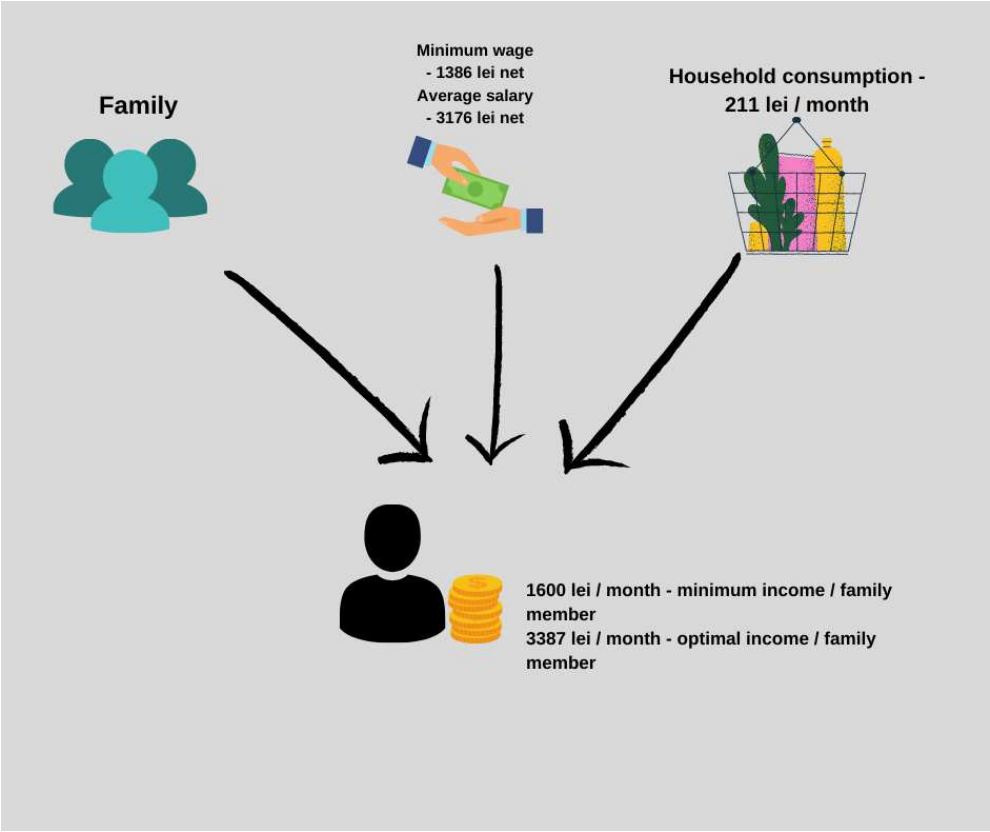
No. crt.	Family members	Minimum salary / average salary *	Average monthly expenses for food and beverages consumed	Months	Farm profit (Col. 1 * (2 + 3) * 4	SO VALUE (Col. 5 / exchange rate)	Example - area cultivated with wheat (Col 6 / SO wheat)
6	4	3176	211	12	162576	89627	146
7	5	1386	211	12	95820	52825	86
8	5	3176	211	12	203220	112034	182
9	6	1386	211	12	114984	63390	103
10	6	3176	211	12	243864	134441	219
11	7	1386	211	12	134148	73955	120
12	7	3176	211	12	284508	156848	255
13	8	1386	211	12	153312	84520	138
14	8	3176	211	12	325152	179255	292

*depending on the minimum / average wage in the economy, the lower and upper limits were determined, depending on family members

Thus, according to the determinations made, the family farm would fall between an economic dimension of 21130 SO (minimum value) and 179225 SO (maximum value), varying according to members the number of members of the farm (Table 1.).

To make it easier to follow and compare, for example, a two-person family farm with an economic holding size of 21130 SO, would cover an area of 34 hectares (with wheat), while a holding of 8 people, should exploit a maximum area of 292 ha with wheat (Table 1.).

Figure 2. Minimum and optimal income for a member of a family farm



Source: own processing;

Based on the above figure, the minimum income of a family-type holding should be determined by the national minimum gross wage, the number of members, the profile of the holding, and the consumption of the household, which is supposed to be insured from its own production. . By determining the minimum income, measures may be imposed at national level to assist these holdings in obtaining this minimum income. Among the most important measures that can come in support of family farms, in order to reach this scale, which we consider particularly important, we mention (Figure 2.):

- Fiscal measures related to VAT reductions on products sold,
- Location of the sub-measure „6.3. - Support for the development of small farms' could be replaced, in the new NRDP, by a measure on 'Support for family farms', through which beneficiaries can receive funding to ensure their guaranteed minimum income, mentioned above, meeting a number of conditions.
- Measures to finance investments in these types of holdings,
- Direct payment measures for family farms to raise their incomes,
- Measures on social contributions to encourage this type of family-type holding,
- Involvement of authorities in supporting family farms by setting up processing / storage units and spaces,
- Cultivation of species that adapt to market requirements and in accordance with existing availability on farms (a small farm can be reoriented to vegetable crops),
- Involvement of private companies in the purchase of products from family farms creating mutual benefits. A safe market for these farms, and for private companies (supermarkets) can increase sales by promoting the purchase of products that protect the countryside (example: Milka chocolate, which is promoted through TV commercials as being obtained from milk from farms family).

Starting from the fact that in 2016 over 3.4 million agricultural holdings without legal personality were registered and used on average an area of 2.04 hectares, it indicates the predominant character of subsistence and semi-subsistence farms.

However, the number of beneficiaries of subsidies in 2016 was 901 thousand, using an agricultural area of 9.22 million hectares, thus determining an average area of 10.2 hectares (Table 2.).

Table 2. Evolution of agricultural holdings that received subsidies through A.P.I.A in the period 2010-2016

Specification	2010	2013	2016	2016/2010 (%)
Number of beneficiaries (number)	1.093.167	1.048.728	901.502	-17,5
Determined area (hectares)	9.503.452	9.863.923	9.223.341	-2,9
Average area of farms receiving subsidies (hectares / farmer)	8,7	9,4	10,2	17,7

Source: APIA data processing.

This indicates, on the one hand, that the number of real agricultural holdings is lower than in the statistical data, as most of these holdings are leased by other farmers for the purpose of cultivating agricultural land, as the subsidy is collected on the holding. agricultural. On the other hand, this indicates the degree of degradation of the rural area (in addition to the demographic decline, insufficient development of local infrastructure) by non-cultivation of agricultural land by the rural population, whose main activity seems to no longer exist.

An important measure for the revitalization of the rural area, in which young people will reappear, would be the promotion of family farms, successfully promoted in many other EU countries, such as Austria.

CONCLUSIONS

With over 3.63 million farms, Romania owns 33.5% of the total number of farms in the U.E., but they represent only 7.5% of the cultivated area in the U.E. For Romania, this discrepancy reflects the dominant character of small farms, respectively a very low average farm area.

A structural attribute of agricultural holdings in Romania that should be noted is the persistence of a very high concentration of holdings with low values of standard production.

Agricultural holdings with legal personality registered a significant increase in 2010 by about 35%, as a result of the impetus given by the National Rural Development Program, which determined farms without legal personality, to be authorized to access these non-reimbursable funds. At the same time, in 2013 there was a decrease in their number due to the inability to adapt to the rules provided by the European Union (example: animal welfare rules).

The tendency of the average agricultural area used on a farm to increase slightly was due to the merger process. This process occurred, on the one hand, due to the impossibility of exploiting agricultural land mainly by the aging population in rural areas, and on the other hand due to the PNDR measures by which they were favored in accessing certain projects, which managed to take over or several agricultural holdings (example: measure 112 - Installation of young farmers).

Insufficient facilities and the promotion of cooperative units have led to a drastic decrease in their number, which has led to a poor sales process by agricultural producers.

In the merger process, the agricultural holdings that used an agricultural area between 5-10 hectares and those between 2-5 hectares were highlighted, while at the same time there was a significant increase of the farms that use agricultural areas larger than 100 hectares. .

The downward trend in the number of agricultural holdings is also recorded in countries such as Bulgaria, Hungary or Poland, amid measures developed under the National Development Programs.

It is necessary to determine a minimum guaranteed income at the level of a family-type farm, starting from the number of household members, the minimum gross wage per economy to which to add the consumption of food at the family level. Based on this income, measures can be taken to help ensure this minimum income on the family farm. It is also absolutely necessary to legislate a definition of a family-type farm in which this minimum income is included.

The next period will be one of particular importance for the future of agricultural holdings. Given the problematic situation facing the rural area, characterized by the aging population, lack of jobs, infrastructure in all respects, the relationship between agriculture and rural space must be seen as a unitary element, designed to encourage the emergence and expansion of farms. family, a process that will lead to the revitalization of the rural space as well as to the provision of the necessary agricultural products for the market.

It is noted that the population of Romania has a sharp downward trend, contrary to the phenomenon encountered worldwide which is characterized by a population explosion, by component countries of Asia, Africa or South America. In this sense, we consider that Romania must take legislative measures and put them into practice in order to ensure the most valuable resource at its disposal, namely agricultural areas. The sale of large areas of agricultural land to various economic operators, especially non-EU ones, should include regulations providing for their obligation to export only finished products, limiting the export of raw materials.

In order to have a record as close as possible to reality and especially to develop a series of solutions regarding agricultural holdings, it is necessary to process data as close as possible to reality. According to the National Institute of Statistics, the data found in the General Agricultural Census (RGA 2002, RGA 2010), the Structural Survey in Agriculture (ASA 2007, ASA 2013) are data that centralize the number of agricultural holdings regardless of their ownership. In other words, an agricultural holding which leases land from several lessors does not appear as a single holding, although it may, if it so wishes, apply for access to European funds as a single holding. Therefore,

the cadastral process is extremely important in order to have concrete data on the real number of agricultural holdings and especially to develop measures appropriate to reality.

According to research methodology, it turned out that the family farm can have an economic size between 21,000 SO and 180,000 SO, so according to the law on classification of agricultural holdings, some family farms can be included among farms that sell 50% of the obtained production (having between 8,000 - 49,999 SO), and a part can be included among the farms of medium size, which have an economic dimension between 50,000 and 999,999 SO.

Starting from these values, we can say that ensuring a minimum income for family members that make up a family farm, can be a solution for the revitalization of the Romanian village.

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STRENGTHENING THE ROMANIAN RURAL HOUSEHOLD BY IMPROVING CURRENT DEMOGRAPHIC STRUCTURES

LORENA FLORENTINA CHIȚEA[1]

Abstract

The main purpose of this research was to establish measures to prevent demographic structural changes, which would positively influence the process of modernization-sustainable development of the rural household and the Romanian rural area. The starting point of the research was the creation of a typology of rural area modernization and socio-economic development from the point of view of the rural household modernization potential. To quantify the links between the investigated phenomena and the demographic indicators, the Pearson correlation was used, which highlighted the type of connection (direct, indirect or without influence). Based on this information, the research was completed by developing three scenarios - the optimistic, realistic and pessimistic scenarios - of consolidating the rural household by improving demographic structures. The demographic indicators taken into consideration registered a significant decline in the analysed period, except for the group of counties with net prospects for modernization-development, which emphasizes the need for demographic policies to prevent existing structural problems.

Keywords: *rural area, rural household, sustainable development*

JEL Classification: R20, Q 01, O2

INTRODUCTION

The demographic dimension is an essential element in determining the viability of rural areas (Alexandri, 2017), and the rural household represents the driver of rural area, the very existence of the Romanian village being linked to the existence of this entity. At present, the rural household has to face the same challenges that the rural area is facing (Chițea L., Dona I., 2017).

The downward trend of demographic indicators (rural population volume, demographic aging, etc.) (Gheță u, 2015) also has a direct impact on the evolution of the rural household. In the period 2007-2018, this evolution had two divergent directions in rural Romania: in the peri-urban areas, there is a favourable demographic evolution, while in the remote/isolated areas we can notice a demographic decline, with undesired effects (abandonment of household, depopulation of rural areas). This situation highlights the need for specific measures depending on the modernization-development level that has been reached.

MATERIALS AND METHODS

The present research study aims to highlight the importance of the demographic dimension in the rural modernization and development processes present in the Romanian countryside, as well as in the modernization of rural households.

In order to measure the modernization and development phenomena of the rural area, the construction of composite indices was used. This involved the following steps: 1. Defining the theoretical matrix specific to each phenomenon investigated. This stage involved the establishment of the dimensions of each index, the selection of primary indicators for each dimension respectively. 2. Normalization of indicators that involved converting the indicators to a common scale, with an average (0) and standard deviation (1). 3. The construction of composite indicators was achieved by giving equal weights to all indicators, to all dimensions of indices respectively. Thus, the theoretical matrix of rural modernization and development indices and the theoretical matrix of rural household modernization index were obtained.

In order to achieve a typology according to the prospects for modernization and socio-economic development of rural area and for rural household modernization, both the value of

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composite indices (Rural Development Index-RDI, Rural Modernization Index-RMI, Rural Household Modernization Index-RHMI) and the trend of these indices in the investigated period were considered. In order to reveal the place of demographic dimension in the case of investigated phenomena, the structural analysis, the factor analysis as well as the Pearson analysis were used.

The main data source was the National Institute of Statistics – tempo online and the Farm Structure Survey. The indicators were introduced in Excel and SPSS for aggregation, data analysis and presentation of results. Indices were calculated at national, macro-region, development region and county level, and the analysed period was the post-accession period (2007-2018).

RESULTS AND DISSCUSION

The typology that resulted after summing up the scores of indices (RDI, RMI, RGMI) by each county and the growth rate scores was structured into five equal intervals, namely:

E) counties with net perspectives of modernization – socio-economic development of the rural area and rural household modernization (Bistrița-Năsăud, Sibiu, Brașov, Cluj, Ilfov, Timiș) – 14.63%;

D) counties with a slight perspective of modernization – socio-economic development of the rural area and rural household modernization (Alba, Constanța, Harghita, Maramureș, Mureș) – 12.21%;

C) counties at a standstill with regard to the modernization – socio-economic development of the rural area and rural household modernization (Bihor, Brăila, Caraș-Severin, Prahova, Hunedoara, Ialomița, Iași, Arad, Argeș, Covasna, Sălaj, Satu Mare, Suceava) – 31.70%;

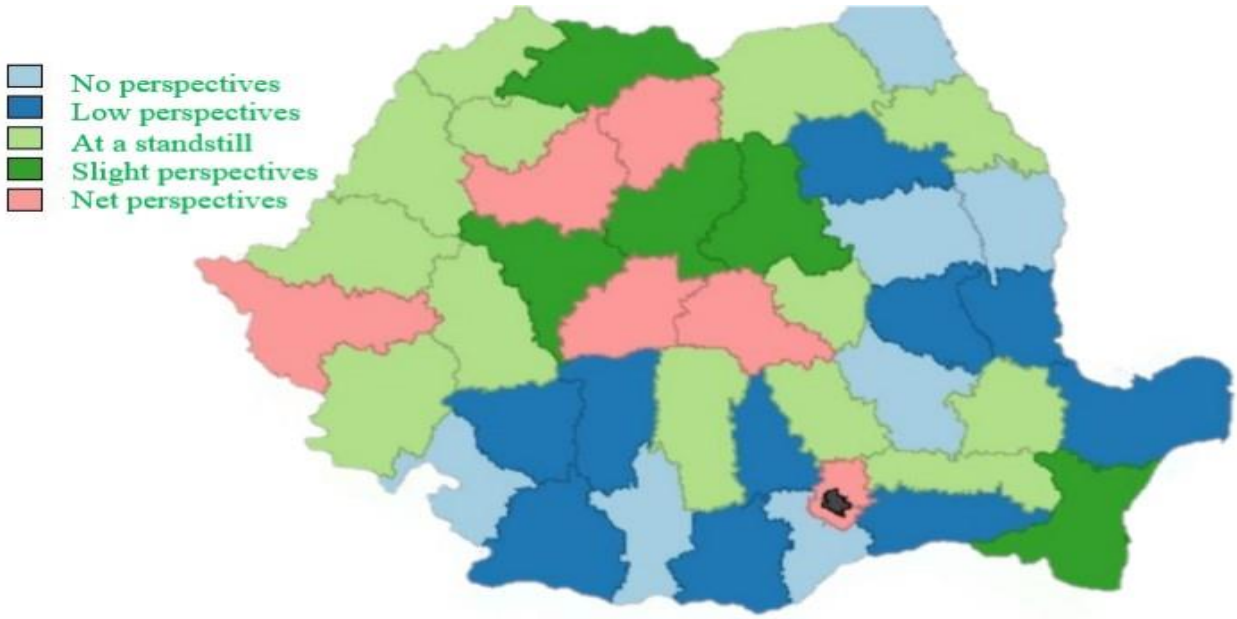
B) counties with low perspectives of modernization – socio-economic development of the rural area and rural household modernization (Gorj, Neamț, Călărași, Dâmbovița, Tulcea, Vâlcea, Vrancea, Dolj, Galați, Teleorman) – 24.39%;

A) counties with no perspectives of modernization – socio-economic development of the rural area and rural household modernization (Buzău, Bacău, Giurgiu, Botoșani, Mehedinți, Olt, Vaslui) – 17.07%.

The structure of counties by rural area modernization trend and by rural household modernization trend implicitly reveals a concentration of counties included in the medium interval (31.70%) and lower interval (41.46%). The counties with net and slight modernization-development perspectives are the only counties with increases of RDI and RMI indices. In the case of RHMI index, all categories experience a decline, the lowest decrease being found in the case of counties with net modernization and development perspectives.

The demographic indicators experienced significant decline in the investigated period, except for the group of counties with net modernization-development perspectives, which reveals the need for demographic policies that prevent the existing structural problems. Even though punctually certain indicators, such as the dependency rate, have had a positive evolution, in recent years a decrease was noticed, from 56.82% to 50.82% (throughout the national rural area). If only the evolution of this indicator is to be taken into account, the situation would be encouraging, but if we look at the evolution by age groups, this situation generates a series of problems, among which the decrease in the share of young dependent persons – under 15 years old (from 17.91% in 2007 to 15.89% in 2018); over time, the elderly population will disappear and will be replaced by a numerous population coming from the present group of 15-64 years, while the group 15-64 years will benefit from a low contribution of young population, which will lead to a high demographic dependency rate. If the decreasing rate of young population is maintained, and there is no intervention through demographic, economic and social policies to encourage births and stop rural-urban and external migration, the situation will continue to generate major imbalances in the age structure of the population.

Figure 1. Typology of counties by the tendency of modernization – socio-economic development of the Romanian rural area and rural household modernization, 2018



Source: author's calculations based on NIS, Tempo online and FSS

Among the demographic indicators taken into consideration in the calculation of composite indices, which have a direct connection with the typology of counties by the modernization-development perspectives, we must mention the natural balance (+0.763**) and the migration balance (+0.419**); among the demographic indicators that are inversely related, we have the degree of aging (-0.426**) and the degree of dependency (-0.362*).

The demographic evolution, the demographic decline in the case of rural population, is influenced by two processes, namely natural movement (declining population renewal capacity) and migratory movement, mainly in the case of young population.

Table 1. The main demographic indicators by the typology of counties according to the perspectives of modernization-development of rural area and rural household, 2018

	A*	B*	C*	D*	E*	Total
Average population per rural community (persons/commune)	3.289	3.451	3.215	3.193	3.976	3.394
Degree of population aging (%)	129.29	136.96	116.70	101.61	89.01	117.90
Natural increase in 1000 inhabitants	-8.31	-6.94	-4.91	-2.84	0.07	-5.00
Rural population renewal index (%)	80.45	89.99	90.99	91.69	92.06	89.19
Balance of changes of residence by residence areas (number of persons)	-180	-51	701	101	1886	467
Dependency rate (%)	53.36	51.63	50.82	48.86	48.16	50.82
Number of agricultural household farms (no.)	106,094	90,802	81,856	71,129	54,164	82,816
Average number of persons who work in the agricultural household farm (no. pers/household)	1.69	1.80	1.73	1.74	1.76	1.74

Source: author's calculations based on NIS, Tempo online and FSS data

** A) counties with no perspectives; B) counties with low perspectives; C) counties at a standstill; D) counties with slight perspectives; E) counties with net perspectives*

The values of the natural increase of the population indicate a demographic crisis of the rural area, which is severe in the case of the categories A (-8.31) and B (-6.94) and acute - in the case of

categories C (-4.91) and D (-2.84). In the category E, the indicator has positive values, but not in all counties.

Migration balance was favourable in the period 2007-2018, yet on the decrease, from a plus of 927 persons in 2007 for the rural area to a plus of 467 persons in 2018, except for the category E where the number of persons who came to the rural area increased (balance of plus 1240 persons in 2007 to plus 1886 persons in 2018). It should be noted that the positive migratory balance in the rural area is found only in adults and elderly people, while in the case of young people the balance is negative (Bădescu, I., Cucu-Oancea, Ozana, Șișeștean, G., 2011).

Migration is based on changing the perspective on life in the community, with sustainable social and economic effects, based on "*a perspective of sustainable relationship between the goals assumed and the means*" (Sandu, D., Voineagu, V., F. Panduru, 2009).

Migration has consequences on the rural household, by changing its demographic structure, social needs and economic competitiveness. Unfortunately, the rural household has become again a means of survival for the population, of ensuring its subsistence. At present, the urban area is losing population in favour of the rural area, but the phenomenon is not based on sound principles in economic terms, as the rural area does not provide sufficient security or welfare to the population, the village representing a refuge from the inability to cope with the challenges of the urban area.

The rate of population aging – in the investigated period – increased from 106.75% in 2007 to 111.90% in 2018, which reveals a marked aging process, an exception being the counties from category E, which have experienced a reverse process, i.e. a decline of the aging rate, in the conditions in which this has the lowest value anyway. The aging of the rural population will generate financial pressures on pensions and healthcare, which will increase in the next period, a situation that is mainly caused by the prolongation of life expectancy (Dona, I., 2015).

Starting from the typology of counties by the Romanian rural area modernization-development perspectives and rural household modernization perspectives, three scenarios have been developed – the optimistic, realistic and pessimistic scenarios – for the counties with net perspectives, for the counties with no perspectives and for the counties at a standstill, which will be useful in highlighting the different needs for intervention.

According to the factor analysis, the determining factors of the modernization and socio-economic development of the Romanian rural area are the demographic and social dimensions, these explaining the trend in proportion of 64.02% in the case of RDI and 66.70% in the case of RMI. The general trends, for the entire sample of counties, are no longer valid for each category of counties.

Scenarios for the category of counties with no modernization-development perspectives in the rural area

The demographic dimension has experienced a significant depreciation in the case of all investigated phenomena (by 38.66% in RMI, 35.45% in RHMI and 20.82% RDI), leading to the inability to maintain diversified and viable economic activities in the rural area.

Among the counties with no modernization – development perspectives of the rural area (Buzău, Bacău, Giurgiu, Botoșani, Mehedinți, Olt, Vaslui – accounting for 17.07%), the county Vaslui was selected for analysis – with the values of RDI, RMI, RHMI indices closest to the average of this category.

In the pessimistic scenario, the local or county public authorities will not intervene to stimulate the economic development and diversification of local economies, which will have an impact on the demographic dimension: increase of the migration trend in young rural population; depopulation of many rural areas, mainly of the deep rural areas, which will mean the depreciation of demographic dimension. For many rural households, this scenario will only mean their disappearance. The population of working age will leave the household looking for a job in town or abroad, and the elderly people who remained in the countryside will disappear over time, leaving behind some abandoned households, in an advanced stage of degradation due to the lack of material possibilities.

In the realistic scenario, taking into consideration the current demographic trend and the structural disequilibria, the population decline will continue in the rural area of Vaslui county; a

decrease of the average population per commune is expected, from 3,161persons/commune in the year 2018 to 2,962 persons in 2030, under the background of population aging (to reach an aging rate of 113.23% by the year 2030, from 97.96% in 2018), a sharp negative natural increase of the population (from -6.5‰ in 2018 to -11.5‰ in 2030) and a negative migration balance , even though this will slightly improve (from -1,444 persons in 2018 to -2,285 persons in 2030). For the rural households, this scenario will mean a poor motivation for the young population to remain in the countryside, which will mean a continuation of rural-urban migration increase (from -1,444 migration balance in 2018 to -2,285 migration balance in 2030). Thus, the young people will leave the countryside to look for a job that can ensure them a decent living, in town or abroad.

In the optimistic scenario, the current depreciation trend will decrease. The repair processes in the Vaslui rural area will imply a lot of effort and a good vision in the elaboration and implementation of complex and complementary modernization and socio-economic development policies, while a viable household will be needed, adapted to the new requirements.

Scenarios for the category of counties at a standstill in terms of modernization-development of the Romanian rural area

From the category of counties at a standstill in terms of rural area modernization-development perspectives (Arad, Argeș, Bihor, Brăila, Caraș-Severin, Covasna, Hunedoara, Ialomița, Iași, Prahova, Sălaj, Satu Mare, Suceava – 31.71%), we selected the county Arad, which has the values of indices closest to the average of this category.

In the pessimistic scenario, the demographic dimension will be marked by the acceleration of depreciation processes, mainly in the less-favoured areas of this county; this depreciation is characterized by a strong decline of rural population that can lead to the partial or total depopulation of certain areas, acceleration of young population migration and increase of the negative natural population growth, increasing aging rate and dependency rate, resulting in the widening of territorial discrepancies across the county.

In the realistic scenario, the rural area in Arad county experienced a slight depreciation of the demographic dimension, and according to this scenario, this trend will be also maintained in the next period. This will mean a slight decrease of the average population per rural community (from 3,006 to 2,998), maintaining a positive, yet decreasing migratory balance (expected to reach 369 persons in 2030, from 792 persons in 2018); even though the natural increase of the population increases, it will remain negative (from -4.5 natural increase in 1000 inhabitants in 2018 to -3.75 in 2030), while the aging rate and the dependency rate will experience slight depreciations.

In the optimistic scenario, there will be an appreciation of the demographic dimension through the increase of rural area attractiveness for the young people who will no longer leave the countryside. The rejuvenation of the countryside in Arad county will have a direct positive impact on the natural population increase, on the increase of the demographic renewal degree and thus, the elderly population pressure on the healthcare and social security system will decrease.

Scenarios for the category of counties with net modernization-development perspectives of the Romanian rural area

From the category of counties with net perspectives of rural area modernization-development (Timiș, Ilfov, Cluj, Brașov, Sibiu, Bistrița-Năsăud – 14.63%), the county Sibiu was selected, which has the values of indices closest to the average of this category.

The demographic dimension of the Sibiu rural area is favourable to modernization-development, with a positive trend in the investigated period, yet some changes are expected (for instance, while at present the share of young people is higher than that of elderly people, this process is expected to be reversed in the future, due to the declining birth rate and the shift of a large population of working age to the category of people over 65 years old).

In the pessimistic scenario, the demographic dimension will have an unfavourable evolution characterized by a great decline of the rural population through increased migration, population aging and partial or total depopulation of certain areas, mainly of difficult to reach areas.

The Sibiu rural area was one of the few counties with appreciation of the demographic dimension in the period 2007-2018 and this trend is expected to continue in the future as well (realistic scenario), so that by the year 2030 the population per rural community would slightly increase (from 2,897 to 3,129), the migratory balance will be positive and on the rise (it is expected to increase from 1,495 persons in 2018 to 1,641 persons in 2030), while the natural increase even though decreasing will remain positive (from 1.1 natural increase in 1000 inhabitants in 2018 to 0.81 in 2030), and the aging rate and the dependency rate will slightly depreciate.

In the optimistic scenario, the population will have a positive trend, through the increase of rural area attractiveness, so that young people will no longer leave the countryside and young specialists from other areas and even from urban areas will be attracted.

CONCLUSIONS

From the typology of countries by modernization-development perspectives of the rural area, it can be noticed as a general tendency that the Romanian rural areas behave differently depending on the proximity to large cities (see counties Timiș, Ilfov, Cluj, Sibiu, Constanța, Brașov), and the rural households in the vicinity of cities have easier access to utilities and to more attractive jobs, accessible for a younger and more educated population.

The counties with net modernization-development perspectives of the rural area stand out by the most favourable demographic situation. Thus, we can find here the most populated communes, with the lowest aging degree, the lowest dependency rate, the highest degree of demographic renewal, the only ones with a positive natural increase of the population and with the highest migration balance.

At the opposite pole we can find counties with no perspectives of modernization-development of rural area and rural household, with a strong demographic decline, continuous degradation of social infrastructure, with no occupational opportunities, etc.

The scenarios elaborated for the 3 categories of counties reveal the different needs for intervention to increase the modernization – socio-economic development level of the Romanian rural area, namely: in the counties lacking perspectives a complex vision and complex and complementary actions are needed that should act on all dimensions (demographic, social, economic, ecological); in the counties at a standstill, measures are necessary that should mainly target the sore points; in the counties with net perspectives, innovative measures are needed to enhance endogenous resources.

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DIFFERIFIATION OF ECONOMIC ACTIVITIES IN THE ROMANIAN RURAL AREA THROUGH EUROPEAN NON-REFUNDABLE FUNDS

ANDREEA DANIELA GIUCĂ [1]

Abstract

The diversification of economic activities in rural areas is a topical issue and can be a fundamental strategy for the development of the Romanian rural area, because it can produce a beneficial effect from an economic point of view, by increasing the income of the rural population.The Romanian rural area is characterized by a weak economic diversification and a major dependence on agricultural activities, which leads to low incomes for farmers. The practice of agriculture represents the essential / primordial activity in the rural environment, because it has a diversity of natural resources, having a strong economic and social potential. Due to the variety of natural conditions at its disposal, agricultural occupations occupy a dominant share in all economic activities carried out in rural Romania. The rural workforce should be directed to other economic activities, especially in services, based on accurate and ongoing information, human resources awareness and training. National rural employment strategies include measures to improve the quality of human resources to facilitate access to employment in non-agricultural economic activities.This paper aims to highlight the importance of developing and diversifying economic activities in rural areas, thus promoting entrepreneurial initiatives and the implementation of integrated actions for the development of local products. This study analyzes the impact of projects carried out through measure 312 "Support for the creation and development of micro-enterprises" of the National Rural Development Program 2007 - 2013, on economic development in rural areas and assess whether investments for the establishment, development and the modernization of non-agricultural enterprises has contributed to this development as well as to the reduction of rural migration.

Keywords: rural, economy, rural development, non-agricultural activities, micro-enterprises

JEL classification: R11

INTRODUCTION

In the context of globalization, rural areas face major development challenges. By definition, rural areas include small and geographically dispersed settlements, which have a significantly smaller population than the urban environment, its main source of income being from land use.(Iagăru, R., 2011)

In Europe, more than half of the population of the 27 EU countries live in rural areas, with rural areas occupying more than 90% of the EU's territory.

Rural development is a strategy at European level that aims to set certain objectives aimed at leading to the economic revitalization of rural areas. The perspective of the development of the Romanian rural space is a positive one, based on two primordial elements. The first element is the European Union's increased focus on rural areas, supporting economic development by financing investments in rural areas. The second element consists of the location area, extended to about 90% of the country.(Iagăru, R., Anttila, C., Iogăru P., 2014)

Currently, the Romanian rural area faces many socio-economic problems that are reflected in the gap with living conditions in urban areas, the standard of living of the resident population in rural areas being significantly lower compared to that of the resident population in rural areas. urban areas of the country.(Lepădatu, C., 2011)

Rural areas, through their natural resources provide many jobs in agriculture, to carry out agricultural activity in optimal conditions farmers in need of land, agricultural machinery, buildings, fuel, plant protection products and animal care, all these products and services formation of the "upstream" sectors. In addition to these sectors, there are also those "downstream" where people who deal with the processing, preparation and packaging of agricultural and food products, as well as their transport, storage and retail. In order to function efficiently and profitably, both agricultural

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enterprises and the upstream and downstream sectors need access to the latest information on agriculture and rural development, as well as information on market trends.(Kerekes, K. şi colab. 2010)

MATERIALS AND METHODS

The paper studies the issue of diversification of economic activities in rural Romania through European non-reimbursable funds. The objective of the research is to analyze the socio-economic impact of the projects financed under the PNDR 2007-2013, through measure 312 "Support for the creation and development of micro-enterprises". on the diversification of economic activities and implicitly on the revitalization of rural areas in Romania. For this purpose, the research on the rural development strategy was followed, using the data provided by the Ministry of Agriculture and Rural Development (MADR), as well as the scientific resource platforms: enformation and google academic. Statistical data on the rural population on the website of the National Institute of Statistics (INS) were processed and analyzed, for these data statistical indicators were calculated such as: minimum, maximum, arithmetic mean, standard deviation, coefficient of variation and rhythm annual growth. To achieve the proposed objective, a database of selected and funded projects and the amounts awarded through measures 312 was created on the basis of reports provided by the Agency for the Financing of Rural Investments (AFIR).

The research methods used in conducting the study were the following: systematic and comparative analysis and complex approach to the topic by studying previous research conducted by different authors. The statistical research process cost the following stages: data collection and recording, data processing, analysis and interpretation of results.

RESULTS AND DISCUSSIONS

For the economy of the Romanian rural area, demography represents the most significant component, its structure and dynamics depending in a very large proportion on the rate of economic growth.

At present, the rural environment is facing problems regarding: the aging of the population, as well as the proportional decline of the labor force and of education. The effect generated by the aging of the population is represented by the decrease of the rural population, a phenomenon that is also influenced by the migration of the population to urban areas or in other countries. Since 2007, the rural population has decreased by about 6%, the negative demographic trend generating a decrease in demand for goods and services, which discouraged entrepreneurial initiatives in rural areas.

Table 1. The evolution of the resident population on January 1 in the Romanian rural area

Specification	Years (thousand persons)							*Average*	*Standard deviation*	*Coefficient of variation (%)*	*Annual growth rate (%)*
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**				
Resident population in rural areas	9,414	9,441	9,429	9,353	9,297	9,242	9,230	9,343.6	88,801.36	0.95	-0.33

Source: data processing provided by the National Institute of Statistics, www.insse.ro, accessed on 02.04.2021

At the level of the period 2007-2013, the resident population in rural areas varied between 9,441,061 people in 2008 and 9,229,533 people in 2013, their average in the analyzed period being 9,343,616 people. Following the analysis of the calculated statistical indicators, a negative annual growth rate was noticed (-0.33%), which means a negative evolution trend. In this context, the acceleration of economic development in rural areas is more than essential, being a priority at both national and European level. (Table 1)

Table 2. Evolution of the resident population on January 1 in the Romanian rural area, at the level of the period 2014-2020 (thousand of people)

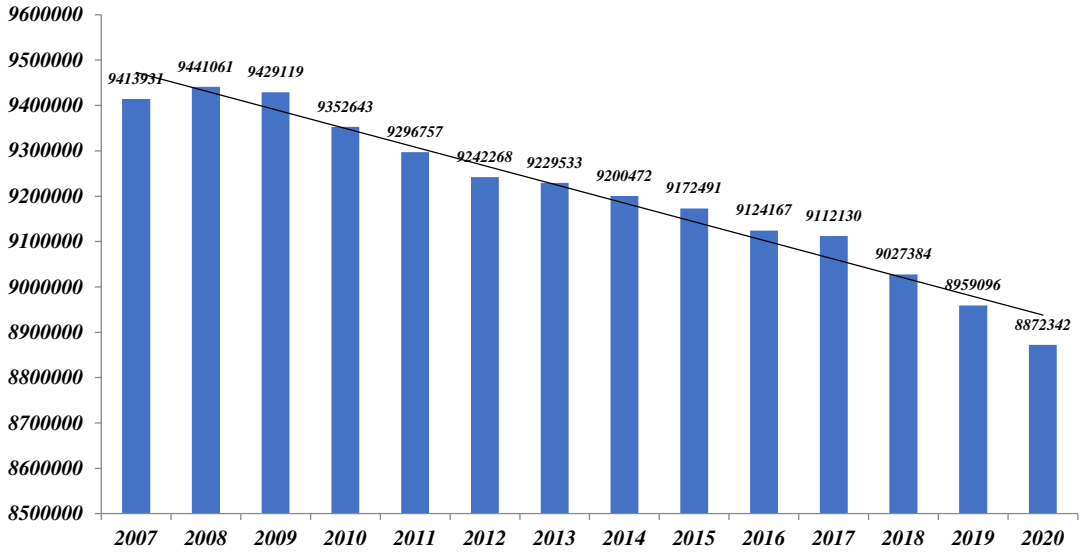
Specification	Years							Average	Standard deviation	Coefficient of variation (%)	Annual growth rate (%)
	2014	2015	2016	2017	2018	2019	2020				
Resident population in rural areas	9.200, 4	9.172,4	9.124,1	9.112,1	9.027,3	8.959,0	8.872,3	9.066,8	119,270. 16	1.32	-1.21

Source: data processing provided by the National Institute of Statistics, www.insse.ro, accessed on 02.04.2021

Analyzing the resident population on January 1, at the level of the period 2014-2020, there was a trend of constant decrease from year to year, from the analysis of statistical indicators highlighting a negative annual growth rate (-1.21%). In 2020 (8,872,342 people), there was a decrease of 4% compared to the population in 2014 (9,200,472 people). (Table 2)

The reduction of the resident population in rural areas is influenced by its migration to urban areas, where the standard of living is significantly higher. Due to this fact, the Romanian rural area is facing the loss of qualified young labor. To address this major problem local authorities should provide incentives for local young people to remain in their communities. In addition to directly supporting local employment, business opportunities should also be provided to local entrepreneurs, selling products based on the nature, history and culture of the area, and providing services that contribute to the development of rural areas. (Figure 1)

Figure 1. Evolution of the resident population on January 1 in the Romanian rural area, at the level of the period 2007-2020 (number of people)



Source: data processing provided by the National Institute of Statistics, www.insse.ro, accessed on 02.04.2021

Following the analysis of statistical data on the participation of the population in the rural labor force, in the period 2007-2019, the following were found: the economically active population varied between 4,016 thousand people in 2016 and 4,589 thousand people in 2008, registering an average of the period equal to 4,238 thousand people who provide the labor force available for the production of goods and services. Regarding the employed population, its oscillations were noticed between 3,765 thousand people in 2016 and 4,376 thousand people in 2008 and an average of the period of 4,017 thousand people. Analyzing the inactive population (students, pensioners, etc.) were observed variations between 4,850 thousand people in 2008 and 5153 thousand people in 2011 and an annual average of 4,989 thousand inactive people. Also, the unemployed population presented an

average of the period of 222 thousand people and values between 185 thousand people in 2019 and 273 thousand people in 2015. (Table 3)

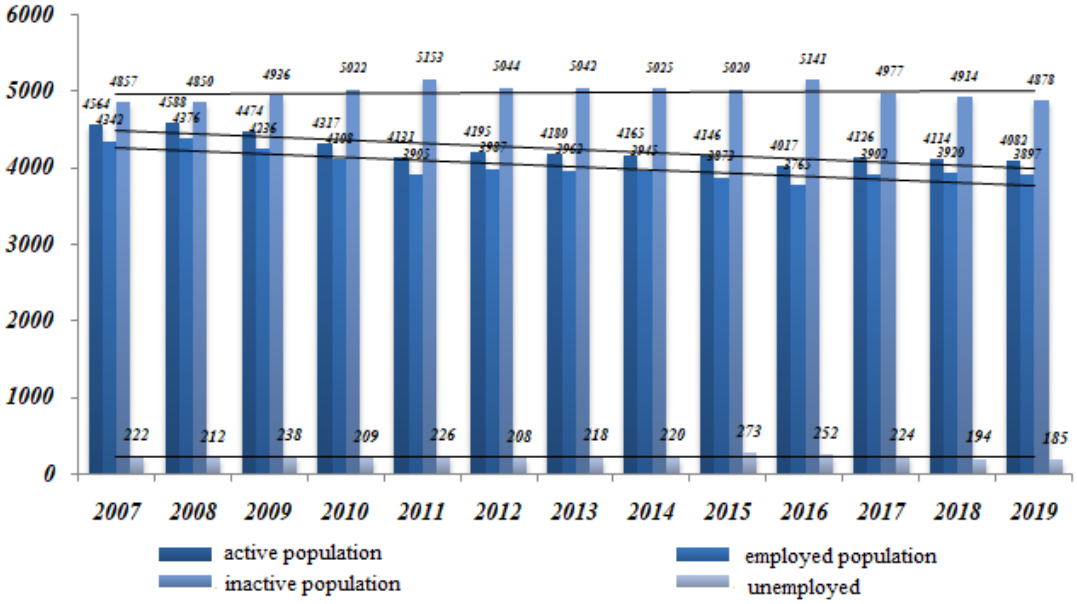
Table 3. Evolution of the active, inactive, employed population and the unemployed in rural areas (thousand people)

Specification	*Years*												
	2007	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*
Active population	4,564	4,589	4,474	4,317	4,131	4,196	4,180	4,165	4,146	4,016	4,126	4,113	4,082
Employed population	4,341	4,376	4,236	4,108	3,905	3,987	3,962	3,945	3,873	3,765	3,902	3,920	3,897
Inactive population	4,857	4,850	4,936	5,022	5,153	5,044	5,042	5,025	5,020	5,141	4,977	4,914	4,878
Unemployed	223	212	238	209	226	208	218	220	273	252	224	194	185

Source: data processing provided by the National Institute of Statistics, www.insse.ro, accessed on 02.04.2021

The evolution trends of the indicators on labor force participation in rural areas at the level of the period 2007-2019 were negative, except for one indicator represented by the inactive population which showed an insignificant increase of 0.43% during this period. It should be noted, however, the reduction in the number of registered unemployed in rural areas, highlighting a decrease of about 17%, the reduction in the number of unemployed population was generated by the development of the economic environment of Romanian rural areas and job creation in areas include agricultural activities, this development was possible due to the non-reimbursable support provided by AFIR through PNDR in the two periods operations, respectively 2007-2013 and 2014-2020. (Figure 2)

Figure 2. Evolution of the active, inactive, employed population and the unemployed in rural areas during 2007-2019 (thousand people)



Source: data processing provided by the National Institute of Statistics, www.insse.ro, accessed on 02.04.2021

In the period 2007-2013, within the NRDP, projects were funded to support the establishment and development of small and medium enterprises. The purpose of the investments made under measure 312. was to diversify rural activities by setting up and developing micro-enterprises in the non-agricultural sector in rural areas, with a view to sustainable economic development, increasing employment and reducing poverty. in rural areas by generating additional income. Within the program, it was possible to request funding for medical and veterinary activities, production, services, crafts, crafts, investments in renewable energy production, or for other complementary activities.

Measure 312 “Support for the creation and development of micro-enterprises” - PNDR 2007-2013 was included in Axis III - “Improving the quality of life in rural areas and diversifying the rural economy” of the National Rural Development Program 2007-2013 (PNDR 2007-2013). The specific and operational objectives of measure 312 were: the creation of new non-agricultural activities, in particular for small farmers or their family members and, in general, for small entrepreneurs in rural areas; diversification of the rural economy by increasing the number of micro-enterprises in the non-agricultural sector which will generate an increase in added value in activities in this sector; service development; creating new jobs; encouraging the maintenance and development of traditional activities in rural areas, encouraging business initiatives promoted, especially by young people and women, and reducing dependence on agriculture.

Under measure 312, investments made by both existing and newly established micro-enterprises in the non-agricultural sectors in rural areas were supported. The non-reimbursable funds were granted to the beneficiaries for investments in tangible and intangible assets in the non-agricultural field. The tangible investments consisted in the construction, modernization or development of buildings for productive purposes, as well as the construction of buildings for the marketing of products, the provision of necessary machinery and equipment.

The intensity of the non-reimbursable public support granted under this measure was up to 70% of the total eligible expenditure. The amounts were distributed as follows: maximum 50,000 euros / project for authorized individuals, 100,000 for micro-enterprises operating in the road transport sector and 200,000 euros / project for individual enterprises, craft and consumer cooperatives of first degree and privately held companies.

According to the data presented in the annual progress report on the implementation of PNDR in 2015, until 31.12.2015, 7 project submission sessions took place during which 9,499 projects with a public value of 1,317,172.81 thousand were submitted euro. From the 9,499 submitted projects, 4,188 projects were selected, out of which 2,693 projects were contracted, respectively 26.69% of the PNDR target of 10,091 projects, with a total investment volume of 598,788.79 thousand Euro and a public value of 336,218.43 thousand Euro.

Table 4. Number of projects contracted under measure 312 "Support for the creation and development of micro-enterprises"

Specification	2008	2009	2010	2011	2012	Total
Number of contracted projects	80	1,024	620	518	451	2,693
Public value (thousands of euros)	11,498.41	147,628.60	65,443.83	47,910.24	63,737.35	336,218.43

Source: processing annual progress report on the implementation of the National Rural Development Program in Romania in 2015

Under measure 312 "Support for the creation and development of micro-enterprises", 2,693 projects were financed, amounting to over 336,218.43 thousand euros, so that the average public value was over 124 thousand euros. Within this measure, in 2009 most projects were contracted, respectively 1,024, the lowest number of contracted projects being 80 projects in 2008, this being the first year of contracting these types of projects. (Table 4)

Table 5. Regional distribution of projects approved under measure 312 "Support for the creation and development of micro-enterprises"

Nr. Crt.	The region	Number of projects	Public valuation (thousand euros)
1.	North East	374	51,682.22
2.	South East	281	37,449.83
3.	South Muntenia	490	59,042.20
4.	South West Oltenia	300	39,052.53
5.	West	358	45,920.54
6.	Northwest	546	61,224.70
7.	Center	322	39,221.42
8.	Bucharest Ilfov	22	2,624.99
Grand total		**2,693**	**336,218.43**

Source: processing annual progress report on the implementation of the National Rural Development Program in Romania in 2015

From the point of view of the regional distribution of the projects approved under measure 312, the North-West region has the highest share, respectively 20.27%, being followed by the South Muntenia region with a share of 18.20%. The lowest share, respectively 0.82%, is held by the Bucharest Ilfov region. (Table 5)

Analyzing the regional distribution of the number of approved projects, it was noted that the most significant number was registered in the North-West region (546 approved projects), followed by the South-Muntenia region (490 approved projects) and the North-East region (374 projects approved). At the opposite pole with the lowest number of projects was the Bucharest-Ilfov region (22 approved projects). (Figure no.3.)

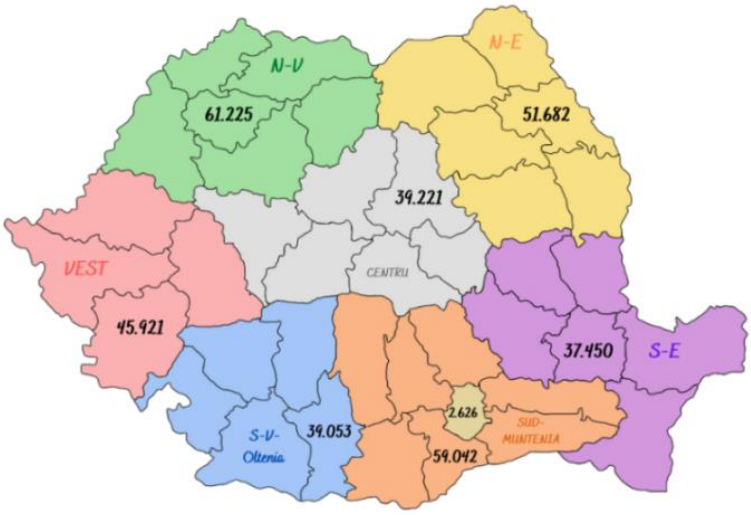
Figure 3. Regional distribution of the number of projects approved under measure 312 "Support for the creation and development of micro-enterprises"

Source: processing annual progress report on the implementation of the National Rural Development Program in Romania in 2015

Regarding the regional distribution of the public value of the approved projects, it was noted that the most significant financing was made in the North-West region (61,225 thousand euros),

followed by the South-Muntenia region (59,042 thousand euros) and the North-East region (51,682 thousand euros). At the opposite pole with the lowest funding was the Bucharest-Ilfov region (2,626 thousand euros), this is due to the fact that the Bucharest-Ilfov region is considered the most economically developed region in Romania, this being a predominant region. urban. (Figure 4)

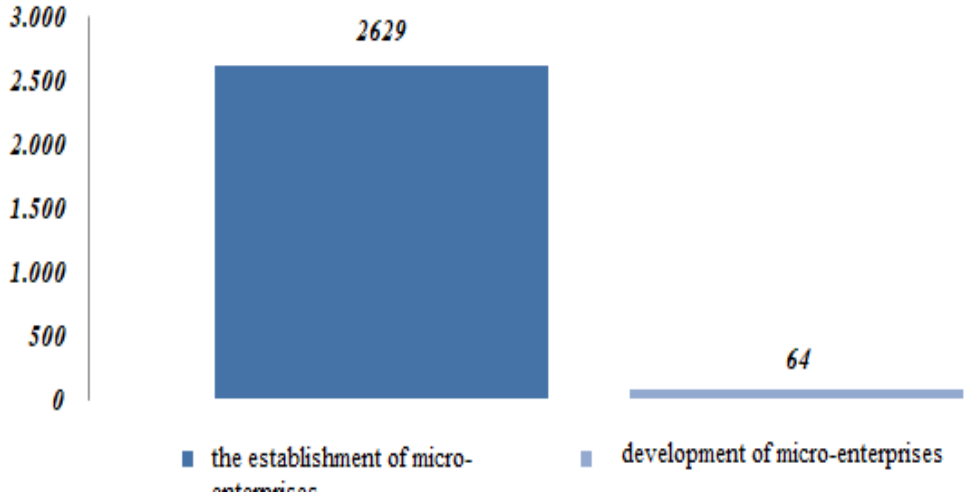
Figure 4. Regional distribution of public value of projects approved under measure 312 "Support for the creation and development of micro-enterprises" (thousand euros)



Source: processing annual progress report on the implementation of the National Rural Development Program in Romania in 2015

Regarding the distribution of approved projects according to the type of micro-enterprise, it was noted that: the largest share is held by the category "Establishment of micro-enterprises", 97.62% of the total projects approved under measure 312 with 2,629 approved projects, and the category "Development of micro-enterprises" has a share of 2.38% of the total projects approved for this measure, with 64 approved projects. (Figure 5)

Figure 5. Number of projects approved under measure 312 "Support for the creation and development of micro-enterprises" by type of micro-enterprise



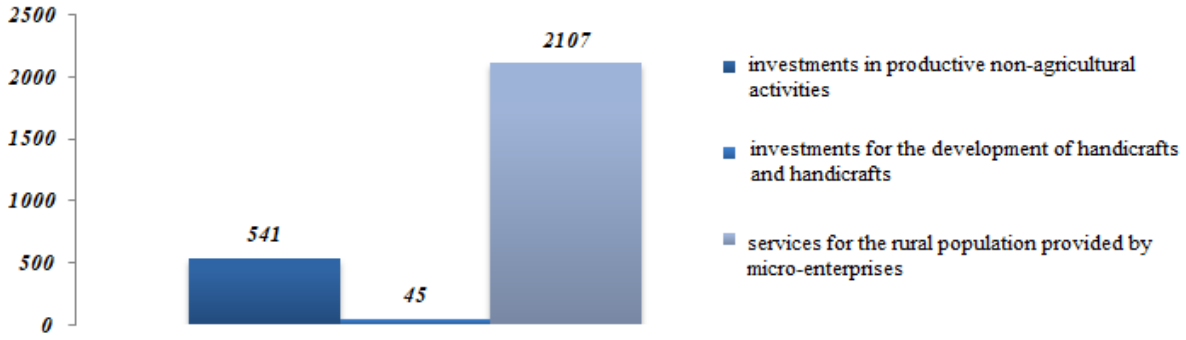
Source: processing annual progress report on the implementation of the National Rural Development Program in Romania in 2015

Depending on the type of investments made through measure 312, the most significant number of projects, aimed at making investments in services for the rural population provided by

micro-enterprises, 2,107 approved projects, representing 46.14% of the PNDR target of 4,567, being followed of investments in productive non-agricultural activities, 541 approved projects, representing 35.55% of the PNDR target of 1,52

The lowest number of projects was registered in the category of investments for the development of craft and handicraft activities where there were 45 approved projects, representing 1.18% of the PNDR target of 3,806. (Figure no.6.)

Figure 6. Number of projects approved under measure 312 "Support for the creation and development of micro-enterprises" by type of investment



Source: processing annual progress report on the implementation of the National Rural Development Program in Romania in 2015

CONCLUSIONS

The conclusions of the paper show that, for the Romanian rural area, the development of the entrepreneurial sector represents an important component whose dynamics and structure influence the rate of sustainable economic growth.

The EAFRD is the main instrument for ensuring that rural development measures are implemented in EU member states. For the 2007-2013 operational period, Romania benefited from effective payments in proportion of 33.5% of the amounts allocated through PNDR, which represents a low degree of absorption of funds in the country, among the main causes that led to this low degree. European non-reimbursable funds include: ambiguous selection criteria, which have left room for interpretation; non-compliant applicant's guides; change of rules during project submission sessions, delays in announcing eligible projects and signing contracts with selected beneficiaries; the requirement of bureaucracy; lack of financial capacity of beneficiaries to ensure co-financing of projects, as well as lack of information on funding possibilities.

At the level of the 2007-2013 programming period, through measure 312- support for the creation and development of micro-enterprises, a total expenditure of 589,891,817 euros was achieved, of which 383,429,681 euros represented public expenditure, and 206,452,136 expenditure This financial support has contributed to the restructuring of rural activities and the creation of new alternative jobs, as well as additional sources of income from non-agricultural activities, making the development of micro-enterprises the most significant source of employment. , both for already established and developing enterprises.

Also at the level of the 2014-2020 programming period, AFIR financed 1,893 projects for the establishment of non-agricultural activities in rural areas, the value of financing contracts being 111.3 million euros.

The analysis of the data shows that the support provided at the level of the two operational periods of financing contributed to the economic and social development of the Romanian rural area, by creating cowsheds that led to the decrease of the unemployed rural population with about 17%.

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FARM FINANCING IN PNDR 2007-2013

MIHNEA-IULIAN VASILIU [1]

Abstract

In Romania we are at the conclusion of the second agricultural financing program since the country's adherence to the European Union and in the transition period towards the next financial exercise. The experience and effects of the first program, that took place between 2007 and 2013, led to a new approach. The results of the 2014-2020 program will be concluded in an ex-post analysis. The family farms have been supported through dedicated measures, in both the first and in the second program, but in what follows I will detail the experience of the 2007-2013 financial exercise in regards to the 1st Axis, with an emphasis on measure 121, named "modernising agricultural exploitations - the family farm". The materials and sources used for this analysis are part of the specialty literature. This study has at its basis Romanian and European Union specialty literature and legislation, such as: regulations, decisions, directives, The National Rural Development Program, guides related to the aforementioned measure. The data collecting, processing, analysis, interpreting and synthesizing of said data have been used as a work method. Quantifying the impact of european funds for agriculture on family farms can be achieved through the dedicated measures from the analysed period and at the end of the currently ongoing agricultural census we will have a clearer bigger picture of the status of these farms in Romania.

Keywords: *financing, PNDR, guide, farm, absorption*

JEL classification: *R51, Q14*

INTRODUCTION

The restitution of agricultural land in Romania began in 1991. During the SAPARD program it reached over 96% of the total area owned by farms that belonged to the Romanian state.

A brief analysis of Romanian agriculture in the post-accession period to the European Union shows us a great polarization and fragmentation of agricultural holdings. This situation has led to a very large number of subsistence and semi-subsistence farms. At the opposite pole we find a small number of large farms that have access to the market.

Within the SAPARD program, a budget of 259.07 million euros was allocated to farmers through measure 3.1, a measure called “Investments in agricultural holdings”. This measure has stimulated investments such as the purchase of tractors, agricultural machinery and equipment, the modernization of technologies for obtaining agricultural products and animal husbandry.

According to the National Institute of Statistics, in 2005, subsistence holdings hold 45.24% of the utilized agricultural area, semi-subsistence holdings approximately 16.09%, and commercial holdings 38.67%.

Within the terminology of family farms in Romania we find both subsistence, semi-subsistence farms and micro-farms or micro-farms. These categories of farms face the greatest obstacles in terms of access to finance and the market. That is why we find in all programs financed with European funds measures for these types of holdings.

The family farm was defined by the O.U.G. 43/2013 as “agricultural holding belonging to natural persons as individual agricultural producers registered in the Register of agricultural holdings or registered as an authorized natural person, individual enterprise, family enterprise, established according to the legislation in force, producing for own consumption and, where appropriate, sells the surplus. The economic size of the family farm is between 2-50 ESU” (GEO 43/2013)

MATERIALS AND WORKING METHODS

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The materials and sources of information used for this paper are part of the literature. This study is based on specialized literature and legislation from Romania and the European Union such as: regulations, decisions, directives, the National Rural Development Program, guides related to the specified measures. Data collection, processing, analysis, interpretation and synthesis were used as a working method.

The interpretation of the laws, guidelines and specialized procedures is achieved through the logical-rational operations of explaining the content in order to apply it correctly. Literary or declarative interpretation, logical interpretation, systematic interpretation is identified as methods - by correlating with other provisions within the materials used.

The logical model is a method for identifying a causal link between the internal and external elements of the National Rural Development Program. Thus, through the logical model, the PNDR elements are structured in order to highlight the program theory. The methods link all these activities to the expected results of the program, to the relevance of the program and to the intervention logic at the level of each axis.

RESULTS AND DISCUSSIONS

Within the NRDP 2007-2013, 27 measures were launched, and through axis 1, the following measures were carried out for family farms:

- ✓ 112 -Installation of young farmers;
- ✓ 121 -Modernization of agricultural holdings;
- ✓ 141 -Supporting semi-subsistence farms.

The applicant's guide and related verification and control procedures included details on the technical, economic-financial and environmental criteria. The indicators for evaluating the performance of the farm were found in the applicant's guides, and the beneficiaries also had the opportunity to access the specified measures using the same business plan, all the task of avoiding double funding being in the administrative procedure of the Paying Agency for Rural Development and Fisheries.

Axis 1, increasing the competitiveness of the agricultural and forestry sectors, received a financial allocation of 43.95% of the total of the 4 axes of the program(NRDP 2007-2013), reaching the final version (version XVI, approved in November 2015 at 31%. The financial reallocation was directed to AXIS 2 to avoid budget disengagement.

Axis 1 of the National Rural Development Program addressed the need to exceed the subsistence and semi-subsistence productive levels of productivity in both the agricultural and forestry sectors, by pursuing the objective of improving the competitiveness of rural areas, through complementary measures to increase knowledge and skills of farmers (measure 111), modernization of agricultural holdings (measure 121), as well as increasing afforestation and promoting sustainable forest management (measure 122).

By measure 112, this axis emphasized the need to renew the generation of agricultural managers. This need is based on improving the management of production activities and the need to increase incomes for young farmers. The axis also aimed to increase the competitiveness of the food and forest products industry by introducing innovation and adapting businesses to European Union standards (measure 123). Competitiveness also involves the efficient use of agricultural land and forests based on the new ownership structure (measure 125), including new infrastructure and well-organized farms (measure 125) but also labor, by promoting organized producer groups (measure 142).

General Objective	Strategic Objectives	Share estimated of objective in total funding public / axis	Estimated share of each axis in total allocation EAFRD for the four axes
Axis 1 Increasing the competitiveness of the agri-food and forestry sectors	Improving the skills / competences of farmers and other persons involved in the agri-food and forestry sectors, as a means of stimulating a better management of agricultural holdings, forests and processing units.	5-10% (PNS) 91.67 million euro according to PNDR	43,95%
	Improving the competitiveness of commercial and semi-subsistence farms and their associations in compliance with the principles of sustainable development.	55-60% (PNS) 2,048.86 billion euro according to PNDR	
	Restructuring and modernization of the product processing and marketing / marketing sectors agricultural and forestry, in parallel with observance of development principles durable.	35-40% (PNS) 744.75 million euro according to PNDR	

Source: PNS 2007-2013, PNDR 2007-2013

Under the measures set out above, farmers were able to obtain non-reimbursable funds provided that the holding had an economic size of more than 2 ESUs. The unit of economic size of a farm was calculated at that time according to a European coefficient that multiplied by the cultivated area or the number of animals. The value of a unit of economic size was 1200 euro.

In the financial year 2007-2013, Axis 1 had three main strategic directions for rural development, which aimed at rejuvenating, developing and professionalizing the workforce or human resources, supporting farms and associations to the market through investments in modernization, for both agri-food and forestry products.

A large proportion of the financial allocation was aimed at the competitiveness, modernization and restructuring of the agricultural sector and farms.

All these priorities have taken into account the principles of sustainable development. In order to achieve this objective, the aim was to stimulate investments by reorganizing, restructuring, reuniting farms, changing generations in farm management, modernizing farms to become competitive in the market.

Farm consolidation has focused on supporting members of associations, young farmers and farms in view of their impact on the economy, the environment and society as a whole.

TOTAL GENERAL							**EURO**
Measure	**Submitted projects**		**Selected Projects**		**Signed contracts**		**Payment done**
	Nr.	**Public Value**	**Nr.**	**Public Value**	**Nr.**	**Public Value**	**Public Value**
111					**36**	**21.033.279**	**19.347.351**
112	22.494	630.074.066	13.450	339.262.514	12.635	318.285.035	305.303.458
121	8.738	3.115.680.605	3.849	1.334.129.323	2.789	755.355.121	662.274.906
122	20	3.011.934	18	2.513.937	16	2.015.271	1.877.966
123	1.762	1.771.015.955	961	939.567.923	518	433.686.052	365.874.869
Schema XS 13/123A/2008	247	113.706.025	215	101.626.174	145	55.813.709	48.291.462

TOTAL GENERAL							EURO
Measure	**Submitted projects**		**Selected Projects**		**Signed contracts**		**Payment done**
	Nr.	**Public Value**	**Nr.**	**Public Value**	**Nr.**	**Public Value**	**Public Value**
Schema XS 28/123F/2008	177	78.896.763	157	67.450.879	85	32.829.779	27.056.505
Schema N578/2009	453	311.099.775	292	216.093.918	175	87.304.654	76.990.962
125	1.701	1.789.032.854	699	739.895.314	677	669.493.488	527.948.491
141	**88.846**	**666.345.000**	**63.544**	**476.580.000**	**50.486**	**372.535.184**	**333.595.687**

https://madr.ro/pndr-2007-2013/situatia-proiectelor-depuse.html

Measure 121 was among the measures that brought added value, contributing to the development of farm production capacities, storage capacities, conservation, modernization of farms, etc.

As we can see in the table above, the situation of the projects under measure 121, in 2016, shows us the decision to finance 2,789 projects worth 755,355,121 euro. Less than half of the projects were selected and less than a third of the total number of projects initially submitted under this measure received funding. The data show that by measure 121 approximately 66% of the projects selected for contracting have been completed. It is noted that this measure remained at the top in terms of funding size. In order to support potential beneficiaries interested in accessing the measure for the modernization of agricultural holdings, the Paying Agency for Rural Development and Fisheries has provided a number of model projects and the necessary technical information.

The ex-post analysis of PNDR 2007-2013 highlights a cost of a beneficiary, of measure 121, ten times higher than the one provided. This did not affect the effectiveness of the measure, as it was accessed by a different type of beneficiary or other type of investment than originally envisaged.

CONCLUSIONS

In conclusion, regarding the subsistence and semi-subsistence farms in Romania, it must be taken into account first of all that the current situation of Romanian agriculture is the direct result of a way of life specific to the traditional rural environment, which requires interventions not only through the Common Agricultural Policy. concentration of measures such as economic, fiscal, social policy, etc.

As we have previously pointed out, the developments in the sector from 2005 to 2010 have been insignificant, especially if we take into account all the support measures provided in the last twenty years for the creation of a modern commercial agriculture. Given that the support measures from PNDR for increasing competitiveness or diversification of activity were primarily directed to farms with 2-8 ESUs, the big problem of Romanian agriculture is that over 3.6 million farms that had less than 2 ESUs, and among only about 1 million received support through the SAPS (single flat area scheme) or PNDC (complementary direct payments) system.However, in order to truly quantify the impact of CAP support on subsistence agriculture and the implications for sector restructuring, research in this paper needs to be revised on the basis of the next agricultural census. It will allow us to observe the general situation, even if not directly the impact of agricultural policy measures in the period 2007-2013. Only in this way, through a post-accession analysis, we can observe the real mutations of the agricultural sector in Romania.

However, I believe that agricultural policy measures, together with access to funds for farms, must be supported by continuing to provide advice, advice and information to small producers in the sector on the opportunities offered, but also on the benefits they can gain through association,

organizing groups producers or the orientation towards the production of quality traditional products to be distributed in traditional markets, through farm tourism networks or any short supply chain.

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THE IMPACT OF EXTERNAL MIGRATION FROM RURAL AREAS ON THE LABOR FORCE IN THE FIELDS OF AGRICULTURE, FORESTRY AND FISHERIES IN ROMANIA

MIHAELA-GEORGIANA OPREA [1], MIHAELA-IRMA VLĂDESCU [2], IRINA BĂNCESCU[3]

Abstract

In the context of an increase in demand for labor in the European Union's internal market (where there is a regulatory framework allowing free movement of labor), particularly in areas such as agriculture, construction and domestic services, romanians' tendency to emigrate increases with the opportunity to earn higher income. Migration among rural working-age people has continued to increase, leading to an increase in labor shortages in particular in the fields of agriculture, forestry and fisheries. In this work, the link between the external rural exodus and the Romanian labor market is being analyzed in the fields of agriculture, forestry and fishing. The importance of this study derives from the fact that agriculture is one of the major branches of the national economy, which, due to the reduction in employment, loses its production potential. As a methodology we use Pearson correlation coefficient and descriptive spatial analysis to study the link between two variables: Number of temporary immigrants in working age (aged 15 to 64) in rural areas and the employed civil population in agriculture, forestry and fishing (at the NACE section level). Following the evolution of the employment in all three areas, a continuing downward trend is observed in the period analyzed from 2012 to 2019, while the number of working-age immigrants in rural areas is growing significantly. Given the current situation, the drop in the number of workers in the fields concerned deepens the disparities between rural and urban areas, jeopardizing Romania's food security.

Keywords: force, agriculture, migration, rural

JEL classification: J01, J11, J43, O15

INTRODUCTION

In the 1990s , agricultural activities accounted for the largest share of rural territory, but due to the borrowing trend of some urban-specific elements, the share of the agricultural population is decreasing. (Dona, 2005) this decline is also caused by other important factors such as: The decline in the area of arable land, the migration from village to city, and not least the increasing trend of emigration of Romanians from rural areas outside the country.

One of the reasons why people migrate is for the purpose of reducing or eliminating poverty through remittances and knowledge transfer. (Chivu L. et all, 2020) At national level, in rural areas, the poverty rate is about three times higher although the population is lower than in urban areas. The President of the national Institute of Statistics states that "the rural environment remains below the level of social and economic development of the urban area, facing specific challenges and being the source of "islands of poverty" and of social exclusion". Among the contributing factors to increasing the level of poverty and deepening the gap between the two residence environments is: early school leaving, limited educational attainment, low accessibility to health and education services, limited infrastructure and not least the low share of the working population. (INS, 2019)

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MATERIALSAND METHODS

For the research that was the basis of this paper, was used the specific methodology, which includes analyzes of the national and county statistical data provided by the statistical documents of the National Institute of Statistics.

In order to identify the link between two variables: The number of working-age temporary emigrants (aged 15 to 64) in rural areas and the employed civil population in agriculture, forestry and fishing (at the CAEN section level) we use the Pearson correlation coefficient and descriptive spatial analysis. The study follows the evolution of the workforce employed in the three areas from 2012 to 2019.

RESULTS AND DISSCUSION

The costs and risks of emigration have decreased over time and as a result the number of migrants has increased considerably. At the same time, some of the destination countries have started schemes to regularize irregular immigrants (Italy in 2002, Spain 2005) and the prospects of long-term legal residence are becoming feasible for a considerable number of Romanian migrants. In the last three decades, the domestic migration from Romania has had a pretty interesting evolution. In the early 1990, a considerable number of people changed their residence. While in the '90, migrants came mainly from urban areas and the more developed (western) regions of Romania, after 2002 the eastern (less developed) part of the country became an important source of Romanian emigration, While the rural population is becoming increasingly connected to various emigration flows (Sandu et al, 2007).

In addition to the positive economic effect of remittances (Massey et al., 1999), the countries of origin are facing a "brain drain" and a decline in the workforce. (Racovitan and Chivu coord., 2019)

Although the number of people employed in agriculture, forestry and fishing is decreasing, the number of active firms increased by more than 20.000 in 2020, compared to 2008 when just over 8000 active firms were registered. In the first semester of this year, more companies were set up with more than 10.000 companies (in agriculture, forestry and fisheries) than in the same period last year. This may be due to the fact that only by operating within a legal framework, people can receive area aid and have easy access to European funds and loans. (Nitu, 2021)

As a result, compared to other economic sectors, agriculture showed the highest growth rate of 16,3% in loans granted and commitments made by banks in May 2021, compared to the same month of the previous year. (Nica, 2021)

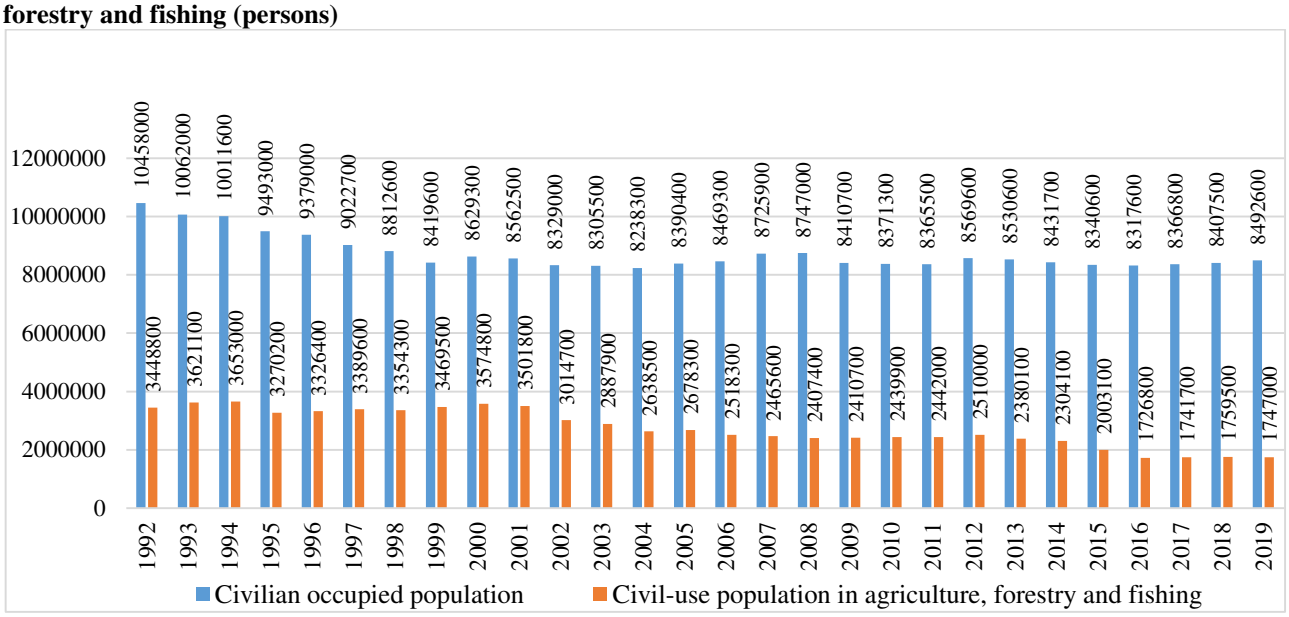
Since 1989, the rural environment in Romania has undergone important socio-economic changes. The changes over the last 30 years have given agriculture a different dimension, while requiring other frameworks, which require both scientific diagnosis, and a forecast of the future dimensions of these trends and of solutions to help optimize action in this field. (Palicica & Palicica, 2005)

After the fall of communism, people were free to follow their preferences in terms of choice of place of work and residence. These relocations were reflected in the high domestic migration rate recorded in 1990, when around 3,4% of the population changed residence. This trend has continued to grow and, as a result, people have even opted to leave the country's borders in order to live better.

According to the INS, the employment rate of the working-age population (15-64 years) was 65,6% in 2020, falling by 0,2 percentage points compared to the previous year, of which 17,6% represents skilled workers in agriculture, forestry and fishing. (Fig 1)

A considerable part of the rural population lives from subsistence farming due to land fragmentation, the limited use of modern technologies, infrastructure and not least to poor labor market access. It accounts for about 50% of the country's agricultural area, but accounts for only 10-15% of agricultural production. In addition, rural areas are facing an accelerated aging population. (Agiu, 2021)

Figure 1. Development of the total employed population and the employed population of agriculture, forestry and fishing (persons)



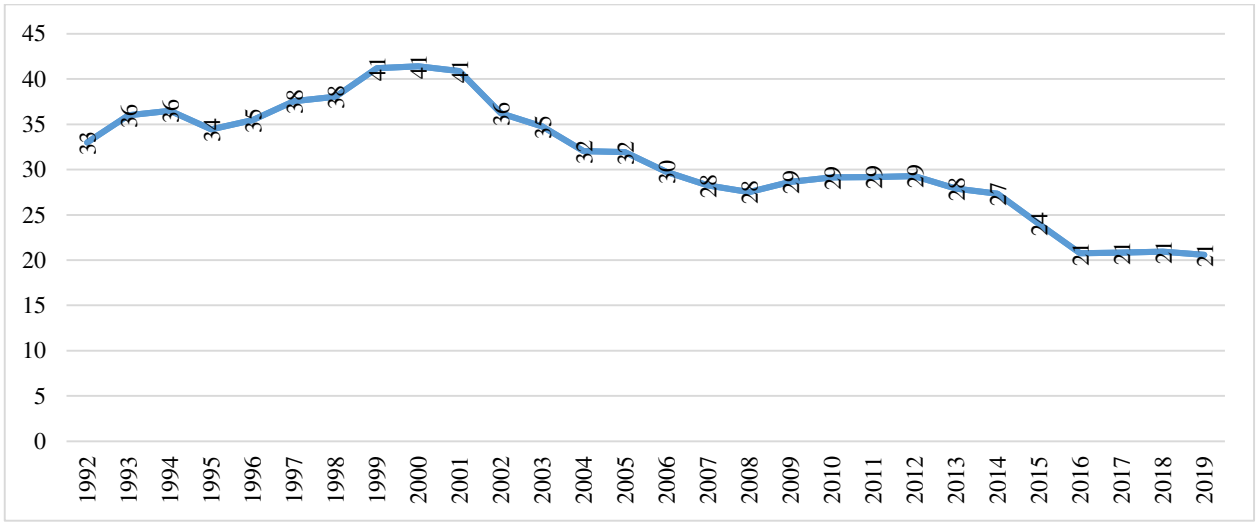
INS Data, TEMPO_FOM103C, accessedat 27_6_2021.

Between 1992 and 2019, Romania's occupied population decreased by more than 1,9 million people, while the farm, forestry and fishing population halved (by more than 1,7 million people).

Since 2002, the agricultural, forestry and fishing population has been gradually declining in most parts of the country, due to falling birth rates, new jobs in urban areas and not least migration. (Dobos, 2008) (Figure 2)

During the analyzed period, we encounter different situations: increases (1995-1999), stagnation (2009-2012), respectively decreases (2001-2007). The highest value of the population in agriculture, forestry and fishing of the total employed population was recorded in theperiod 1999-2001 (41%), while the lowest value was reached in the period 2016-2019 (21%).

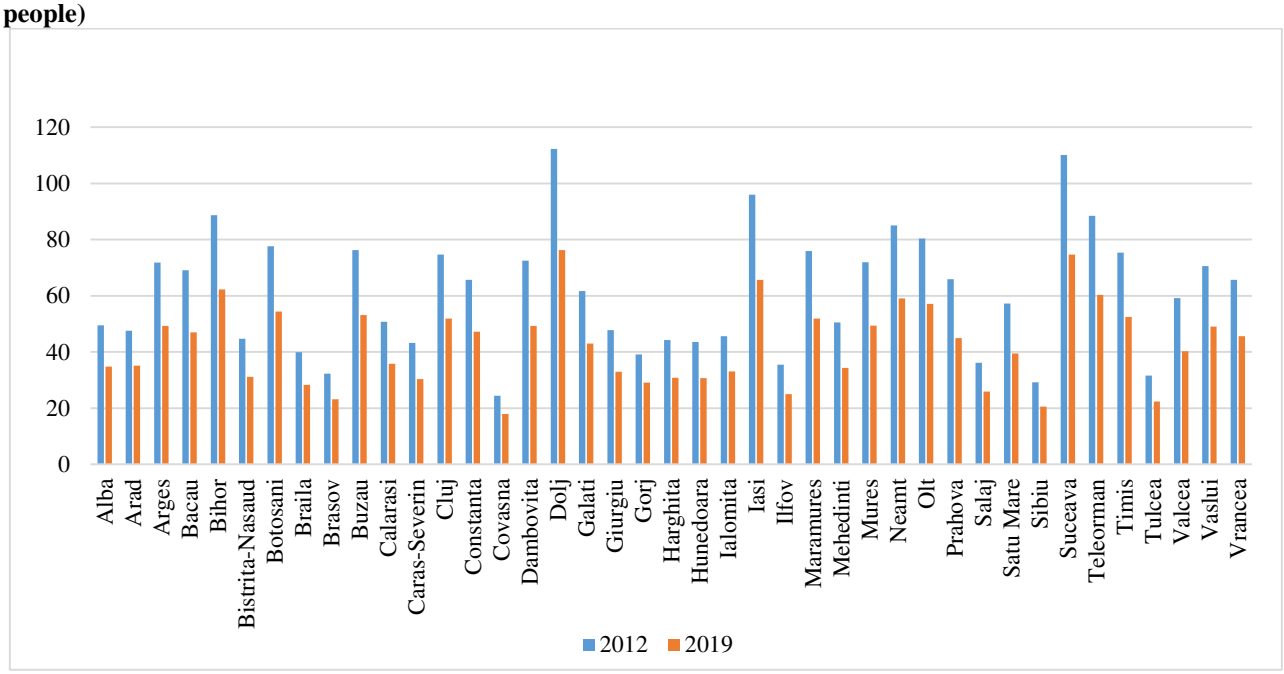
Figure 2. Civilian employed population in agriculture, forestry and fishing of the total civilian employed population (%)



Source: Author's calculations based on INS data.

Although, according to Eurostat, in 2016, Romania ranks first in the EU in the number of agricultural employees in the total number of employees (C.E., 2018), this percentage is in a continuous decrease in all counties of the country (Figure 3).

Figure 3. Civilian employed population in agriculture, forestry and fishing by counties (thousands of people)

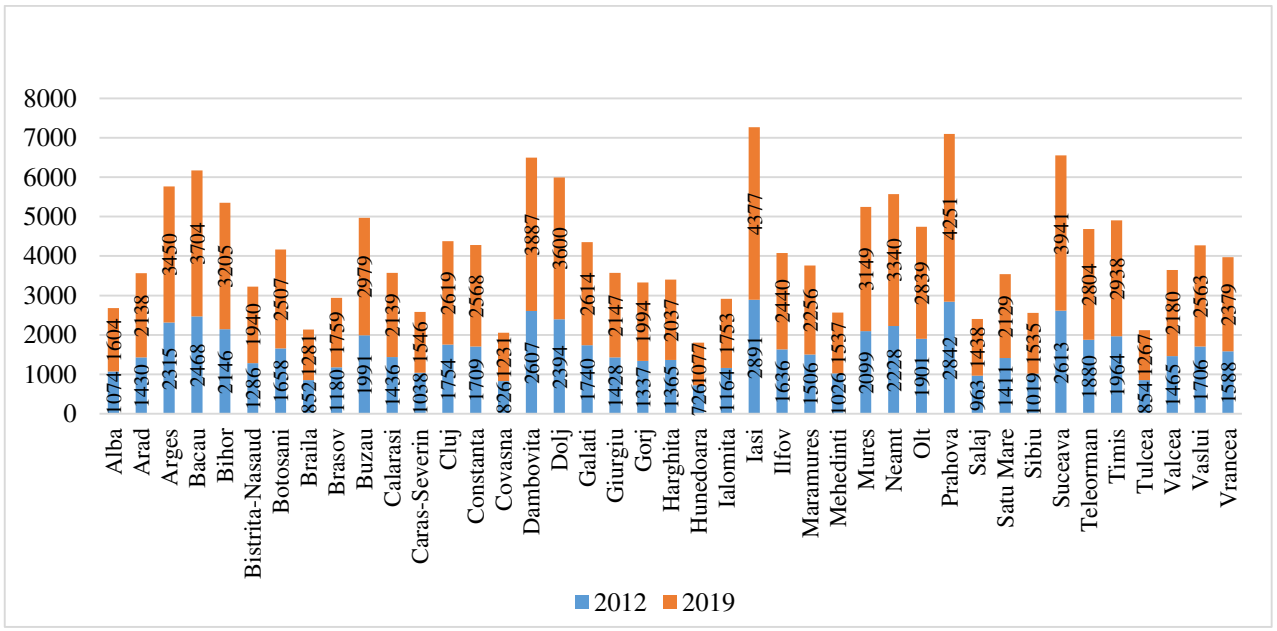


Source: INS Data, TEMPO_FOM103D, accesat la 29_6_2021.

The agricultural population, including forestry and fisheries, declined in all 41 counties in 2012-2019. The most significant losses (over 26 thousand people) were recorded in Dolj, Suceava, Iasi, Teleorman, Bihor and Neamt. This trend may be due to the emergence of new jobs, in the context of the expansion of private sector activities, migration, which has spread across all the country's counties, including the rural population which, according to the statistics, has a significantly lower standard of living than the urban population, and also, the natural decline in population.

With the poverty rate in rural areas in the country around three times higher than in urban areas, although the population is significantly lower, people choose to migrate in order to reduce or eliminate poverty through remittances and knowledge transfer. (Figure 4)

Figure 4. Temporary rural working-age emigrants in counties (persons)

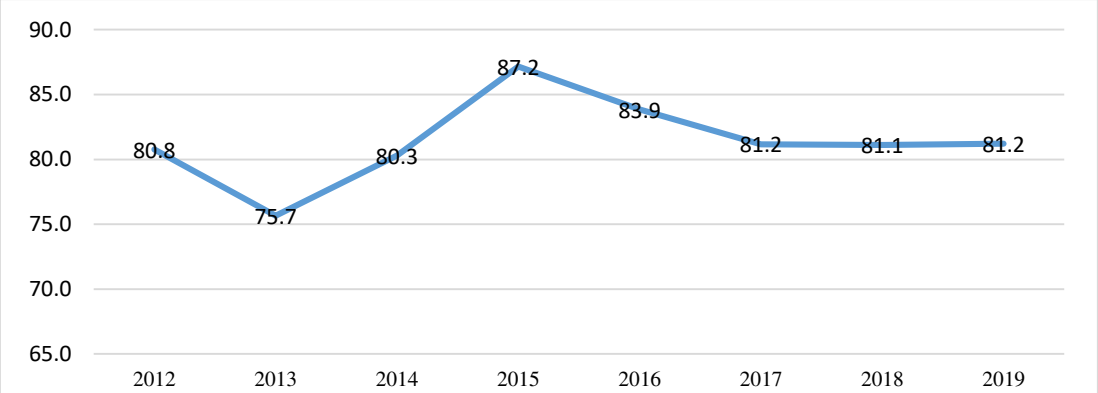


Source: INS Data, TEMPO_POP320C, accesat la 29_6_2021.

The counties with more than 20.000 temporary working-age emigrants between 2012-2019 are: Iasi, Prahova, Suceava, Dambovita, Bacau, Dolj, Arges, Neamt, Bihor and Mures. Also in the same counties, the highest difference (over 1.000 persons) in the number of temporary working-age emigrants in 2019 compared to 2012 is observed.

The low incomes in agriculture and lack of jobs in other areas have determined the migration from village to city, or even the migration of the young labor force out of the country, thus the majority of the population over the age of 45 are working on agricultural land (Figure 5).

Figure 5. Share of 15-45-year-olds among all working-age emigrants (%)



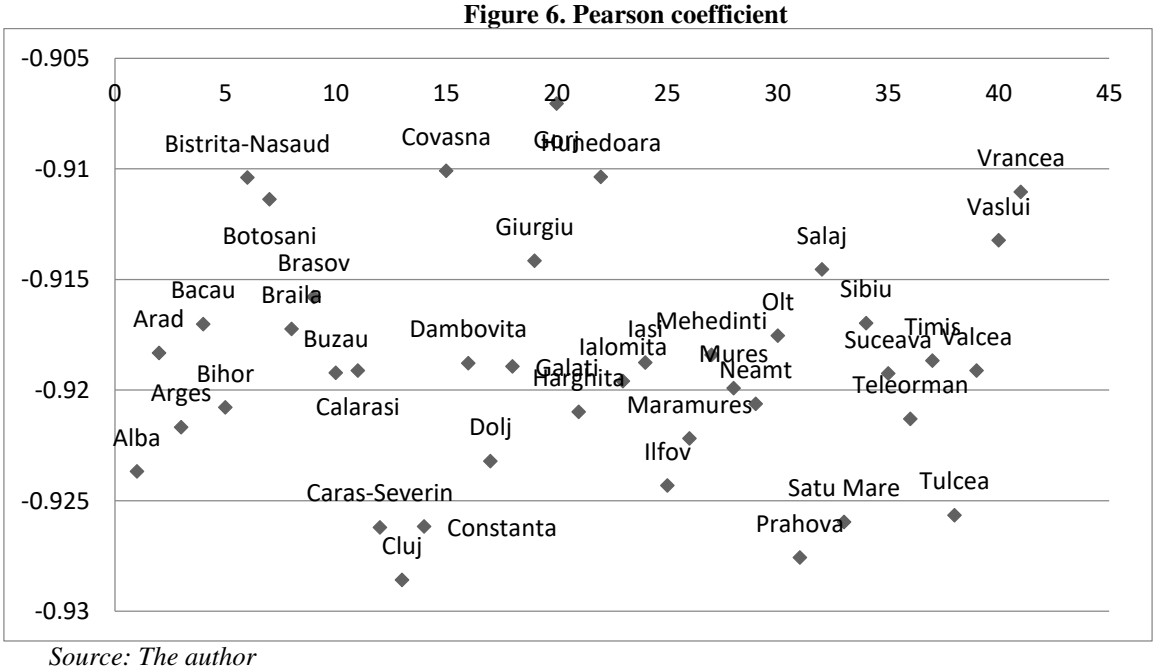
Source: Author calculations based on INS data.

Over the period analyzed, the share of 15-45-year-olds among all working-age immigrants exceeds 80%, with the exception of 2013 (75,7%).

In addition, according to the INS data, there were significant increases in female, working-age emigrants from rural areas over the period 2012-2019, while significant decreases in the female-employed agricultural, forestry and fishing population from 1375,8 thousand people in 2012, to 884,6 thousand people in 2019.

Over the period under review (2012-2019), the number of female employed agricultural, forestry and fishing has fallen by almost twice as high as the number of male workers.

Figure 6. Pearson coefficient



Source: The author

Romania is among the countries with the lowest young farmers in the European Union. According to the European Commission data published in 2018, only 10% of farmers are under 40, of which only 23% are women and the figures are steadily falling.

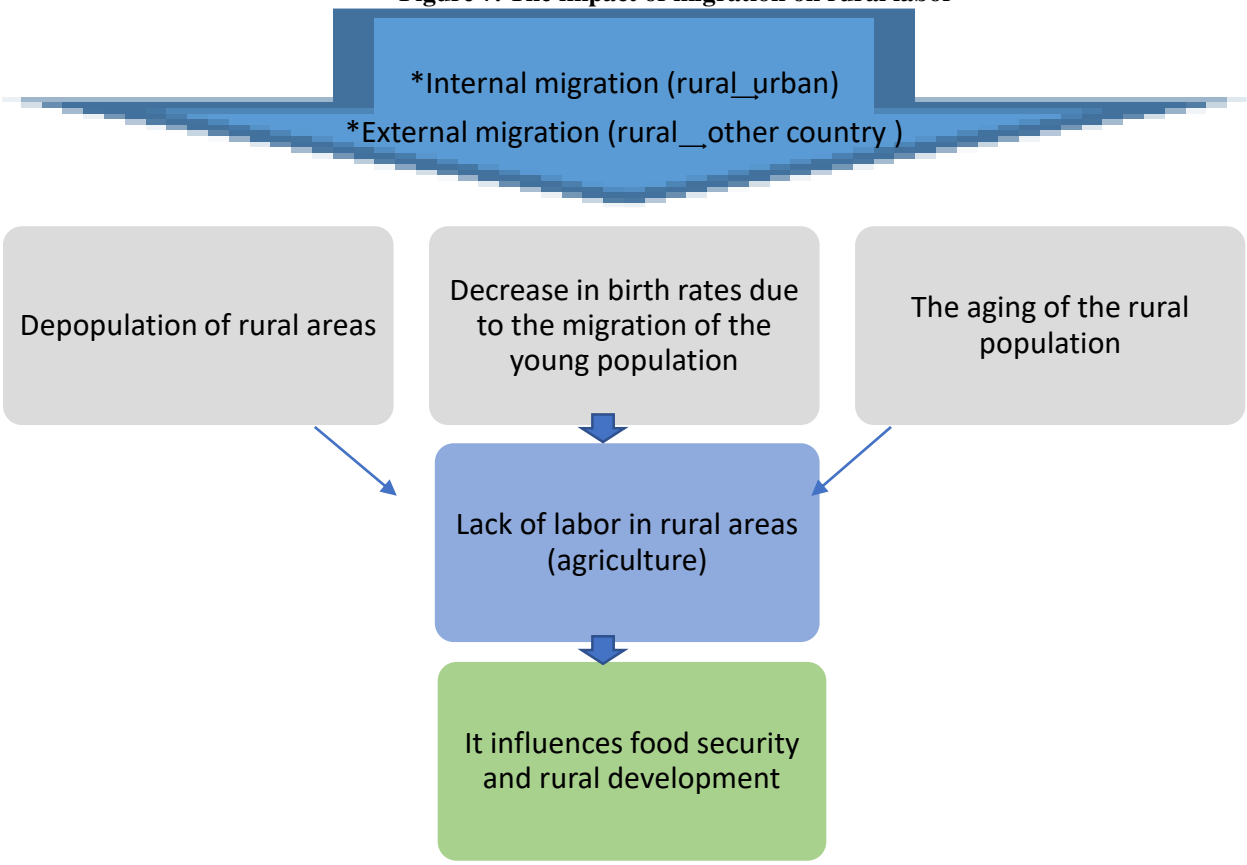
In order to identify the link between two variables: the number of temporary migrants of working age (aged 15 to 64) in rural areas and the civilian employed population in agriculture, forestry and fishing (in the CANE section) we used the Pearson coefficient (Figure 6).

Following the evolution of the labor force, employed in the three fields, in the analyzed period, 2012-2019, there is a continuous downward trend in all counties of the country, while the number of working-age migrants from rural areas, increases significantly. . The coefficient between the two variables is thus negative, while the number of temporary emigrants from rural areas increases, the population employed in agriculture, forestry and fishing decreases.

The European Commission draws attention to the issue of an aging agricultural population, stating that "only 11% of farms in the European Union (EU) are managed by farmers under 40 years of age – and young people are left hard to be persuaded to become farmers". (E.C., 2018) at the same time, the intensification of migration has raised concerns about rural youth abandoning agriculture and the implications for agricultural production and food security.

The relationship between food security, the labor force in agriculture and migration is direct, when people consider that migration is the only option to escape hunger. Links between agriculture, food security and migration can also be indirect as a strategy for households to address income uncertainties and food insecurity risks. (Figure 7)

Figure 7. The impact of migration on rural labor



Source: The author

In a context of ever-changing demography, climate change and increasing pressure on all natural resources, a major transformation will be needed in the way we produce, manage and consume food. This involves moving to sustainable and resilient agricultural production systems that can help, at the same time, mitigate gas emissions and adapt to changing environmental conditions, while

ensuring food security. It is therefore necessary to rethink the food production process, to reduce waste and losses, and not least to protect biodiversity.

CONCLUSIONS

There are probably significant overlaps between statistical data on employment in agriculture, forestry and fisheries and informal employment in these areas of activity. The latter is a significant component which, by measuring it as accurately as possible, can contribute to the development strategies that support decent work. The link between the information raised in rural areas and national legal and institutional frameworks is basic, helping to create the context in which inclusive labor market policies for rural areas can be developed and implemented.

Addressing the development of rural areas is particularly necessary given that some areas suffer from over-average migration (these are remote and/or rural areas or unindustrialized regions without an attractive growth pole and consequently, they suffer from structural underdevelopment and lack of employment opportunities. Due to the major migration of working-age young people, the aging process in these regions is accelerating.

Understanding contemporary, external and internal migration remains a challenge. People's decision to migrate either within their own countries or across borders is influenced by a variety of factors. This study aimed at examining the complex interlinkages between migration and the civilian population in the activities of the national economy (agriculture, forestry and fisheries) by county, food security and rural development and the factors determining the rural population's decision to migrate.

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NATIONAL AND EUROPEAN STRATEGIES AND POLICIES FOR THE GENERATION CHANGE IN ROMANIAN AGRICULTURE

GEANINA-VALENTINA LUPU [1]

Abstract

The aging of the population is a real phenomenon and even more so highlighted in the agricultural field. The statistics highlight the fact that there are about 10% more elderly Romanian farmers than the European average. The causes of this fact lie in the aging population, the departure of young people abroad, difficulties in attracting young people to agricultural education. The need for technologicalization in agriculture also requires young entrepreneurs who are able to learn and apply such innovative technologies. The measures provided by European funds to attract young farmers are proving insufficient to ensure the renewal of generations in agriculture and to achieve sustainable development. Governments are trying to apply strategies and policies, some implemented according to the requirements of the European Union, which aim to attract the NEET category in the agricultural sector, coherent measures in the high school, vocational and dual education system to attract young people to vocational training with agriculture and entrepreneurship. The paper analyzes quantitatively and qualitatively statistical data on enrollment figures, accessing non-reimbursable funding provided by the National Rural Development Program to young farmers, various measures under the Common Agricultural Policy, other legislative initiatives. There is a better correlation of the educational offer for all levels with the real requirements of the agricultural field and the adoption of concrete measures to facilitate the transition from subsistence to efficient and attractive agriculture for young generations, allowing a renewal in this sector so important for the Romanian economy.

Keywords: farmer, young, agricultural education, financing, NRDP

JEL classification: I25, J58

INTRODUCTION

The preponderance of subsistence agriculture, a major differentiation between urban and rural in terms of life chances (quality of life, opportunities) and a massive concentration of poverty in rural areas, raises the issue of taking urgent measures to stop these trends. (Hatos, 2019)

The European Union raises the issue of attracting the younger generation to agriculture, mainly from the perspective of population aging. In Romania, the problem is marked by at least three difficulties: the aging of the population, the overwhelming migration of young people and the difficulty of attracting young people with professional training to the field of agriculture.

Romania is among the Member States with a relatively small share of young farmers, along with Italy, Belgium, Great Britain, etc., being considered among the countries where the problem of aging has an impact all the stronger as the number of agricultural holdings small sizes, which are the most numerous, are coordinated by older farmers. Depending on the age structure and the total agricultural land, it is pointed out that the aging problem is the most acute in countries such as Portugal, Italy and Romania. (Popovici & Călin, 2019)

This study refers to a series of information provided by the National Program for Rural Development (NRDP), Eurostat, studies conducted by the Consortium of organizations that include the World Vision Romania Foundation, Junior Achievement Romania, Civitas Foundation for Civil Society and the Romanian Centre of European Policies. Through the "Growing through Agricultural Education" Program, the consortium puts at the same table the agricultural education with the new technologies and the business environment, in order to support the performance of high school teachers and managers.

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MATERIALS AND METHODS

Taking into account the objectives of this study, our exploratory initiative was based on a mix of quantitative and qualitative research procedures in order to obtain relevant and valid information about the measures taken by the competent authorities to support young farmers, agricultural education and young people who are not yet included in employment, but do not follow any form of vocational training.The data are provided by Eurostat ,the Ministry of Education and the Ministry of Agriculture and Rural Development.

RESULTS AND DISCUSSIONS

In Romania, a large part of the active population is involved in agriculture, which is indisputably correlated with the large number of agricultural holdings. Many of these households are subsistence, have low productivity, require a lot of physical work, but with few specialized skills. The agricultural sector highlights an acute labor crisis, an accentuated aging of farmers and a low rate of those who have received an education in this field. Although many people work in agriculture, the demand for initial and continuing training is quite small.

An opportunity in this regard is also the allocation of European funds accessible with the help of the National Program for Rural Development (PNDR). Sub-measure 6.1 Support for setting up young farmers gives them a chance to establish themselves as heads of an agricultural holding. Increasing the number of young farmers to join and participate in food chains, to become competitive, to establish themselves in rural areas is one of the real measures that contribute to the much needed generational renewal in agriculture (AFIR data).

Another measure concluded in 2019 was sub-measure 1.1. Support for vocational training and the acquisition of skills, which aimed at improving the specific technical and economic knowledge for the practice and management of agricultural and agri-food activities of farmers, as well as the general management of the farm. The two sub-measures mentioned are closely linked and are seen as a unitary whole, aiming for young farmers who benefit from support under sub-measure 6.1, farmers who work on small farms and who benefit from support under sub-measure 6.3, to implement agricultural techniques and technologies, including research results (AFIR data).

Table 1 exemplifies a number of sub-measures that have been implemented, as well as the absorption rate of these initiatives. As expected, the highest absorption of 92.80% had the professional training of young farmers, a measure concluded in 2019. It follows at a short distance the one on the installation of small farmers with a percentage of 90.80%, and the measure on the development of small farms registers by 12.39% less than the previous measure. Measure 6.1 is also allocated to support the installation of young farmers - NextGenerationEU (EURI), amounting to 100,000,000 which aims to continue the effort of generational renewal in the agricultural sector.

Table 1. The stage of implementation National Programs for Rural Development (NPRD), July 2021

Submeasure	NPRD financial allocation 2014-2020	Value of funding applications submitted	Value of ongoing and completed contracts	Value of completed financing contracts	Payments made	%
1.1 "Support for vocational training and skills acquisition"	5,910,092	37,704,742	6,664,023	6,589,605	5,485,009	92,80
6.1 "Support for the installation of young farmers"	466,724,186	622,600,000	433,990,000	396,570,000	423,786,798	90.80
6.1 "Support for the installation of young farmers"- ITI Delta Dunării	10,000,000	9,510,000	8,180,000	8,020,000	8,132,444	81,32
6.3 "Support for the development of small farms	241,590,566	309,240,000	34,984,500	34,983,000	189,448,841	78,41

Submeasure	NPRD financial allocation 2014-2020	Value of funding applications submitted	Value of ongoing and completed contracts	Value of completed financing contracts	Payments made	%
6.3 "Support for the development of small farms" - ITI Delta Dunării	5,000,000	3,405,000	2,801,250	2,250,000	2,653,000	53,06

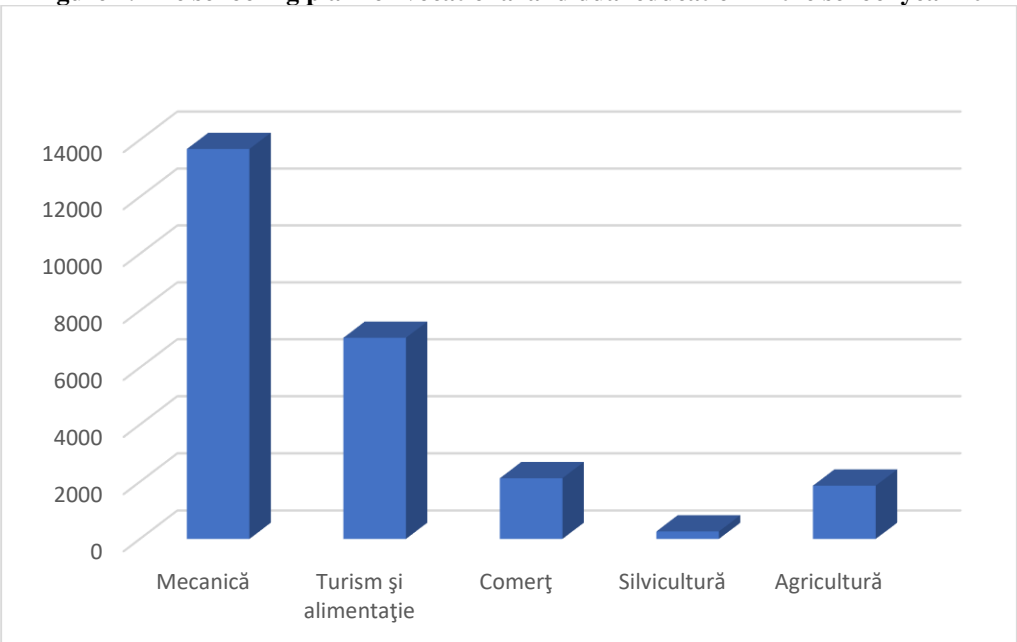
Source: The stage of implementation of National Programs for Rural Development 2014-2020, July 2021, https://www.madr.ro/pndr-2014-2020/implementare-pndr-2014-2020/situatia-proiectelor-depuse-2014-2020.html?start=10 , Accessed on September 28, 2021

European funds for young farmers, among the few forms of support for them in Romania, are not enough to ensure the exchange of generations. Young people from rural areas in other European countries turn to agriculture earlier, from lower classes, mostly through forms of vocational and technical agricultural education in real business and farms (Toderiță et al., 2017).

Vocational and high school education with an agricultural profile have a low demand compared to the rest of the profiles. In general, agricultural-specific qualifications are aimed at eighth-grade graduates with a low level of knowledge, who often choose this profile due to their proximity to home, have low school performance and a fairly high dropout rate.

The initiative of the Ministry of Agriculture to finance high schools with an agricultural profile is welcome. These high schools are under double subordination to both the Ministry of Education and the Ministry of Agriculture. But, this is not enough. There is a trend in terms of cutting the number of classes among agricultural and technological high schools in favor of the theoretical ones. This does not help the achievement of the strategic objective assumed by Romania within the Strategy of vocational education and training in the period 2016-2020 regarding the achievement of the level of 60% for vocational and technical education out of the total number of high school students. Figure 1 shows the number of places in the schooling plan for the school year 2021-2022 for different basic areas. The weiht of the places occupied at the end of the admission stages for the year 2021-2022 is 82.6% for tourism and food, 79% for mechanics, 69.9% for trade, 57.4% for agriculture and 50.8% for civil engineering.

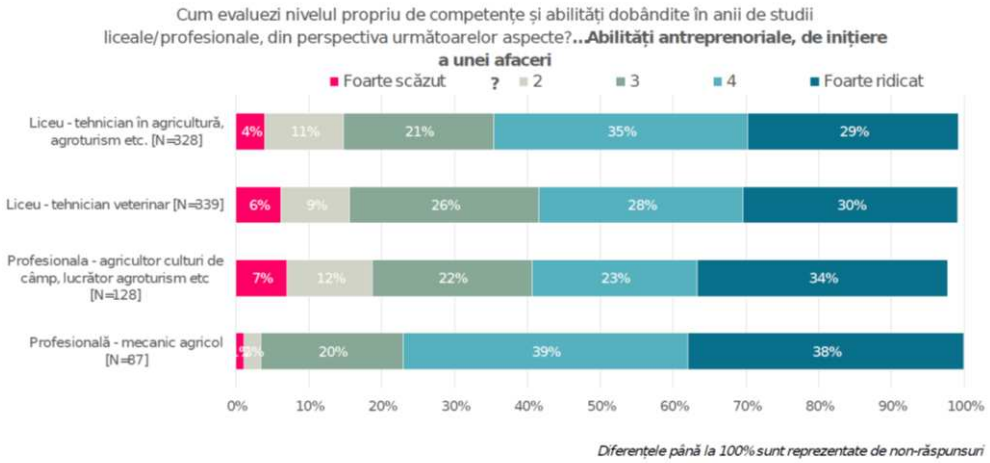
Figure 1. The schooling plan for vocational and dual education in the school year 2021 -2022



Source: data processed after https://www.alegetidrumul.ro/, accessed September 20, 2021

A number of bodies have been active in conducting research on agricultural education, the intention of young people to continue their studies in this sector, and in the development of entrepreneurship in agriculture. In this sense, it is necessary to take into account the report made by the Romanian Centre for European Policies within the program "We grow through Agricultural Education" which addresses the 57 high schools with agricultural profile in the country.[1]

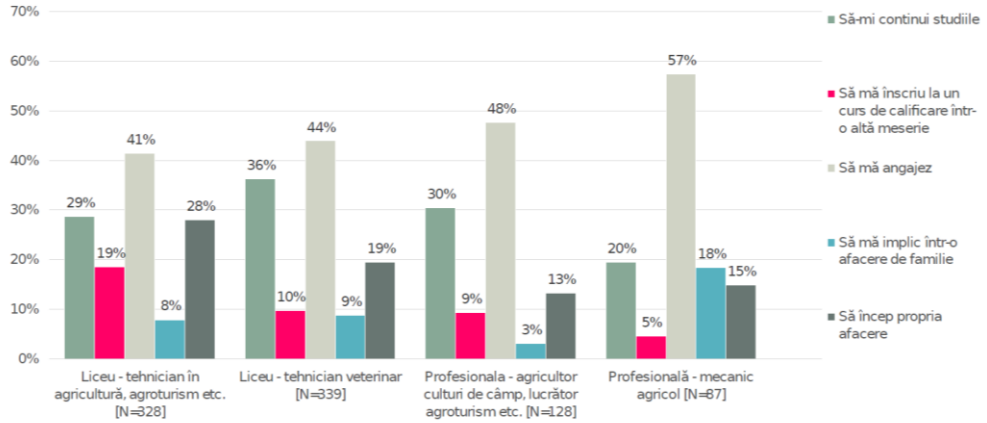
Figure 2. Self-assessment of entrepreneurial skills acquired according to the qualification obtained at the end of studies by students in high schools with an agricultural profile



Source: Romanian Centre for European Policies, Study on the motivations, experiences and intentions of students in the final years of high schools and vocational schools with a predominantly agricultural profile, 2021, p. 32

Regarding the self-assessment on entrepreneurial skills, there is an overestimation of them, partly due to participation in entrepreneurship education classes, and on the other hand to insufficient interaction with entrepreneurs in the agricultural field. The perceived usefulness of participating in entrepreneurship education activities is relatively high, and a number of students would have appreciated that these courses have taken place in recent years of study, so as to better understand what these classes entail and what would be their further practical usefulness (CRPE, 2021).

Figure 3. The future plans of the students from the high schools with agricultural profile depending on the qualification



Source: Romanian Centre for European Policies, Study on the motivations, experiences and intentions of students in the final years of high schools and vocational schools with a predominantly agricultural profile, 2021, p. 58

[1]For more information https://educatieagricola.ro/despre-program-consortiu/, accessed September 27, 2021;

From figure 3 it can be seen that the students'future plans vary depending on the qualification where they are educated. The students from the veterinary technician specialization want to continue their studies, and the ones from the agricultural mechanic want to get hired.

A special situation have young people who are not employed or actively looking for employment, are not enrolled in a form of education or training, it is the so-called NEET category (Not in Education, Employment or Training). These people are mostly active young people, who find occasional work or low-paid jobs. This situation is also due to poor schooling, with insufficient or inappropriate qualifications, the economic, geographical or cultural causes contributing to the deepening of this precarious situation. As it can be seen in Table 2, young people in Romania are above the European average by about 3%. Overall, in the last 10 years there has been a decreasing trend of about 3-4%.

Table 2. Young people neither in employment nor in education and vocational training according to sex, age and professional status(% NEET), 15-19 years

An	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
UE 27	16,6	16,8	17,3	17,5	17	16,6	16	15,1	14,4	14	14
România	19,2	20	20,1	20,5	20	21,1	20,8	18,7	18	17,3	17,5

Source: Eurostat

Given that the vast majority (90.7%) of young people in the EU between the ages of 15 and 19 have continued to participate in some form of education and training (formal or non-formal), the following analysis focuses in particular on the population aged 20 to 34.

The current situation of young people is complicated because there are new models of transition from the educational to the lucrative area. Until a few years ago, young people integrated into the labor market only when they finished the last year of high school or college, and less often were employed. There is a lack of predictability now, because young people change jobs very often and look for the jobs that best suit their ideals and expectations.

Young people attending university courses are employed on a part-time or fixed-term basis, and some of the young employees undergo other training and qualification programs. In 2019, approximately 11.1% of young people aged 15 to 19 in the EU used this more flexible transition from education to employment, a share that rose to 18.7% among people aged 20 and 24, - 14.3% among those aged between 25 and 29 and 10.6% for those aged 30-34 [6]. As shown in Table 3, it can be seen that Romania is below the European average in the participation of young people in education and training, the difference being about 12%.

Table 3. Rate of participation of young people in education and training by sex, age and employment status (including NEET rates) 15-34 years

	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
UE 27	39,2	39,6	40	41,5	41,6	41,6	41,7	42	42,3	42,6	41,7
România	30,8	31	30,6	31	30	27,8	29,4	29,8	29,9	30,2	30,2
UE NEET	60,8	60,4	60	58,5	58,4	58,3	58,2	57,9	57,6	57,4	56,6
România NEET	69,2	69	69,4	69	70	72,2	70,6	70,2	70,1	69,8	69,9

Source: Eurostat, https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=edat_lfse_18&lang=en, accessed 27 September 2021

This situation of young people who are not integrated on the labor market in any way, not even through a form of professional training, is closely related to the acute unemployment, but also to the rural environment from which they come and where they do not find work. It is important in this sense, the difference of mentality, economic and social development, of different employment opportunities between rural and urban areas.

CONCLUSIONS

In a few years, we already anticipate a crisis in the agricultural labor force due to declining birth rates, internal and external migration from rural to urban areas in search of employment opportunities and to ensure a better life.

Increased aging of farmers and subsistence agriculture has led state institutions to implement a series of measures to attract national and European funds to counter this. The fact that the percentages of more than 70% for the absorption of European funds for sub-measures 1.1 "Support for vocational training and skills acquisition", 6.1 "Support for the installation of young farmers", 6.3 "Support for the development of small farms" shows the efforts of governments to encourage the development of work in rural areas, but also the growing interest in these aspects of people from this environment.

The double subordination of high school education institutions to the Ministry of Education and the Ministry of Agriculture proves to be auspicious, because there are investments of several million lei to improve the material base, professional training of these units.

Forms of vocational training in the agricultural sector at high school, vocational and dual level are beginning to gain ground over other qualifications, but this is also possible with the support of a number of private institutions, which through a series of well-thought-out initiatives have made a constructive advertisement for agricultural profiles. It is noted that 8th grade graduates are poorly informed about agricultural profiles, and their explanation could help increase the number of students who will continue their studies at high school, vocational or university level.

From national research, about 45% of high school graduates want to get hired. This category is followed by those who want to continue their studies (31%) and those who want to start their own business (21%). To the latter can be added those who plan to get involved in a family business (9%). About 1 in 8 students would like to enroll in qualification courses to learn another trade. Many students appreciate positively the study conditions offered by the agricultural high schools where they studied, the usefulness of the notions learned, the internships, the interaction with the business and entrepreneurial environment in agriculture (CRPE, 2021).

Many people in rural areas live in communities that fall into the category of the poorest. The generation shift in the agricultural sector is becoming more acute, with the need for well-trained farmers to take over their farms from their parents and truly ensure the sustainable development of agriculture. In these communities we find that people who fall into the NEET category is over 80%. The need to introduce accessible training courses for these categories is urgent. Attracting these young people to the agricultural sector through a series of financial and fiscal facilities, as well as a free qualification for an agricultural profile, would lead to a reduction of the labor crisis, and at the same time could ensure a reduction of the economic gap between the rural and urban environment as well as ensuring sustainable development in rural areas.

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STUDY ON THE IMPACT OF THE COVID-19 PANDEMIC ON THE NATIONAL UNEMPLOYMENT RATE

DIANA CREȚU [1]

Abstract

In this article I set out to present the situation in terms of unemployment rate, the number of registered unemployed but also the share of unemployed nationwide in the period 2020-2021. Due to the Covid-19 pandemic, the unemployment rate has increased considerably. The provisions of the military ordinances on stopping the new virus have caused many companies to partially or even completely cease their activity, many people being left without a job, they being helped by the state with a technical unemployment benefit, which led to the highest unemployment rate in the last two years, resulting in a deficient economy. The research method used in the study undertaken is the statistical processing and economic analysis of existing data for the period 2020-2021 on specialized sites such as the National Institute of Statistics, Ministry of Labor and Social Protection, Eurostat, FAO, Ministry of Agriculture and Rural Development but also other specialized materials.

Keywords: unemployment rate, pandemic, unemployed

JEL Classification: C13, J60, J20

INTRODUCTION

The crisis caused by coronavirus has been and still is a threat to the economy and the living standards of its citizens. During this health crisis, many employees lost their jobs, so the unemployment rate rose considerably. The pandemic risks leading to the emergence of a blocked generation of young people with too few employment prospects. and the latest figures show that young people face major obstacles, which prevent them from continuing their training and education, trying more jobs or entering the labor market. In this article we will see which ones are more accurate. the effects of the COVID-19 pandemic on the labor market from the latest statistics.

MATHERIAL AND METHOD

The research method used in the study is statistical processing and economic analysis of data. The research was conducted on the basis of statistical data provided by INS, Ministry of Labor and Social Protection, MADR, but also books, magazines, scientific papers on the Romanian labor force (unemployment rate, number of registered unemployed and the share of unemployed).

RESULTS AND DISCUSSION

Table 1. Monthly unemployment rate by gender

Period	Mar 2020	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020
Total	2.9	2.9	2.9	3	3.2	3.3	3.3	3.3	3.3	3.4
Male	2.9	2.8	2.8	2.9	3.1	3.1	3.1	3.1	3.1	3.2
Female	2.9	3	3	3.1	3.5	3.5	3.5	3.5	3.5	3.6

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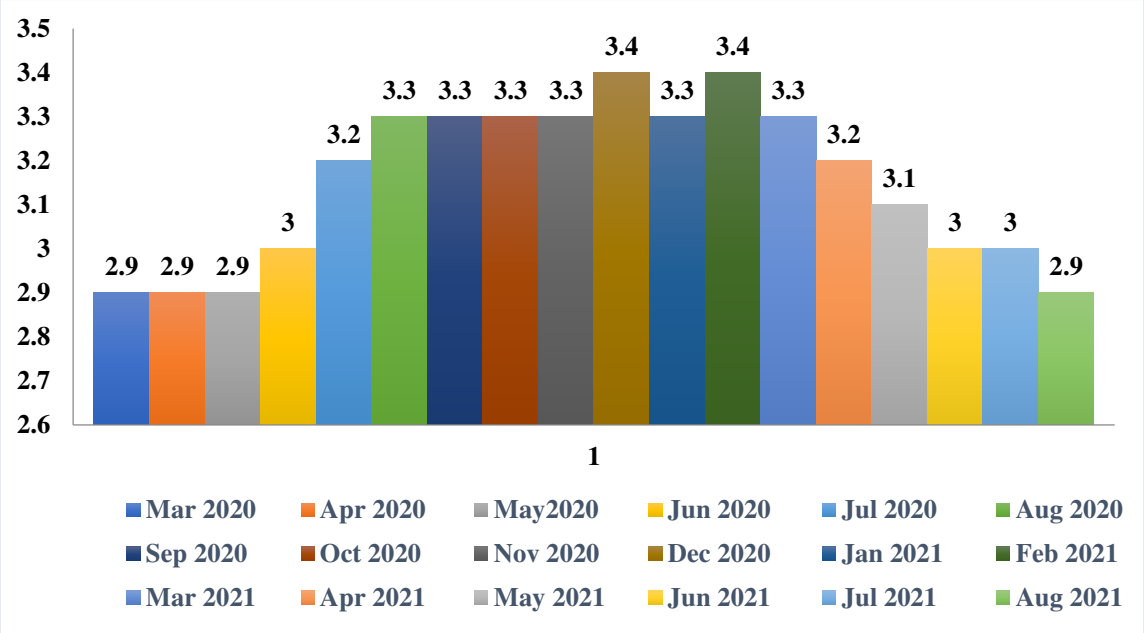
Table 1 Monthly unemployment rate by gender (continued)

Period	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021
Total	3.3	3.4	3.3	3.2	3.1	3	3	2.9
Male	3.2	3.3	3.2	3.1	3	2.9	2.9	2.9
Female	3.5	3.5	3.5	3.3	3.2	3.1	3	3

Source: INSSE

Table number 1 according to the National Institute of Statistics shows the unemployment rate (ratio between the number of unemployed and the active civilian population) in March 2020 (beginning of the pandemic) until August 2021 by gender and total.

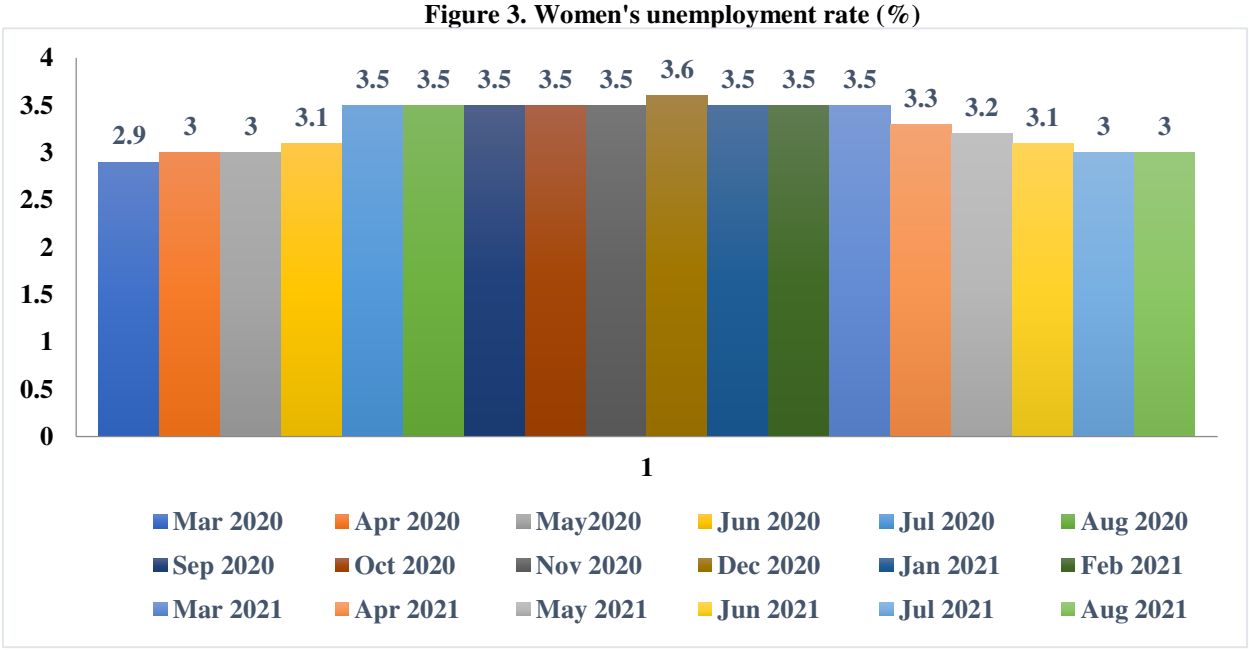
Figure 1. Unemployment rate in total (%)



Analyzing the total unemployment rate, we notice that the highest value was registered in December and February with 3.4% and the lowest at the beginning of the pandemic period (March, April May) with a percentage of 2.9% and the average being 3, 15%.

Figure 2. Male unemployment rate (%)

Figure 3. Women's unemployment rate (%)



Source: INSSE data processing

Analyzing the two genders (graph 2 and 3) we see that the highest unemployment rate is given by women with an average of 3.28% and men recorded an average of 3.03%.

Table 2. Number of registered unemployed

Period	2020									
	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Total	250882	251944	249635	260667	283939	286662	285294	285731	290676	296051
Male	135218	132833	131145	135760	145579	146227	145465	145567	149130	154250
Female	115664	119111	118490	124907	138360	140435	139829	140164	141546	141801

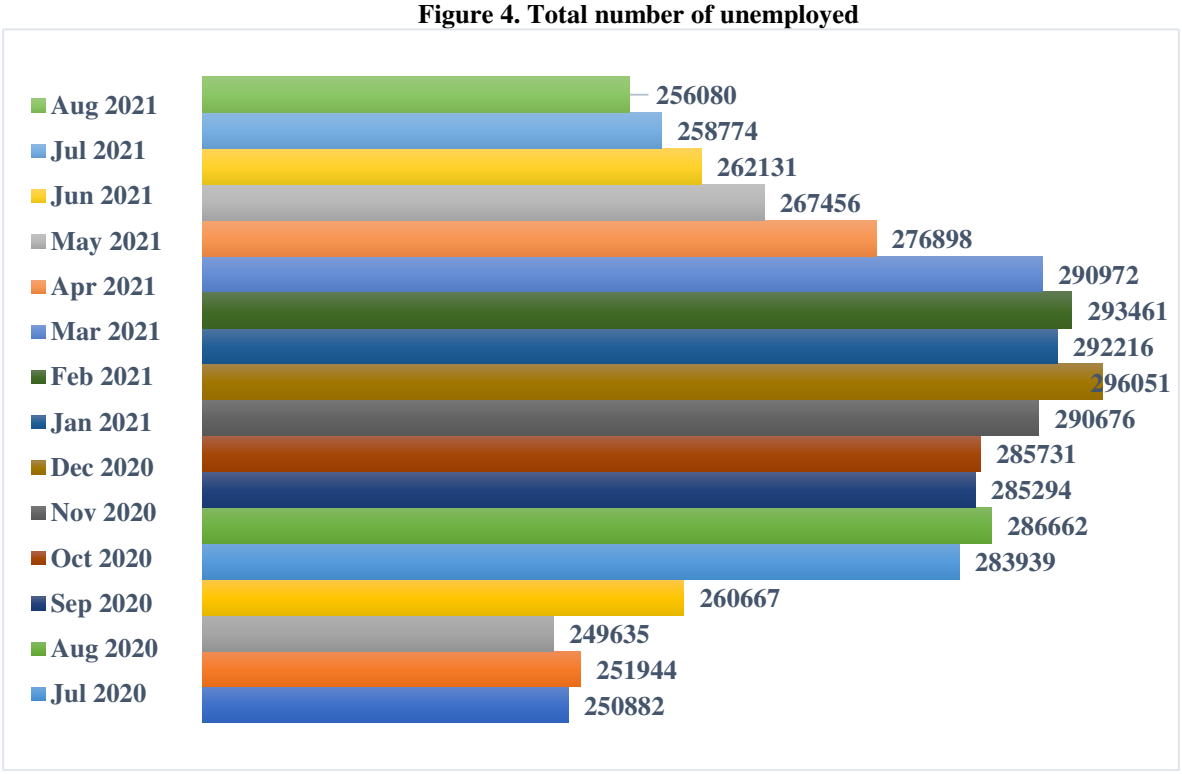
Table 2. Number of registered unemployed (continued)

Period	2021							
	I	II	III	IV	V	VI	VII	VIII
Total	292216	293461	290972	276898	267456	262131	258774	256080
Male	153446	154828	153370	145983	141394	138998	137590	136676
Female	138770	138633	137602	130915	126062	123133	121184	119404

Source: INSSE

Table number 2 shows the number of registered unemployed from March 2020 to August 2021.

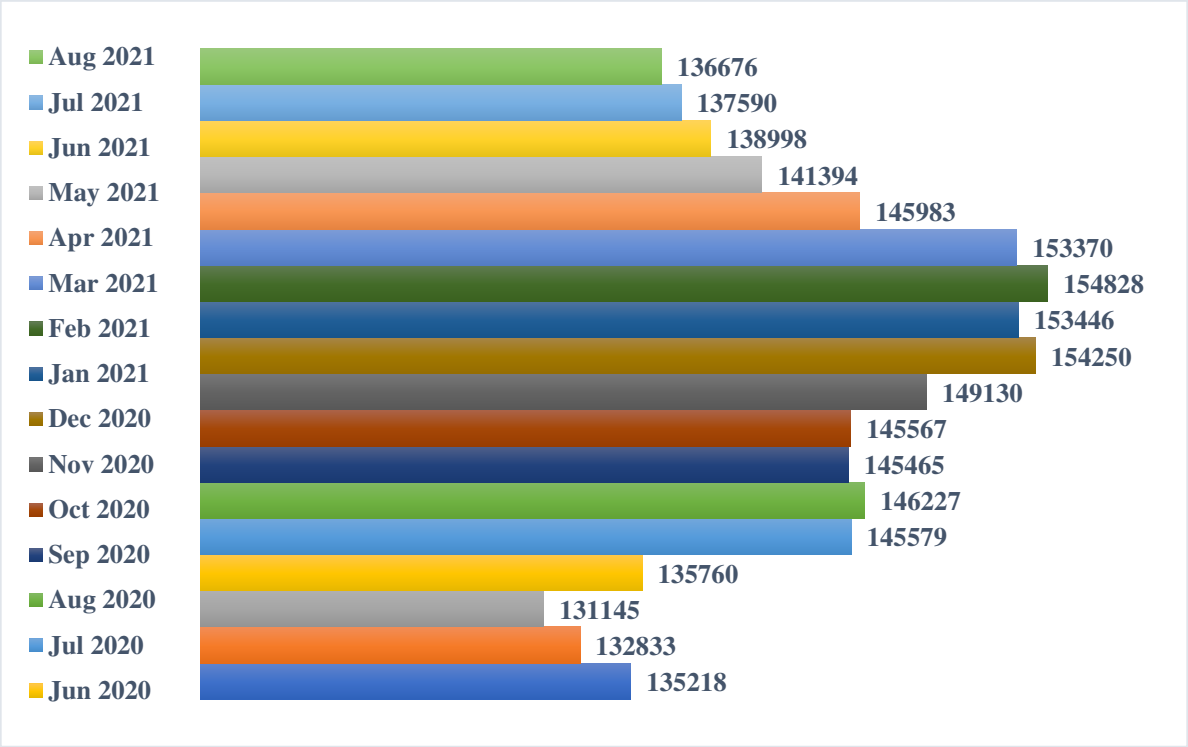
Figure 4. Total number of unemployed



Source: INSSE data processing

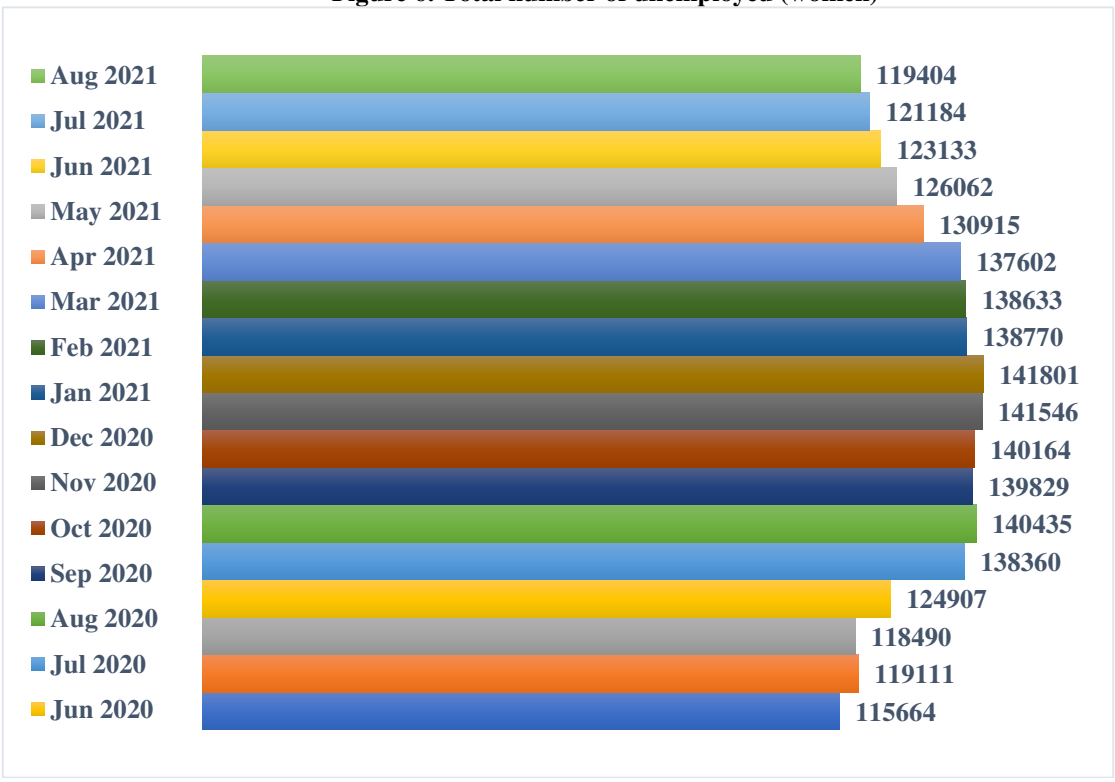
If we refer to the total number of unemployed we have a maximum registered in December 2020 with a value of 296051 people and the lowest value was registered in May of the same year resulting in an average of 274414 people.

Figure 5. Total number of unemployed (men)



The maximum regarding the number of male unemployed was registered in February 2021 with a value of 154828 persons and the minimum was registered in May 2020 with a value of 131145 persons resulting in an average of 143525.5 persons.

Figure 6. Total number of unemployed (women)



Regarding the female sex, the total unemployment rate reached the maximum in December 2020 with a value of 141801 people and a minimum of 115664 people in March 2020, resulting in an average of 130889.44 people.

Table 3 Share of the unemployed by sex (%)

Period	Mar 2020	Apr 2020	May2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020
Total	1.8	1.8	1.8	1.9	2	2.1	2.1	2.1	2.1	2.1
Male	1.9	1.9	1.9	1.9	2.1	2.1	2.1	2.1	2.1	2.2
Female	1.7	1.7	1.7	1.8	2	2	2	2	2.1	2.1

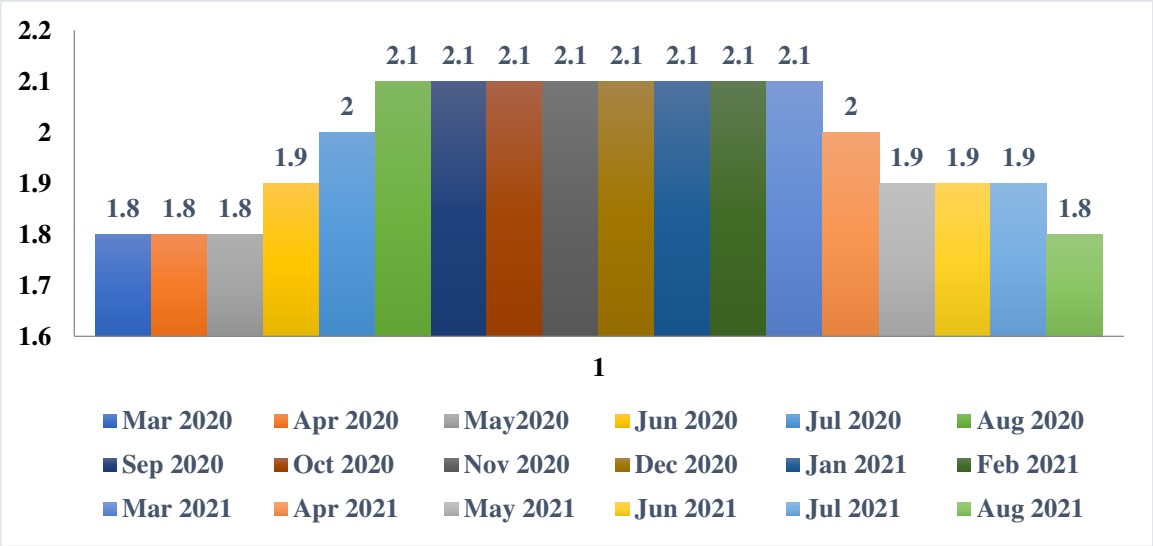
Table 3 Share of the unemployed by sex (%) (continued)

Period	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021
Total	2.1	2.1	2.1	2	1.9	1.9	1.9	1.8
Male	2.2	2.2	2.2	2.1	2	2	2	2
Female	2	2	2	1.9	1.8	1.8	1.8	1.7

Source: INSSE

Table 3 shows the share of the unemployed by total / gender between March 2020 (beginning of the pandemic year) and August 2021.

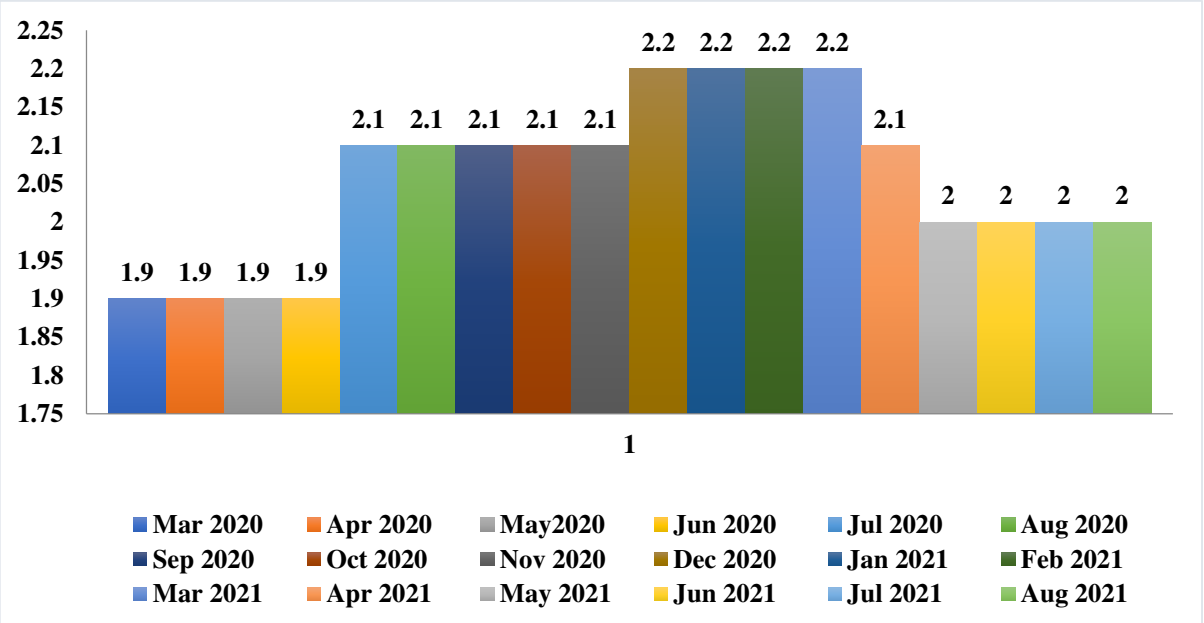
Figure 7. Share of unemployed in total labor resources (%)



Source: INSSE data processing

The maximum reached regarding the share of the total unemployed was 2.1% in the period August 2020-March 2021 and the minimum of 1.8% in the first 3 months of the analyzed period and the last month. The average reaching the value of 1.97%.

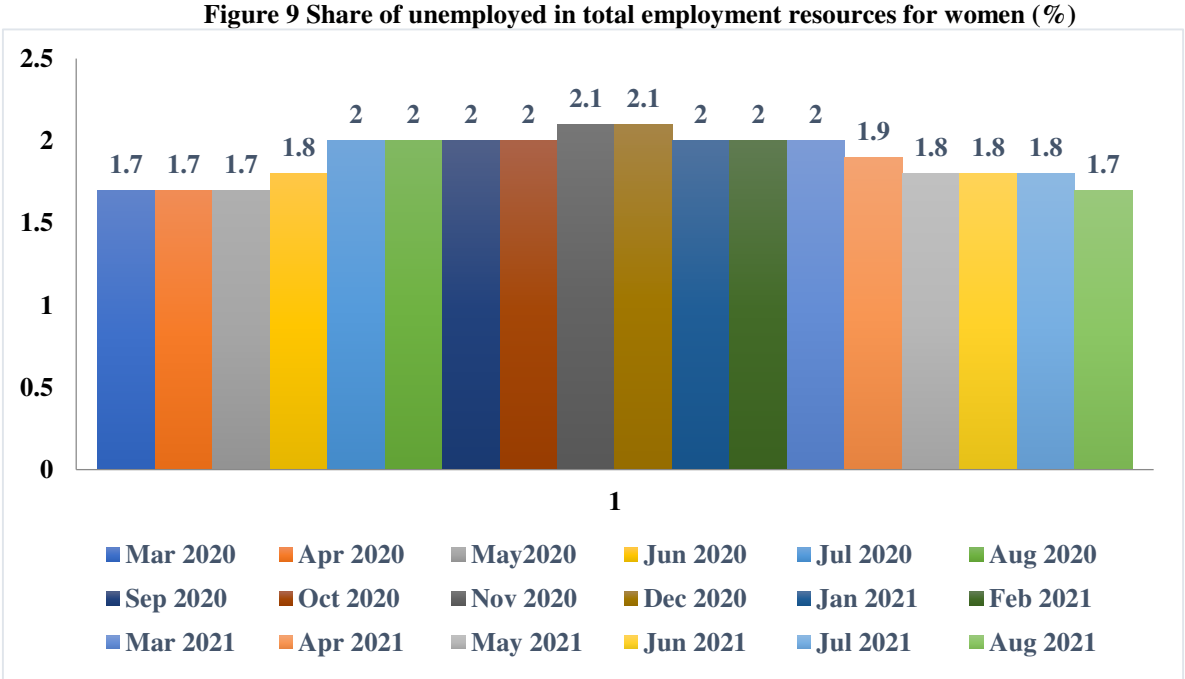
Figure 8. Share of unemployed in total labor resources for men (%)



Source: INSSE data processing

The share of male unemployed reached a maximum of 2.2% in December 2020-March 2021 and a minimum of 1.9% in the first four months of the analyzed period. Their average reached a value of 2.05%.

Figure 9 Share of unemployed in total employment resources for women (%)



Source: INSSE data processing

The share of the unemployed for females reached a maximum of 2.1% in November and December 2020 and a minimum of 1.7% in the first three months of the analyzed period, averaging 1.89%.

CONCLUSIONS

Due to the Covid-19 pandemic, the labor force was severely affected, as we can see in the statistical data presented above.

Regarding the number of unemployed per total / country at the beginning of the pandemic, a total of 249635 people was registered and in December the figure reached 296051 people.

From the whole analyzed period resulting an average of 274414.94 people. In the same period analyzed, the average number of unemployed men was 143525.5 and the average number of women was 130889.44.

If we refer to the unemployment rate per total / country we have a maximum of 3.4% in December 2020 and February 2021 and a minimum of 2.9% recorded at the beginning of the pandemic and at the end of the analyzed period (August).

The unemployment rate (men) registered a maximum of 3.3% in February of 2021 and the minimum reached a value of 2.8% in April and May of 2020. The average of the analyzed period of the unemployment rate in the category of men of was 3.03%.

The maximum registered for the unemployment rate (women) was 3.6% in December 2020 and the minimum registered a percentage of 2.9% in the first month of the analyzed period. The average calculated unemployment rate is 3.28%.

The share of unemployment in the total country reached a maximum of 2.1% between August 2020 and March 2021 and the minimum was 1.8% at the beginning of the pandemic. The average share of unemployment in the analyzed period was 1.97%.

The share of unemployment among males had a maximum of 2.2% in January-March 2021 and a minimum of 1.9% in the first 4 months of the pandemic. The average share of unemployment in men during the period is 2.05%.

According to the INS, the share of female unemployment in the analyzed period registered a maximum of 2.1% in November-December 2020 and the minimum had a value of 1.7%. The average share of unemployment in the analyzed period was 1.89% .

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THE RURAL DIGITAL DIVIDE - RECOMMENDATIONS FROM A SCOPING REVIEW

ANCA-MARINA IZVORANU [1]

Abstract

The digital divide can be determined by the gap between those people who are literate and have access to various information resources (such as the Internet) and those who do not have access to them.The COVID-19 pandemic highlighted the digital vulnerability of many rural citizens. Through this article, the author wants to identify and analyze the proposals in the literature to bridge the digital divide in the rural world. The global and national countryside, faced with a serious division, but with a great possibility of growth, must benefit from policies designed to increase access to the Internet and information.Online databases were used to identify scientific articles from which, after screening, certain key documents were selected. The results update the systematic analysis of articles published in the last five years on digital and rural development and also intend to provide various recommendations. A variety of political, social, educational, technical and economic issues were exposed, with an emphasis on rural populations. The conclusions consist of proposals that can be considered to bridge the rural digital divide.

Keywords: digital division, rural, systematic review

JEL classification: O18, P25

INTRODUCTION

Towards a digital society

The inevitable tendency to connect our daily lives with a multitude of digital technologies has started the development of information and knowledge gaps among the population in rural and urban areas (Selwyn, N., 2003). Increasing digitalization can be a factor in combating social exclusion, poverty and inequality in rural areas. In a society in a continuous digital and technical transformation, it is important to follow the direction of this development, so as not to accentuate the social gaps even more.

The Lisbon Strategy, set up at the European Council meeting in March 2000, was a starting point for the development of information and communication technologies (ICT), as only through it could the goals set for 2010 and „the EU to become the most dynamic and competitive knowledge-based economy in the world, capable of ensuring sustainable growth and development, as well as the best possible level and quality of employment, while ensuring social cohesion" (European Parliament, 2000). This information society project was based on the dissemination and use of information through ICT, advancing wider access to knowledge, in order to promote new ways and opportunities to take part in social life, increasing potential jobs, better and more, and the development of conditions for better prosperity and social cohesion (European Council, 2000).

Digital division and digital inclusion

The digital divide can be explained as the difference between individuals, regions and states in access to and use of information and communication technologies (Pejic, M., 2013). It consists of a difference in approach to technological tools and services, such as the Internet and devices, which generates some inequality of opportunity in meeting daily needs and improving living conditions. The concept of digital divide has gained momentum since 1995, when it was used in the US Department of Commerce's Falling through the Net report to express inequalities in access to information and communication technologies (Yu, L., 2011).

In its early forms of study, the digital divide has been closely linked to access to technology and the skills of using technology (Riggins, 2005). Subsequently, studies have shown interest in the skills of using technology - but at a more complex level, in the fields of education and trade. On the

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other hand, the concept of digital and social inclusion has been linked to the measures taken by a state government to spread the use of technology among the population (especially for those who do not yet enjoy this good or technology) (Spante, M., 2018). Social inclusion does not refer strictly to the connection of individuals, but to the use of technologies and factors that influence them.

MATERIALS AND METHODS

Identifying the Research Questions

Restricting mobility caused by the Covid-19 pandemic, together with accelerating the process of digitization of society will force citizens to actively participate in the intensive, continuous and even exclusive use of information and communication technologies (ICT). In the same direction, public authorities need to contribute to the development of various policies that minimize digital differences of any kind, including those of territorial origin, especially in rural areas. Such an approach will help reduce the inequality of citizens and territories in their participation in the information society.

The digital divide remains a global research topic, especially in rural or vulnerable areas. Thus, the analysis of the specialized studies that were elaborated regarding the rural digital division was the method used, being a research problem with a remarkable scientific and social relevance, considering, in particular, the current pandemic. (Mack, E., 2019).

The Covid-19 pandemic was a time of reporting in the scientific literature, focusing on equally important issues in social development, such as the availability of infrastructure for generating growth or dependencies between the subjects of the pandemic, the food system and the of the circular economy (Giudice, F., 2020).

The purpose of this research is to provide an overview of the recommendations made in the scientific literature in the five-year period 2017-2021 in order to bridge the digital divide in the European rural world, conducting a review of the purpose. From the selected documents, it is desired to clarify three research questions:

Q1: Which sectors does the literature propose in the action of overcoming the digital divide in rural areas?

Q2: What recommendations have been invoked in the literature?

Q3: Are there any proposals in the literature that may be applicable to the current situation?

The defined time frame is within the period of 2 years before the onset of the Covid-19 pandemic and 2 years after its onset, respectively the present time - October 2021.

From a relevant scientific perspective, the purpose review will allow to verify whether the research on the digital divide in the rural world has influenced the study of particular situations.

Identifying Relevant Studies

Four electronic databases, including Science Direct, Scopus, Web of Science, were used to identify relevant studies in this specific field of research. The keywords that guided the search could be classified into two groups, namely: (1) 'rural' and synonyms; (2) 'digital divide' and 'digital inclusion' and synonyms. Boolean connectors (AND / OR) were used to combine keywords and connect different groups. Although the subject of the digital divide is widespread among existing studies, its link to the subject of rural areas has only been recognized in recent years. Thus, as mentioned above, this purpose review limited its search to articles published in journals between 1 January 2017 and 1 October 2021, with the main focus on the use of ICTs among the rural population, with perspectives from the digital divide and inclusion. digital. The analysis identified the summaries of the articles in the mentioned databases - if they contained the search terms in titles, abstracts and keywords.

Study Selection. Inclusion and exclusion criteria.

For the selection of studies, criteria for inclusion and exclusion of specialized studies were submitted. First of all, all the studies from the aforementioned search were imported into EndNote and the multiplied articles and results such as: book reviews, editorials, comments were removed. Subsequently, the titles and abstracts were read to decide whether the articles meet the inclusion and exclusion criteria, as well as the purpose of this review. The review of the studies included articles written in English and published in full-text journals in electronic databases. The articles should be based on empirical studies, with a main focus on the digital divide and digital inclusion among rural individuals.

The language of the study was limited to English - due to the extra time that would be required to include articles in all possible languages. This review excludes book chapters, book reviews, reviews, and perspective. The review also excluded articles published by unrated sources. Articles that were not based on empirical studies were also excluded. Articles were removed if they were not related to the key concepts of the review or if the article was a systematic review or meta-analysis.

Table 1. Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Research papers published in academic journals or in proceedings of scientific conferences	Chapters edited in collective books
Published in the period of 2017–2021	Reviews
Written in English	Comments

Source: Author

Figureing the Data

The relevant data from each study were organized and abstracted to answer the research questions, as follows:

1. Characteristics of the study: names of authors, year of publication and location of the study.
2. Methods: methodology, study design and participants.
3. Factors: identified digital inclusion or digital gap in the study.
4. Outcome: Empirical findings and conclusion of the study related to the aims of this review.

Collating, Summarizing and Reporting the Results

With the data in the form of diagrams, a thematic analysis was then performed to sort and compare the articles, which helped to identify research gaps in the existing literature (Aronson, J., 1994).

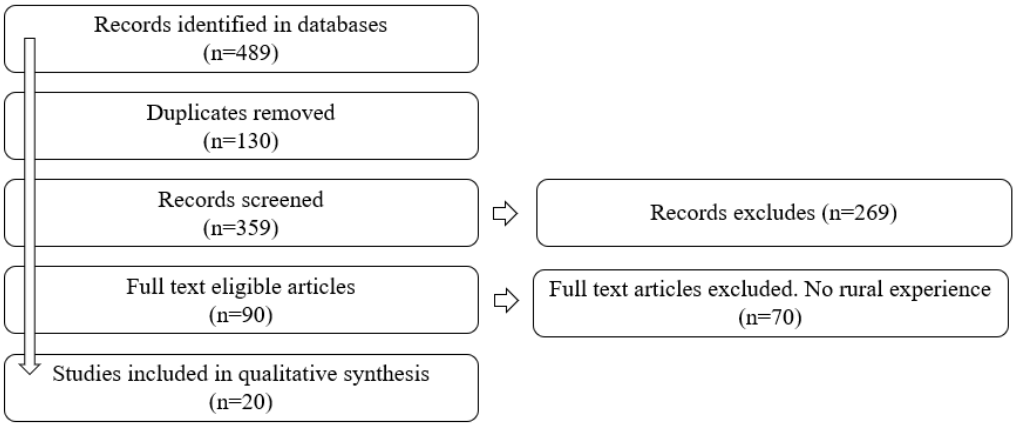
RESULTS AND RECOMMENDATIONS

On October 1, 2021, an exhaustive search was performed on the following reference bibliographic databases: Scopus, Web of Science, Science Direct. In order to build the optimal search equation, terms related to the digital divide, social inclusion and the rural world in English were searched and combined. The search for "digital divide" in title, abstract and keywords led to 489 documents: Web of Science (n = 125); Science Direct (n = 234); Scopus (n = 130). This high figure is an indicator of the existence of extensive terminological standardization. Then, in the results, articles written in English were searched to allow searching in databases in (Scopus, Web of Science, Science Direct). Subsequently, in the results obtained, the word "rural" was searched.

The results of the analysis of the specialized studies were exported to the EndNote reference management software: 130 duplicate elements were removed, leaving the sample at 359 references. An examination of the title and abstract studies was performed for selection. Two hundred and sixty-nine papers were excluded because the full-text papers were not identified in the EndNote program. Subsequently, an assessment of the degree of interest of the remaining 90 studies was performed, eliminating those that did not meet the objective of the study from the perspective of social sciences. As a final result, 20 studies were selected for qualitative synthesis. Figure 1 shows the stages of the

review decision process (identification, selection, eligibility and inclusion) in accordance with the PRISMA standard. (Esteban-Navarro, M.A., 2020)

Figure 1. FlowFigure of inclusion decisions.



Source: The Authors from PRISMA standard.

The 20 empirical studies included used various research methods and methodologies to treat the position of the rural in the digital divide in an era in a continuous digitalization. As shown in Table 2, ten publications used qualitative methods, including focus group interviews. The other ten studies used data analysis.

Table 2. Results of the methodology employed by the included articles

Author & Year	Title	Journal	Country	Methods	Research design
Kenichiro Onitsuka 2019	How social media can foster social innovation in disadvantaged rural communities	Sustainability	Japan	Qualitative	Semi-structured interview
Viviane Brito Nogueira, et al. 2021	Towards an inclusive digital literacy: An experimental intervention study in a rural area of Brazil	Education and Information Technologies	Brazil	Qualitative	Survey and semi-structured interview
Leon Tinashe Gwaka 2018	Digital technologies and youth mobility in rural Zimbabwe	Electronic Journal of Information Systems in Developing Countries	South Africa	Qualitative	Survey and semi-structured interview
V. K. Cik, D. Zagar and K. Grgic 2018	A framework for optimal techno-economic assessment of broadband access solutions and digital inclusion of rural population in global information society	Universal Access in the Information Society	Croatia	Quantitative	General population
R. Gallardo, L. B. Beaulieu and C. Geideman 2021	Digital inclusion and parity: Implications for community development	Community Development	USA	Quantitative	General population
J. F. Gu 2021	Family Conditions and the Accessibility of Online Education: The Digital Divide and Mediating Factors	Sustainability	China	Qualitative	Semi-structured interview
A. Dutta and H. W. Fischer 2021	The local governance of COVID-19: Disease prevention and social security in rural India	World Development	India	Qualitative	Semi-structured interview

Author & Year	Title	Journal	Country	Methods	Research design
H. Barrett and D. C. Rose 2020	Perceptions of the Fourth Agricultural Revolution: What's In, What's Out, and What Consequences are Anticipated?	Sociologia Ruralis	UK	Qualitative	Survey and semi-structured interview
H. R. Marston, R. Genoe, S. Freeman, C. Kulczycki and C. Musselwhite 2019	Older Adults' Perceptions of ICT: Main Findings from the Technology In Later Life (TILL) Study	Healthcare	Canada, UK	Qualitative	Survey and semi-structured interview
H. H. Han, J. Xiong and K. X. Zhao 2021	Digital inclusion in social media marketing adoption: the role of product suitability in the agriculture sector	Information Systems and E-Business Management	China	Qualitative	Survey
M. Dyba, I. Gernego, O. Dyba and A. Oliynyk 2020	Financial support and development of digital rural hubs in Europe	Management Theory and Studies for Rural Business and Infrastructure Development	Europe	Quantitative	Review of scientific articles
B. P. Alant and O. O. Bakare 2021	A case study of the relationship between smallholder farmers' ICT literacy levels and demographic data w.r.t. their use and adoption of ICT for weather forecasting	Heliyon	South Africa	Qualitative	Survey
T. Dlamini and S. Vilakati 2021	Remote and Rural Connectivity: Infrastructure and Resource Sharing Principles	Wireless Communications & Mobile Computing	South Africa	Quantitative	General population
G. Neagu, M. Berigel and V. Lendzhova 2021	How Digital Inclusion Increase Opportunities for Young People: Case of NEETs from Bulgaria, Romania and Turkey	Sustainability	Bulgaria Romania and Turkey	Quantitative	General population
L. Norris 2020	The spatial implications of rural business digitalization: case studies from Wales	Regional Studies Regional Science	UK	Quantitative	General population
J. James 2019	Confronting the scarcity of digital skills Among the poor in developing countries	Development Policy Review	Netherlands	Quantitative	General population
K. Onitsuka, A. Hidayat and W. H. Huang 2018	Challenges for the next level of digital divide in rural Indonesian communities	Electronic Journal of Information Systems in Developing Countries	Indonesia	Qualitative	Survey and semi-structured interview
M. F. Majeed, I. A. Abbasi, S. Ali, E. E. Mustafa, I. Hussain, K. Saeed, et al. 2021	From Digital Divide to Information Availability: A Wi-Fi Based Novel Solution for Information Dissemination	Wireless Communications & Mobile Computing	Pakistan	Quantitative	Collection of data, interpretation of data
C. Ievoli, A. Belliggiano, D.	Information and communication infrastructures and new business models in	European Countryside	Italy	Quantitative	Case studies

Author & Year	Title	Journal	Country	Methods	Research design
Marandola, P. Milone and F. Ventura 2019	rural areas: the case of molise region in Italy				
P. F. Guo, F. F. Zhang, H. Y. Wang and F. Qin 2020	Suitability Evaluation and Layout Optimization of the Spatial Distribution of Rural Residential Areas	Sustainability	China	Quantitative	Collection of data, interpretation of data

Source: Author

The results of the analysis of the literature from the last five years regarding the rural digital divide give the chance to obtain answers to the three questions proposed by the author in this paper. It should be noted, first of all, that the subject of the digital divide is being widely analyzed by researchers around the world, with emphasis on South Africa and China and especially in recent years, especially in the years leading up to the Covid-19 pandemic. Although there is a comprehensive analysis of all dimensions of the digital divide, most of the articles specialize in the technical or social side. In general, social studies focus on issues related to the use and exploitation of the Internet to promote personal and territorial development, rather than on the development of technical skills in ICT. In general, the literature covers all four aspects of the general environment of the rural digital divide: political, economic, social and technological. Moreover, most studies are not limited to explaining and analyzing the situation of a rural community or social group, but also propose specific intervention measures, which made possible the development of three recommendations, summarized in the conclusions section.

The analysis was divided into 3 main levels, as follows: recommendations related to access and connectivity; recommendations related to use of ITC; recommendations related to public policies.

Informations related to access and connectivity

- The study shows that to increase the overall number of users in rural areas and to reduce the existing digital divide, rural users should be encouraged to request broadband technologies and services compatible with their needs. (Cik, 2018)
- The challenge of providing connectivity to remote/rural areas will be one of the pillars for future mobile networks. To address this issue, in this paper, the authors present an infrastructure sharing and resource management mechanism for handling delay-sensitive workloads within a remote/rural site. Numerical results, obtained with real-world energy and traffic load traces, demonstrate that the proposed algorithm achieves mean energy savings of 51%. Also, the energy that can be saved decreases as the number of users connected increases, with a guarantee of serving more users as long the green energy is available (Dlamini, 2021).
- The study findings confirm that a device and internet access divide persists between urban and rural and that rural lags urban in resourcefulness and utilization. On internet use (IUS) specifically, while the difference is statistically significant as well, both urban and rural households used the internet in at least 11 different ways once monthly over the past year (Gallardo, 2020).
- According to the results of the study, among low-income households, the probability of having a personal computer was 1.64 times that of non-subsistence households. The probability of agricultural Hukou households having a computer was only 34.2% of that of non-agricultural Hukou households. In addition, when there was a computer, in low-income households, probability that children of agricultural Hukou households could access adequate resources for online education at home was only 39.5% of that of non-agricultural Hukou households (Gu, 2021).
- Empirical evidence obtained from the study show that DTs (digital technologies) create new opportunities for young people to explore unfamiliar places - e.g., through virtual mobilities (through social technologies) enabling them to save time and costs. Also, findings reveal that while

DTs have desirable affordances, they can also perpetuate social challenges such as inequality (Gwaka, 2018).

- The study has revealed a positive relation between the individual use of ICT facilities (access and effective utilization of high and low digital divide in a society). From the above descriptive analysis, Wi-Fi-BCDs (Wi-Fi-Based Content Distributors is a solar-based system that is used to deliver quality educational contents directly to classroom, library) affect students' motivation. Based on the observations of the respondents, the Wi-Fi-BCD enhances individual experience, develops digital skills to access ICT services, and makes learning fun. Moreover, the Wi-Fi-BCD enhances student interest and motivates them to learn new things (Majeed, 2021).
- The results of this analysis show that the NEET (Not in Education, Employment, or Training) population is a complex one but, especially in rural areas, tends to be often reduced to the issue of youth unemployment. It is very important to consider all of the that cause young people to be vulnerable. NEET analysis in relation to ICT must be studied because this may be one of the most important vulnerabilities that young people face in the digital age. According to the results of the analysis, the digital skill level of young people in the countries included in the social analysis of NEETs in rural areas is very low compared to the EU average but also compared to the urban environment of their own countries. Turkey is characterized by a lower level of digital skills of young rural NEETs compared to Bulgaria and Romania (Neagu, 2021).
- The study revealed the degree to which disadvantaged rural communities have adopted Facebook as an innovation throughout Japan and how the adoption was realized. The authors believe that these findings and implications are useful not only for Japan but also for other countries that are expected to mirror Japan in terms of experiencing serious aging and depopulation in rural areas in the future (Onitsuka, 2019).

Informations related to use of ITC

- The findings arising from this study highlight that agriculture is central to every rural and developing context's socio-economic development and that digital technologies have the opportunity to "revolutionize how rural communities secure and improve their livelihoods". Also, when examining the relation between ICT literacy levels and the demographic variables, significant negative associations were found between the ICT literacy levels and age as well as years of experience, while significant positive associations were found between ICT literacy levels and educational level. This means that the age and years of farming experience are negatively and inversely proportional to their ICT literacy proficiency, whilst their educational level is directly proportional to their ICT literacy proficiency (Alant et al, 2021).
- The study shows that the prioritization of 'big-tech' innovation pathways necessarily excludes other ideas from coming to the fore, including simpler measures such as improving advice provision to farmers, encouraging them to make better use of technology that they already have on the farm (e.g., weighing cattle more regularly, WhatsApp communication), or scaling up farmer-led innovations, including retrofitting (Barrett, 2020).
- The authors show that individual differences, including both age and gender, only play limited moderating roles in determining Chinese farmer's SMM (social media marketing) adoption intention and use. Age only positively moderates the relationship between behavioral intention and use, while all other hypothesized moderating effects are statistically insignificant. It confirms prior literature that older people tend to be more cautious when moving from technology adoption intention to actual usage. Similarly, gender only negatively moderates the relationship between social influence and behavioral intention, while all other hypothesize moderating effects are statistically insignificant. The result, consistent with prior literature, suggests that men are less likely to be affected by external referents than women when forming their technology adoption intention (Han, 2021).

- From the analyses of the case studies of this article, it emerges that the main impact of new technologies regards the organizational innovation reshaping all farm relations. A strong point in organizational innovations is their capability of valorizing farm products and processes, locally specific, and to reproduce in time natural resources from remote rural areas. The ICT-enable innovation, especially organizational, does not lead to a one-size-fits-all solution. The solutions seem to be territorially and human capital sensitive, based on needs and potentials of the respective territory and human capital they are able to mobilize. They should be supported by new or existing public territorial strategies that include the construction of digital infrastructure. (Ievoli, 2019)
- The authors demonstrate that the Digital Literacy Course-which was a research experiment-positively affected students 'scores in the logic assessment (Nogueira, 2020).
- From the results obtained, it should be accepted that there are strong gaps in Internet use even among digital natives in rural areas. We have to focus not only on developing infrastructure but also on educating those who were teenagers before the Internet was available and popular in the target areas. The age of digital natives should be defined differently according to the developmental stages of countries. Age also influences motivation, skills, and knowledge of the Internet among users. The next big challenge for future digital divide studies will be to foster motivation, skill, and knowledge leading to ideal usage of the Internet for communities. (Onitsuka, 2018)

Informations related to public policies

- India's lockdown has caused great disruptions of lives across the country, perhaps especially among the rural poor. With a warning of its imminent implementation of just four hours, it caused an immediate mass exodus of migrant workers back to their villages due to closure of all economic activities in urban areas. This caused two immediate problems for local authorities: (1) mitigating the spread of infection from urban centers to rural areas and (2) helping to deal with widespread economic fallout from loss of cash income and consequent food insecurity for a large proportion of the population that already lives close to the margin to begin with. The Ministry of Panchayati Raj in April 2020 launched an e portal called the eGram Swaraj. The portal is intended to digitalize the everyday functions of gram panchayats and also aid in preparing and sharing village development plans. This could also be used in times of Covid to share village level updates (Dutta, 2020).
- The digital potential of rural areas is developed within the Rural Renaissance call of the Horizon 2020 work program. Innovation and digital technology in rural areas are among the European priorities of the Smart Specialization Platform for Agri-Food. In accordance with European network for rural development (ENRD) forecast, EURO 24 from European funds will be spent on different priorities of rural hub development that makes nearly 16% of RD expenditures in 2020 (Dyba, 2020).
- The government should take measures, such as the transformation of rural residential areas, solve the problems of rural household registration, employment resettlement, and social security, and use urbanized rural residential areas as a reserved area for future urban development. (Guo, 2020)
- The authors suggest that Government agencies need to collect more detailed information on ICT use and ownership across all age cohorts, and not simply group all persons aged 65 years and older into the same age cohort. New questions may be added to existing surveys to reflect ICT and technological advances such as smart phones and mobile apps, and wearable health technologies to support age in place (Marston, 2019).
- Where ERDF funding has been used, the evidence outlines what can be achieved. This is both in terms of increasing broadband availability and supporting SMEs to integrate digital technologies into the business model. Crucially, the combination of these two aspects has the biggest impact for SMEs in less-developed or rural regions (Norris, 2020).
- The typical policy response to this problem is to provide more opportunities for poor people to learn the missing skills, mainly, but not only, in school. It is certainly true that in the absence of

such policy the growth of developing countries will be hindered and indeed may fall even further behind in the effective use of digital technologies. On the other hand, bringing about a sharp increase in the supply of digital skills will often be a lengthy and difficult process, especially among students with limited literacy and numeracy (James, 2019).

CONCLUSIONS

The limited access to the Internet is the main reason for the huge digital divide in the rural areas. This digital divide is quite visible in the case of children or older adults. Basic ICT skills and infrastructure are necessary for people to use ICT facilities. The availability of ICT infrastructure positively contributes to overcoming the digital divide. The problem with rural communities in third world countries and not only is the lack of access to information.

The results of the empirical study also show that governments need to provide aid to develop and support effective social and educational strategies among the population, with special treatment for vulnerable families in rural areas - who can enjoy equal access to information and communication technology. .

Thus, from the qualitative analyzes carried out with the help of systematic reviews, some recommendations will be offered, essential in the current crisis situations:

A1: Continuity of national and regional initiatives and policies.

R2: Running training and counseling actions

A3: Possibility of using available resources, such as those in rural libraries.

This paper is a starting point for the subject of digital division in vulnerable environments. A future paper will analyze the situation of internet access among the rural population.

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ROMANIA – READY FOR ONLINE LEARNING?

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Abstract

The Covid-19 pandemic has had a strong impact on education in Romania and worldwide. Radical measures have been necessary in the field of education, to limit the spread of the virus (like in all the fields affected by the pandemic). One of these measures – the closure of schools, universities and other education institutions and the shift to online learning – has led to a series of disequilibria in the entire education system, with major consequences on pupils/students, mainly in the case of those already vulnerable and disadvantaged. Online learning has been the greatest challenge that the education system has ever faced. The availability of Internet and mobile communication infrastructure, the access of population and education units to Internet and computers, the digital skills of pupils/students as well as of teachers, the availability of school curricula in forms necessary for online presentation have led to this challenge. At the same time, although many young people in Europe use the Internet for social activities, and the mobile Internet access has significantly increased in recent years, the use of technology for education purposes has not followed the same trend. Reducing the negative impact on learning and schooling has therefore been one of the challenges facing the education system.This paper attempts to highlight how the education system has adapted to the restrictions imposed by the pandemic, Romania's readiness, since the pandemic outbreak, for this type of education (through specific indicators on digital skills, connectivity and use of technologies in education, population access to Internet and to a personal computer at home, nationwide and by areas of residence), as well as the gaps between residence areas, between different categories of affected population.

Keywords: education, online learning, disparities in education, urban-rural disparities

JEL Classification: I21, I24, J14, J15, R11

INTRODUCTION

The COVID-19 pandemic has represented a turning point in education, a shift from classical education, which was in place until the pandemic outbreak, to online education, practically determining the transition of society to a digital age.

The educational landscape in Europe and globally has fundamentally changed, pupils needed to adapt rapidly to the new leaning system, to acquire new digital skills. In their turn, teachers had not only to acquire computer skills, that many of them did not have, but also to develop these skills at a higher level, in order to reach their pedagogical objectives, by using new technologies to improve children's learning and understanding of the lessons taught.

However, the adaptation to the new learning system of the involved actors (pupil/students, on the one hand, and teachers, on the other) was not as expected, the transition to online learning highlighting significant deficits in terms of digital skills, connectivity and use of technologiesin education, both in terms of teaching staff and pupils / students.

An image, in this sense, is provided by the results of a study conducted by World Vision Romania in February 2021 *"Online school in Romania offline, in rural areas, 2021"*[2]. According to this study, although in the pandemic period significant steps have been made for the improvement of digital infrastructure (more than 250,000 pupils have received tablets for online school – either through the national program or through private initiatives) and forInternet connection (however many areas in the countryside have no signal and access to Internet), although new digital education platforms have been used or the already existing ones have been improved, basic digital skills have been created for pupils and teachers, the pandemic impact – one year of online school in the rural area – has widened the already existing gap between urban and village schools. The pupils from this residence area lost 25 weeks of school, having practically no access to education, due to the lack of equipment and Internet access. The expected consequence would be the increase of dropout rate.

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[2] Survey conducted by World Vision Romania in the period February 5-12, 2021 in 74 education units in the rural area from 14 counties.

According to the results of the same study, 1 out of 2 teachers consider that pupils did not cover the learning areas of the curriculum this year, 1 out of 10 teachers consider that pupils were not able to cover 80% of the school curriculum and 1 out of 3 teachers consider that children's scores have deteriorated in the period of online school.

80% of teachers also consider that they need continuous training in digital education and 77% of these consider that a standardized guide would be necessary for online teaching and evaluation of schoolchildren.

The conclusion of the study: "the learning loss of rural students accumulated during the online school are major and require immediate intervention to recover this learning loss".

Education digitization (real digitization, not only at declarative level) should be one of the main priorities of governments, so that all children, regardless of their residence area, urban or rural, should have equal access to education. Narrowing the gap between the rural and urban areas (Romania is on the penultimate place in terms of rural digitization in the European Union) would bring real benefits for Romania and for the Romanian village and its community in particular.

The analysis of the access to Internet and computer at home reveals that in the countryside, access to Internet and to computer at home, in particular, is quite limited, therefore the applicability of measures by the Ministry of Education is limited.

Those marginalized before the pandemic are even more exposed to risk at present. The correlation between the socio-demographic factors (gender, ethnicity, age, residence area) and the economic factors (poverty) can highlight multiple forms of discrimination and exclusion. At the same time, despite the existence of such initiatives to create distance learning platforms and systems, even though these gradually emerged since the authorities decided school closure, these not reached all children/young people, as access to distance learning is conditional to the social environment of their origin, by parents' educational level, etc. Irrespective of the formula adopted by authorities in this period, pupils have been left with a deficit of knowledge.

MATERIAL AND METHOD

One of the methods used to prepare the raw analysis material was the personalized query of the official available databases. The information on access to Internet and computer at home, on the disparities by areas of residence had as data sources the official publications of the National Institute of Statistics (NIS) from the Survey on population access to information and communication technology in Romania, the query of the public Tempo Online database, followed by author's own processing.

Reports, strategies and plans of action have been consulted with regard to education and the impact of pandemic on education, the adopted and implemented measures in this sector by other EU member states and Romania.

For the purpose of documentation, the national and international literature, various studies and analyses by national and world-renowned economic institutions were useful benchmarks. Information from various statistical research studies, analyses, reports and unofficial studies, as well as from regional development strategies were also used. Another method used in this study was complementary information filtering, collection and analysis (from Internet, various publications).

RESULTS AND DISCUSSIONS

According to the conclusions of the European *Education and Training Monitor*[1]*, in Romania*, published by the European Commission in November 2020, which mainly focused on teaching and learning in the digital age, in a year marked by the pandemic and its effects, although the mobile Internet access has significantly increased in latest years, the process of technology integration in the educational system has continued to be slow, most youngsters in Europe preferring activities on the

[1]Education and Training Monitor, 2020

internet to access social networking sites.

Only 57% of the Romanian young people aged 16 – 19 years have basic or above basic overall digital skills (as against the EU average - 82%). A partial explanation for this low percentage, compared to the EU average, is that in the primary and gymnasium classes, when practically the basic digital skills are acquired, ICT (information and communication technology) is an optional subject (it is only since 2017 that it has been a compulsory subject in high school). The situation is even more critical in the rural schools (where 43% of pupils are enrolled), where the capacity to provide digital education is lower than in urban areas (due to the small number of qualified teachers in this field – 2 out of 10 teachers do not have any digital skills – and to the weaker digital infrastructure).

In terms of teachers' digital skills, the report shows that there are many weak points in teachers training for the use of this technology. Although about 70% of teachers in the lower secondary education consider that they are well or very well prepared for the use of digital methods in the teaching process[1], more than half of the number of teachers who participated in the study consider that they have insufficiently developed their skills for the effective use of distance learning platforms and one fifth of the teaching staff participating in the study reported an acute need for professional development in digital skills (EU average is 18%).

Digital infrastructure in schools is not sufficiently developed, in the rural areas in particular. Compared to the EU average, far fewer schools are highly equipped and connected. Few Romanian pupils have the opportunity to learn in a school equipped with computers and Internet connection. Only 14% of the Romanian pupils enrolled in primary education (EU average: 35%), 16% in the lower secondary education (EU average: 52%) and 31% in the higher secondary education (EU average: 72%) are learning in such schools (European Commission, 2019).

According to the available data, in the year 2017, 1 out of 5 schools had no Internet connection, of which only 5% in the urban area and 24 % in the rural area (according to the Minister of Education and Research data, 2018). The number of computers in each school is higher by 60% in the urban than in the rural areas, which illustrates the deep urban/rural gap, which has grown even wider due to the shift to online learning.

38% of the teaching staff had to use a shared device with other family members, while 11% had no device at all.

Although Romania has undertaken to implement a digitization agenda for education by the year 2020, the report concluded that Romania still has great shortcomings in this regard, so that the recommendation of the Council of the European Union for Romania was to "strengthen digital skills and learning and ensure equal access to education".

The conclusions of this report add to the analysis of the population access to information and communication technology, of population access to Internet and computer at home respectively. This analysis, carried out at national level and by areas of residence, provides an overview of Romania's readiness for the transition to online learning, at the beginning of the pandemic, to assess the efficiency and applicability of government measures on online learning.

Population'sinternet access, at home

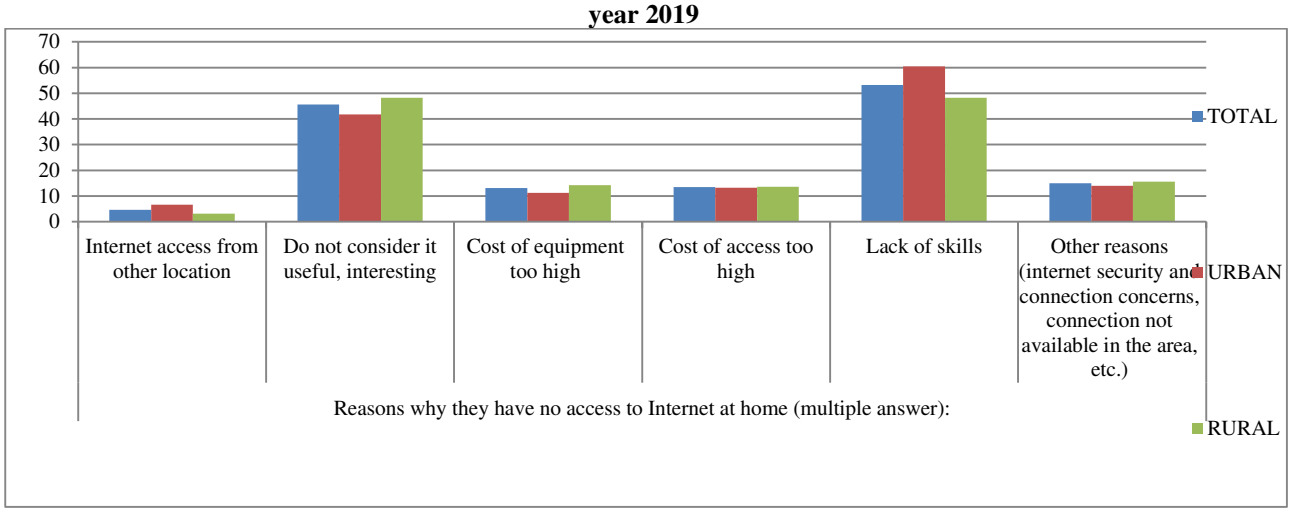
According to the results of the *Survey on the access to information and communication technology (ICT)*, in the year 2019, conducted by NIS, 75.7% of households in Romania had *access to the Internet at home*, of which almost two thirds were found in the urban area and only one third in the rural area (almost double in the urban area compared to the rural area). This urban/rural gap can be explained by the Internet providers that are available in each area and by the financial possibilities of each household to pay or not pay for the Internet connection.

On the other hand, out of total households in the urban area, 82.5% have Internet access at home, and only 66.7% of rural households have Internet access at home.

[1]According to the International study on the teaching-learning process of 2018, initiated by OECD, mentioned in the European Monitor of Education, in Romania

However, a significant percentage (24.3%) of households in Romania have no Internet access at home, the *reasons* being different. At national level, more than half of households have no Internet at home due to lack of skills, and 2 out of 5 households do not consider the Internet interesting and useful enough to be connected at home.

Figure 1. Share of households with no Internet access at home, by reasons and areas of residence, in the year 2019



Source: INS

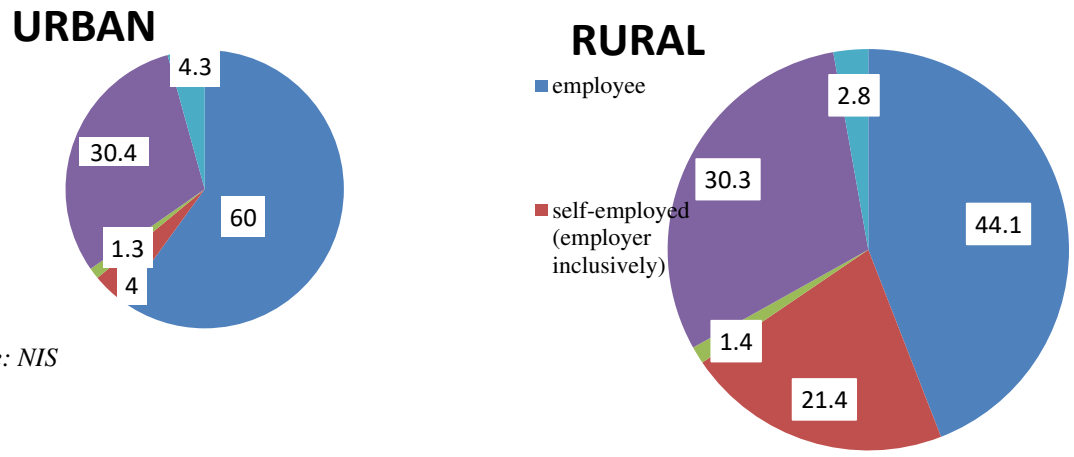
The situation is similar by residence areas, with different weights, for some reasons, so that in the urban areas it is noted that 3 out of 5 households do not have Internet at home due to lack of skills and over 2 out of 5 households because they do not consider the Internet interesting and useful enough to be connected at home. In the rural area, almost half of the number of households have no Internet connection due to lack of skills and because they do not consider it useful/interesting to be connected at home. (*Figure 1*)

By *occupational status of household head*, more than half of total households that have Internet access at home are households with salaried household heads (53.9%), about one third are households with pensioner household heads, the remaining being households of self-employed (10.7%), households with other inactive person as household head (3.7%) (where pupils/students are also included) and households with unemployed household heads (1.3%).

By areas of residence, the previously mentioned hierarchy at national level is also maintained, yet the shares are significantly different in the case of households with self-employed household head: in the rural area, the share of households of self-employed with Internet access at home is five times higher than in the urban area, and the share of households with Internet access at home with a salaried household head is lower by 15 percentage points in the rural area than in the urban area. This situation overlaps the structure of households in the two residence areas. (*Figure 2*)

In terms of people using the Internet, it is shown that nationwide, 82.3% of persons aged 16 - 74 years are using or have used/accessed the Internet at a given moment (17.7% of persons have never used the Internet), and in the urban area this share is even higher (88.5%).

Figure 2. Structure of households with Internet access at home, by occupational status of household head and residence areas, in the year 2019



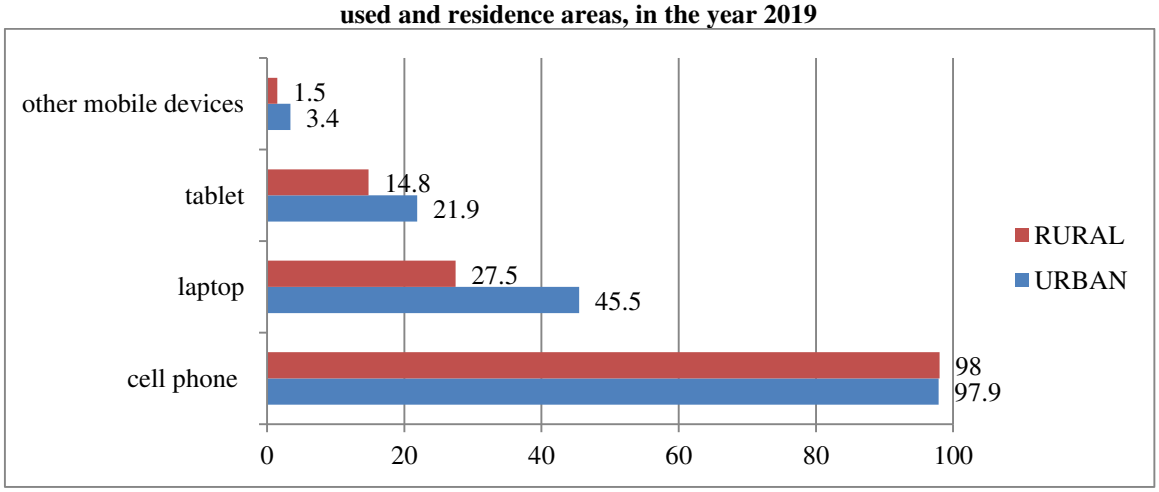
Source: NIS

Out of these, 60% are in the urban area and the remaining 40% in the rural area, the distribution by areas of residence indicating another urban – rural divide. In the rural area, the share of those who have ever accessed the Internet is lower by 14 percentage points than in the urban area, the share of persons who have never used the Internet being double compared to that in the urban area (25.2%).

According to NIS data, out of total persons aged 16 - 74 years using mobile devices to access the Internet, in the last 3 months, *the most used mobile devices for accessing the Internet* were the cell phone or smartphone (97.9%). The laptop comes next, yet at a far distance (38.2%), followed by the tablet (19.1%).

In terms of distribution by residence areas, it is noted that certain mobile devices used for accessing the Internet contribute to differentiations.

Figure 3. Share of persons aged 16 -74 years who have used the Internet in the last 3 months, by devices used and residence areas, in the year 2019



Source: NIS

While in the urban area the share of persons aged 16 - 74 years who used a laptop to access the Internet was 45.5%, in the rural area this represented a little less than half of the share in the urban area, and the share of persons who used the tablet to access the Internet in the rural area was lower by 7 percentage points compared to the urban area. (*Figure 3*)

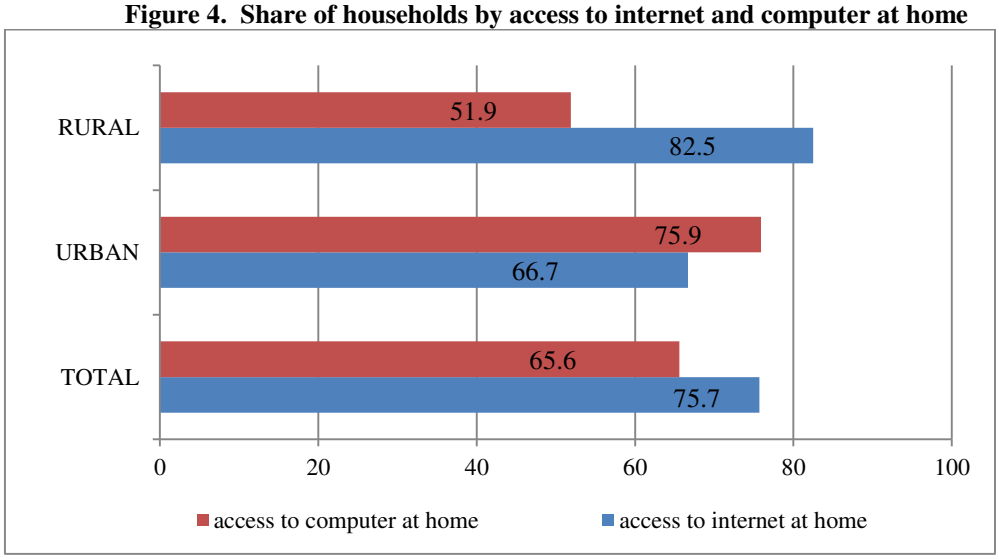
Population access to computer at home

Nationwide, two thirds of total households have access to computer at home. This indicator differs by areas of residence areas, so that while in the urban area, three quarters of households have access to computer at home, in the rural area only half of rural households have access to computer at home.

At the same time, out of total persons aged 16 - 74 years who have ever used the computer, about two thirds are living in the urban area and only one third in the rural area.

Correlating the two previously analyzed indicators, i.e. the share of households with Internet access at home and the share of households with access to computer at home, we note that at national level, access to computer at home is lower (by 10 percentage points) than access to Internet (*Figure 4*)

Figure 4. Share of households by access to internet and computer at home



Source: NIS

By areas of residence, disparities are highlighted by a higher share (by about 10 percentage points) of households with access to computer at home as against the share of households with Internet access at home, in the urban area, as compared to the rural area, where the share of households with access to computer at home is much lower than the share of households with internet access at home (by 30 percentage points), the limited access being determined by the connection to Internet mainly on cell phones and other mobile devices.

CONCLUSIONS

On the basis of these data, the following conclusion can be drawn: Romania, at the beginning of the pandemic, was not prepared for the transition to online learning, in logistical terms in the first place, i.e. in terms of access to Internet and to computer/tablet/mobile device at home, the situation being more critical in the rural area. At the same time, both in the rural and in the urban areas, the online learning was only at declarative level, with no consistency and continuity[1]. In the next school year (the current year), 2020/2021, the situation changed in this respect, but even though the online classes were held, the conclusion of the previous school year remained valid – pupils have been left with a lack of knowledge.

The existing gaps before this situation caused by pandemic between the areas of residence and between pupils in the urban area and those in the rural area implicitly, have been reconfirmed by

[1]Concrete example, in Bucharest, in the period since school closure until the end of the school year 2019/2020, in the case of an 8thgrade, there was only one meeting on a leaning platform (Zoom) in one of the subjects in which pupils were supposed to go in for a national assessment exam.

the indicators presented above, highlighting inequalities of opportunity in terms of children/young people education in Romania, currently greater inequalities than those already existing.

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RURAL TOURISM IN THE DANUBE DELTA - BETWEEN THE EMPIRICAL AND THEORETICAL APPROACH

RUXANDRA-EUGENIA POP [1]

Abstract

Within the COASTAL project (Collaborative Land-Sea Integration Platform), funded by GA 773782, through Horizon 2020, six different coastal regions in Europe are analyzed, in order to study the synergy between rural and maritime economic activities, in order to generate policies and solutions for the business environment, respecting the environment, improving the living standards of the inhabitants, increasing the area from an economic point of view. Regarding Romania, the area of interest on which the case study is carried out is the Danube Delta. After analyzing the literature, meetings with stakeholders working in both coastal and rural areas, we tried to model through specific software programs of economic activities in the Danube Delta: agriculture, fishing and rural tourism. In this paper we will present the main results obtained from the empirical and theoretical perspective through which we looked at the activity of rural tourism in the area of interest.

Key words: rural tourism, VENSIM modelling, marketing, environment pressure, rural development

JEL CLASIFICATION: Z32, C54, O11

INTRODUCTION

As tourism becomes increasingly important for economies around the world, the sustainable development of tourism is also becoming an important concern at European level and beyond. This is also the case of the Danube Delta area, defined, according to the Integrated Strategy for Sustainable Development of the Danube Delta Area (2016), as an attractive area - with valuable biodiversity and dynamic business environment, with low / medium economic activities both in both traditional and modern fields - where people live in harmony with nature, integrating economic activities in the tourism, agriculture and fishing sectors". In fact, the population of the Danube Delta is a basic primary resource, on which tourism depends, and the existence of rural communities in a certain place at a certain time can be used to justify the development of tourism itself. For tourists who come to the Danube Delta, especially foreigners, they want to experience the way of life of the locals in the Delta, to know the customs and traditions of the area, cultural and gastronomic.

According to the statistical data taken from the database of the National Institute of Statistics, in the Danube Delta area, referring to Tulcea County, the number of domestic tourists coming to the Danube Delta increased considerably between 2015-2020, this number increasing even by 60 %. A special case is represented by the situation delimited at the level of 2020, in the context of the Covid-19 pandemic. Thus, the number of Romanian tourists who went to the Danube Delta increased, managing to reduce the deficit in the area to only 8.8%, this happening given that the number of foreign tourists decreased from 47,056 visitors (2019) at just 4721 visitors (2020), a categorically dramatic drop of up to 90%. In fact, during the meetings we held with stakeholders, some of the tourism specialists stated that, unlike other areas in Romania, the pandemic will be beneficial for tourism operators in the Danube Delta, because more and more tourists locals will choose to spend their vacation in this location.

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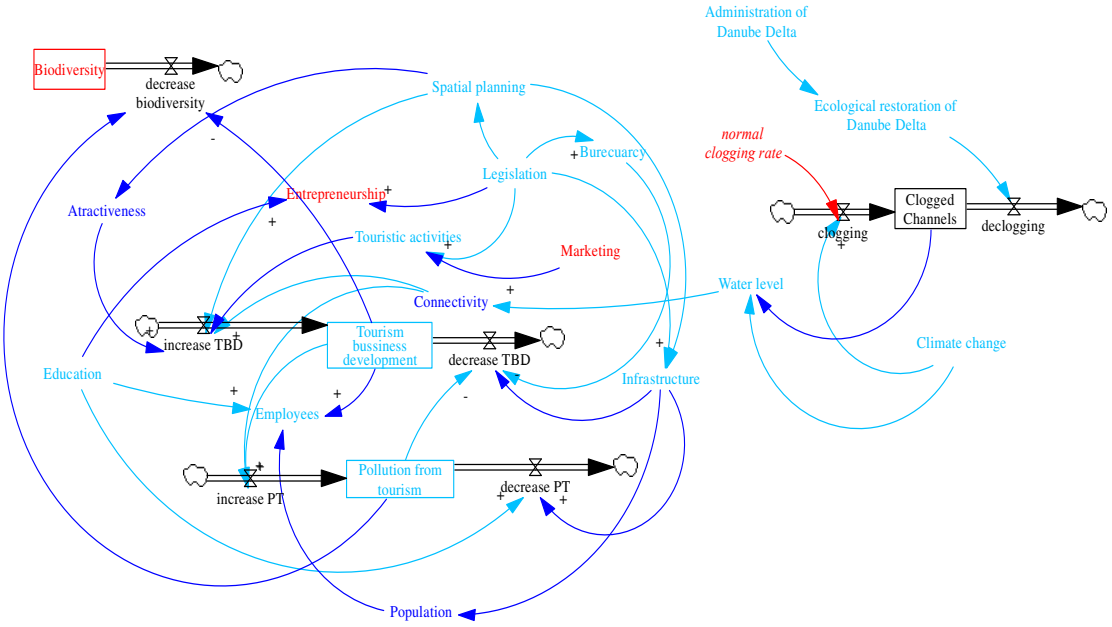
MATERIALS AND METHODS

As the title of the paper shows, the empirical approach, identified in this case by workshop-type meetings, with a strong interactive and practical character, attended by stakeholders in the field of tourism, as well as the theoretical approach, present in the case of by going through the national and international specialized literature, the consultation of the reference statistical databases, were the basis of the process of processing the different variables of interest for the tourist activity in the Danube Delta. Following this process, a model was developed using the VENSIM program, a software used to support the modeling of dynamic systems.

RESULTS AND DISCUTION

The first meetings with stakeholders held together with experts in the field of tourism, which had as main theme "Rural tourism, leisure and other rural activities" and "Rural development", led to the initial CLD diagram as they were described in the deliverable. *"D13 Pilot SD Models for Coastal-Rural interactions"*. For both rural and coastal tourism, the meetings' outputs were similar for the rural and coastal tourism outlining that tourism has significant potential as a driver for growth for the local economy.

Figure 1. The structure of the model for Rural Tourism in the Danube Delta



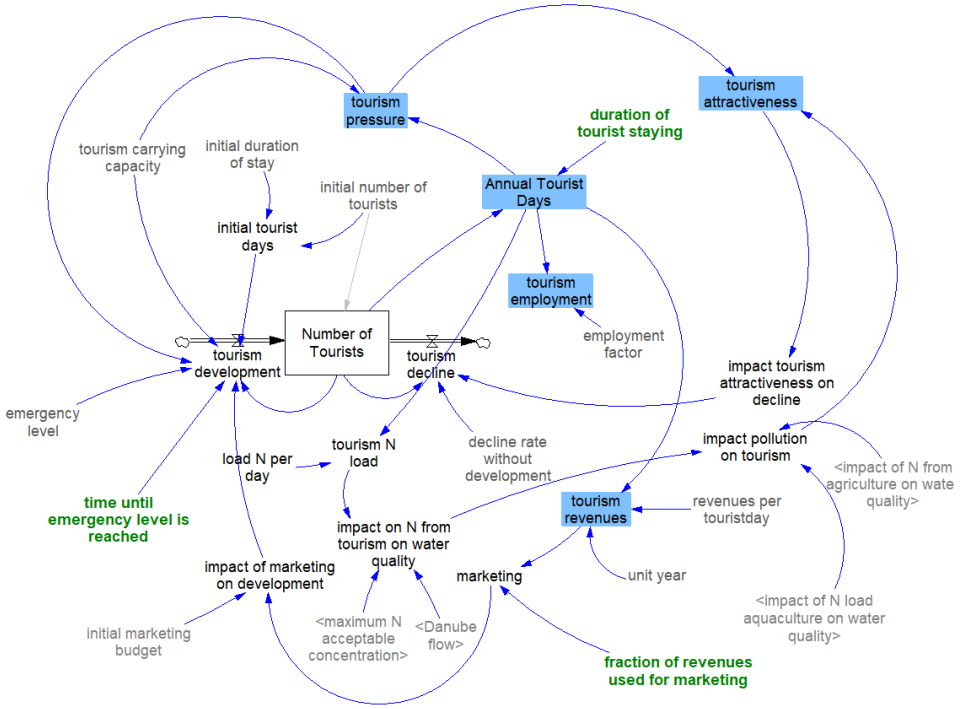
Source: https://h2020-coastal.eu/assets/content/Deliverables/773782-COASTAL-WP4-D13.pdf

However, the protected areas restrictions are limiting its growth which is usually accompanied by significant changes. Thus, the need for ecotourism was emphasized, as well as its diversification (*touristic activities*) leading to slow tourism in the benefit of the protected area (*biodiversity*) and local people (*workforce*). Destination planning and development strategies (*marketing*, *social events*) are important steps towards the greening of tourism.

The sub-model structure has as main balancing loop *Tourism-Pollution-Biodiversity - Tourism*. Thus, the sub model considers that the increase of tourism has as main consequence the increasing pollution which led to biodiversity decreasing, and the area attractiveness decreasing. Once the biodiversity has decreased the area is no more a touristic attraction. Pollution from Tourism, Tourism business development, Biodiversity and Clogged channels stocks in the sub model structure. The sub model drivers are *Climate change*, *Legislation*, *Administration of the Danube Delta Biosphere Reserve*, *Education,Spatial planning*, *Marketing*.

Subsequently, holding other meetings with tourism stakeholders, the variables were renamed, based on their views and perspectives on the importance of the purpose of the obtained model, which is to determine how far the rural tourism of the area can be developed, without damaging the balance with the environment.Among the main variables included in the model to be presented below, we can mention, in particular: ***number of tourism*** (stock variable), tourism pressure, tourism carrying capacity, employment factor, marketing budget, emergency level and time until the emergency level is reached, tourim development and tourism decline.

Figure 2. The structure of the dynamic model Rural Tourism



Source:https://h2020-coastal.eu/assets/content/Deliverables/773782-COASTAL-WP4-D14.pdf

The model (figure 2) includes representative data identified in Tulcea County, to maintain the accuracy and significance of the data we used as input for the model presented. The model includes a single stock variable, called Number of tourists, determined over a period of 30 years, taking the year 2020 as the beginning of the simulation and the end of the simulation until 2050. We have included in the model specific quantitative input variables, such as accommodation capacity, employment rate, level of urgency, time to reach the level of urgency, income generated by daily tourism activity, share of income used for marketing, initial number of tourists, initial length of stay of a tourist , the rate of decline without the development of the area. These variables are used as constant variables, based on calculations made with data from the National Institute of Statistics, in most cases, but also based on other scientific publications of interest for the model presented. Second, the model includes auxiliaryvariables, which are calculated and forecasted with a specific given formula, based on the first category of variables mentioned: initial tourist days, annual tourist days, employment in tourism, also the model worked with variables and run determined interactions. with the search function, following the shape of the Figure that experts and stakeholders in the field of tourism believe should be designed, such as: the pressure of tourism, tourist attractiveness, the impact of marketing on development.

Regarding the variable number of tourists, it is calculated based on the difference between the development of tourism and the decline of tourism:

Table 1 presents some equations introduced in order to define some variables in the model:

Table 1. Tourism model equations introduced in the VENSIM program

No.	*Variable name*	*Conceptual definition*	*Operational definition*
1	***Number of tourists***	Number of tourists who will visit at some point the Danube Delta	Tourism(t - dt) + (tourism_development - tourism_decline) * dt
2	***Tourism pressure***	The increase of the pressure will ensure the environment following the increase of the tourist activity in the area	Tourist Days/tourism carrying capacity, with Look up function, the higher the number of tourists
3	***Tourism revenues***	Revenues obtained by all economic agents in the Danube Delta area	Annual Tourist Days*revenues per touristday/unit year
4	***Tourism employment***	Evolution of the number of employees in the tourism field in the Danube Delta area	employment_factor*Tourism

Source: introduced ecuations VENSIM model functionallity, https://h2020-coastal.eu/assets/content/Deliverables/773782-COASTAL-WP4-D14.pdf

CONCLUSIONS

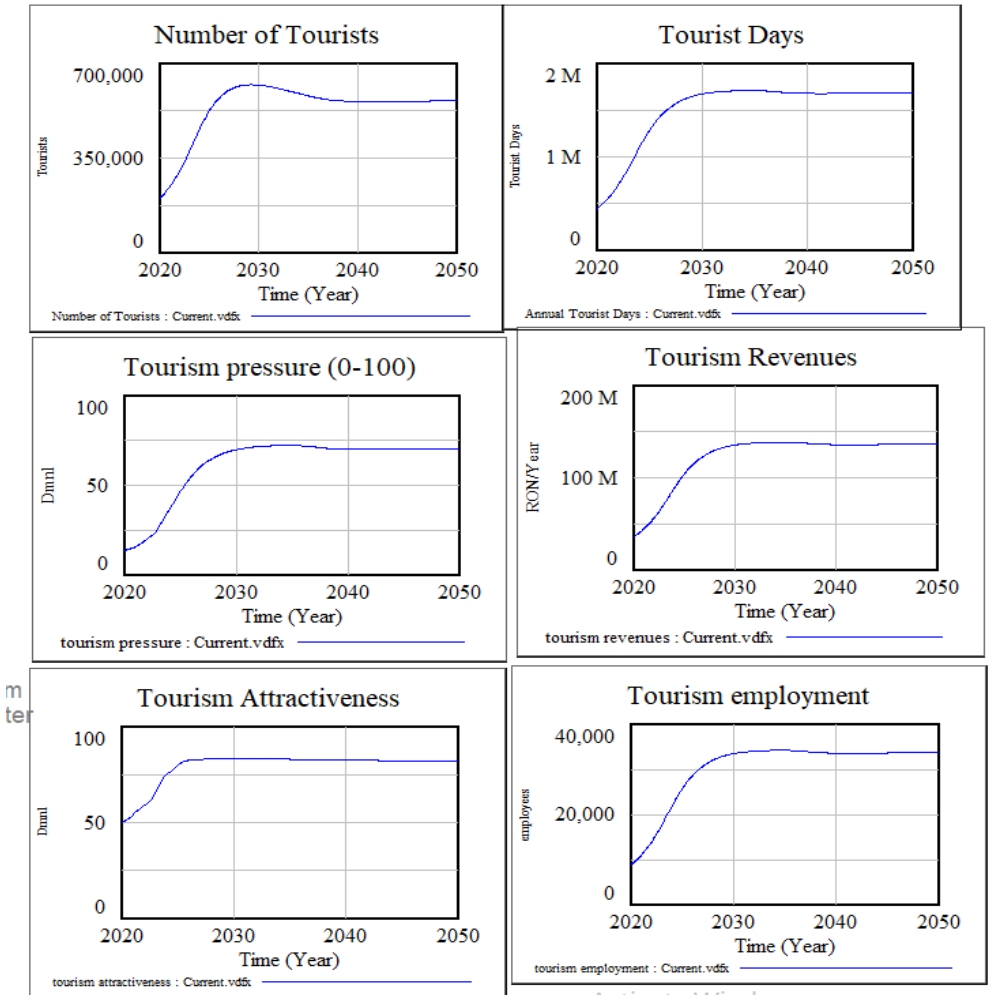
Figure 3 shows the main results obtained after running the model generated in VENSIM, edifying for the conclusions section of this paper.

Thus, regarding the number of tourists who will come to visit the Danube Delta, there is an increase in their number until 2031, and then this value decreases slowly between 2032-2040, starting with 2040 the number of tourists remaining constant. It is interesting that the variable fraction of income used in marketing has a large impact on the oscillation of the number of tourists, but also on other variables, such as: average length of stay of a tourist, number of nights, income from tourism, tourist attractiveness of the area, employment in tourism.

A larger marketing budget leads to a faster increase in the number of tourists, due to the increased level of development of the area, but the time frame in which the values of the presented variables increase is shortened. After this increase, all variables follow a decreasing trend, then remaining constant.

We can also add that the faster the number of tourists in the area or the average length of a stay increases, the more the tourism activity has a negative impact on the environment. Once the environment is affected, the number of tourists will be characterized by a downward curve. Generating higher revenues in the short term is not always the most efficient or effective method of developing a tourist area, which is also relevant for any management strategy to promote the Danube Delta area, it is necessary that its implementation corresponds to certain short, medium and long term goals.

Figure 3. Results obtained after running the Rural Tourism in the Danube Delta model



Source :resulted graphs in VENSIM program

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ROMANIAN RURAL TOURISM DEVELOPMENT THROUGH EUROPEAN FINANCIAL SUPPORT MEASURES

ELENA SIMA[1]

Abstract

Encouraging the development of tourism activities represents an occupational alternative for the rural labour force. It is a significant way to diversify the economic activities in the countryside. Finally, it is a stabilizing factor for the rural population. The objective of this paper is to investigate the Romanian effort to develop and promote tourism in the rural area with support from the European funds. Statistical data was completed from articles and studies published in specialty journals, as well as in government documents. The results allow us to conclude that the natural resources and landscape, the social capital, the rural governance, the business and social networks as well as the information and communication technologies have dynamic and complex influences upon the entrepreneurial activity in the rural areas.

Keywords: rural tourism; European funds; investments; Romania.

JEL Classification: Q14, L83, R58

INTRODUCTION

Financing programmemes from non-refundable European sources is highly significant for the development and promotion of tourism in the Romanian rural area. They support the development of small-scale businesses in this sector, recognized as the most important source of jobs for obtaining additional incomes in the rural area. (2, 7, 9)

The promotion and development of tourism activities in the Romanian countryside has seen an upward trend since 2000, when Romania's rural development was integrated into the context of reform and development proposed by the European Union through the Common Agricultural Policy. The objectives of the National Rural Development Program have ensured a sustainable economic and social development of rural areas, by managing the modernization of the agricultural sector and the diversification of economic activities. To have an alternative source or additional income, farm/agricultural household had the opportunity to be financially supported and develop an agro-touristic activity. This was organized and carried out in the rural area by the members of a family; activity that involves combining agricultural works with tourist services (1, 10, 14).

Also, the stimulation of touristic services such as accommodation, leisure and public catering in the Romanian rural area allowed the capitalization of environmental and natural resources (biodiversity, forest patrimony, fisheries, etc.), the dissemination of information on the cultural heritage (traditions and professional experiences accumulated), as well as the development of social capital and the creation of new specializations that reduce the economic and social imbalances existing between the level of development of the different regions of the country, but also between rural-urban residence environments. Thus, by encouraging rural tourism and agro-tourism"Romania has become, year after year, a much more attractive tourist destination for both Romanian and foreign tourists" (8).

MATERIAL AND METHOD

The objective of this work is to analyze the Romanian effort to develop and promote tourism in rural areas, completed with the support of European funds (which started in 2000), in accordance with the priorities and directions of rural development of the National Plan for Rural Development (NRDP). This was established in close connection with community priorities and according to the

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analysis of the socio-economic and environmental situation in Romania, and obtained on the basis of available statistical data.

In Romania, rural tourism has been defined as all touristic activities, products and services organized and carried out in the rural area, by the local population, in close connection with the environment and the basic activities of the locals, through which the tourist resources, the cultural heritage, traditions, tourist structures and local products are capitalized. Agro-tourism, as an important segment of rural tourism, is organized and carried out by members of an agricultural household and involves the combination of agricultural activities with touristic services (tourism activity being secondary to the agricultural one), the provision of accommodation and food (partially obtained in the household) and the involvement of the tourist (if desired) in household activities.

The methodology used is based on the synthesis of information on the main measures to promote and stimulate the Romanian agro-tourism, and supported by the agricultural and rural development policy. The statistical data was complemented by information contained in articles and studies published in specialized journals, as well as in governmental and non-governmental reports and documents.

RESULTS AND DISCUSSIONS

Romania's transition to the market economy led to deep and long-lasting changes in the organization and functioning of the rural space. The first signs of encouraging tourism were seen in the year 1994, after the creation of the legal framework on the development of mountain areas such as the Danube Delta and the Black Sea Coast. This is when power supply, water and sewerage systems were created; and tax exemption was approved for a 10-year period for the households that began such an activity (3-20 rooms). Another major aspect was the creation of certain organizations to guide and coordinate the network of farms included in the rural tourism system, such as:

- The Romanian Federation for Mountain Development (1990), promoting and supporting mountain households, including the organization and development of agro-tourism;
- The Romanian Agro-tourism Agency (1995), aiming to align Romanian agro-tourism to the international tourism system;
- The National Association for Rural, Ecological and Cultural Tourism in Romania – ANTREC (1994), member of the European Federation of Rural Tourism (EUROGÎTES). (10)

The development of entrepreneurial initiatives in Romanian agro-tourism takes place in the context of significant increase, both in qualitative and quantitative terms, of accommodation units in rural areas in recent years. This is due to individual investors and finance from the governmental pre-accession – SAPARD and post-accession programs – PNDR 2007-2013 and PNDR 2014-2020.

The financial support necessary forthe development of tourism activities in the rural area was provided, mainly, by applying the following measures:

-Measure 3.4 "Development and diversification of economic activities generating multiple activities and alternative incomes" assigned to Priority Axis 3"Development of the rural economy"programmes SAPARD ("Special pre-Accession Programme for Agriculture and Rural Development")applied in the country over the period 2000-2006;

-Measure 313 "Encouragement of tourism activities"framed in Axis 3: "The improvement of life quality in the rural areas and rural economy diversification" of the National Rural Development Programmes 2007-2013;

-Measure 6 "Development of exploatation/farms and enterprises" with sub-measure 6.2. "Support for the creation of non-agricultural activities in the rural areas" and sub-measure 6.4"Investments in the creation and development of non-agricultural activities" of the National Rural Development Programmes 2014-2020.

*The general objective*of these measures was to support the creation and/or maintenance of jobs and the generation of alternative incomes by diversifying rural activities related to agriculture and forestry. This also included the possibility of promoting ecotourism and making use of areas

protected by tourism activities, resulting in possible increased protection of the environment and the natural landscape. (1)

*Eligible investments*for which the European funds were granted concerned:

- the infrastructure of tourism reception and recreational activities (in which there are registered also actions regarding the construction, modernization, expansion and endowment of tourism reception structures;
- the tourism infrastructure for leisure, independent or dependent on the tourism reception structure);
- the small-scale infrastructure (such as office for tourism information, guide marks arrangements/touristic routes etc.);
- development and/or marketing of touristic services connected to the rural tourism (elaboration of promotional materials, information etc.) (1)

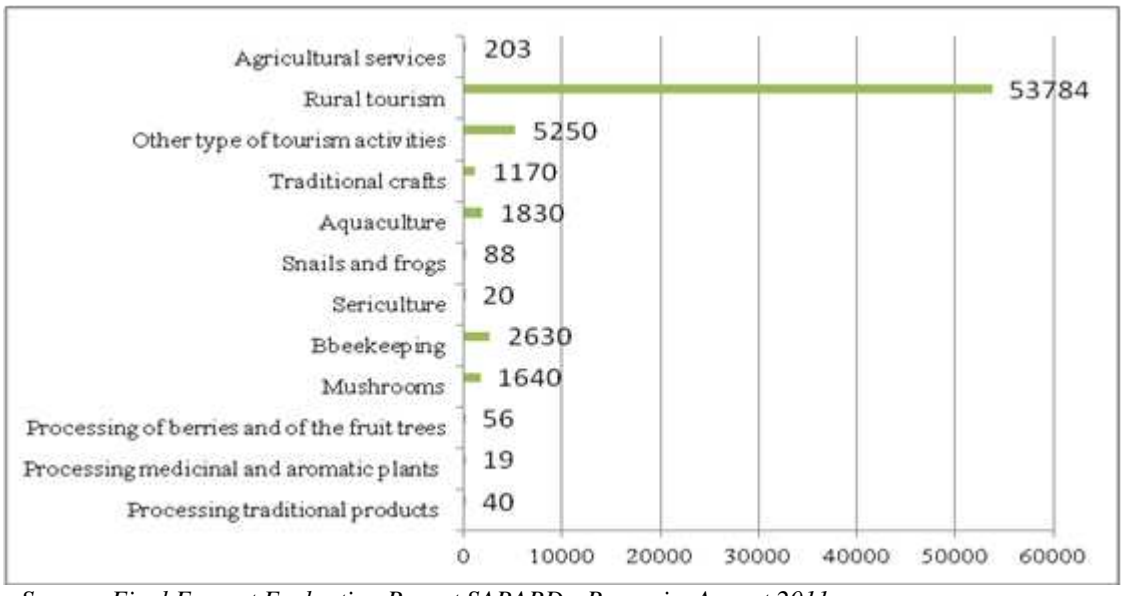
*The direct beneficiaries*of the measures to promote and encourage the Romanian rural tourism were:

- authorized natural persons(individual agricultural producers, forest owners, etc.);
- professional associations / registered family associations and producer groups;
- agricultural companies and commercial companies;
- consumer cooperatives and craft cooperatives;
- local communities and local public authorities;
- non-governmental organizations. (1)

*The indirect beneficiaries*of the financial support granted to stimulate the touristic accommodation, leisure and public catering services in the Romanian countryside were the tourists who spent at least one weekend or visited the Romanian rural localities with agro-tourism potential.

In the pre-accession period (2000-2006), the use of funds received by beneficiaries of the measure 3.4 "Development and diversification of economic activities generating multiple activities and alternative incomes" started in 2005 and continued until December 2007 (when the submission of applications ceased). As for the distribution of the 68,196,079.21 EUR (the total amount paid until 31 December 2009 for the 1018 projects declared eligible), most of the funds were absorbed by investments in rural tourism (78.86% of the resources paid) and other types of tourism activities in rural areas (7.67% of the resources paid for M3.4) (Figure 1).

Figure 1. Value of projects paid on sub-measurements under Measure 3.4, as of 31.12.2009, in thousand euro



Source: Final Ex-post Evaluation Report SAPARD - Romania, August 2011.

As for the projects that support ***agro-tourism*** actions, through measure 3.4, 667 projects were financed; most of them ensured investments for the modernization and construction of new buildings for accommodation, public catering (restaurants) and recreation areas in the counties of the Development Regions: Alba Iulia Center and North-West Satu Mare.

In the post-accession period (2007-2020), the use of funds received by beneficiaries measure 313 "Encouragement of tourism activities"(NRDP 2007-2013) and of the measure 6 "Development of exploatation/farms and enterprises" (NRDP 2014-2020) were mainly oriented towards stimulating touristic services of accommodation, leisure and public catering in the Romanian countryside.

The payments made in the NDRP 2007-2013 for Measure 313 were 138 million Euros, thus absorbing 29,50% of the resources allocated; the payments made in the NDRP 2014-2020 for sub-measure 6.2 were 92 million Euros, thus absorbing 82.84% of the total of funds made available and for sub-measure 6.4 were 104 million Euros, thus absorbing 62,42% of the resources allocated (Table 1).

Table 1. Financial support for the Romanian rural tourism, in the period 2007-2020

Measure	Budget allocation (mii €)	Value of payments made (mii €)	Degree of consumption (%)
313 – Encouragement of tourism activities	467,000.86	137,768.25	29.50
6.2 – Support for the creation of non-agricultural activities in rural areas (including ITI Danube Delta)	111,583.30	92,435.90	82.84
6.4 –Investments in the creation and development of non-agricultural activities (including ITI Danube Delta)	166,503.97	103,938.75	62.42

Source: http://www.madr.ro/

According to the "NRDP annual progress report", at the end of 2015, the category "Leisure infrastructure" had the highest share of investments, with 72,24% of total approved projects, followed by the category "Small-sized infrastructure" with 27,28% of total approved projects and the category "Development/promotion of rural tourism services" with 0,49% of total approved projects under this measure.

The stimulation of agro-tourism services continued during the application period of the measures approved by the NRDP 2014-2020 and consisted mainly in the arrangement of multifunctional sports fields/spaces for sports activities/sports activities in winter, summer, etc./swimming pools, beach spaces/food-restaurant services/organization of events, conferences, internet access/diversified recreation services - tourist transport by sleigh and cart, etc.

The level of financial absorption of the measures that encourage rural tourism and implicitly agro-tourism was situated, according to the reports on the implementation of the National Rural Development Programmes in Romania made by the Ministry of Agriculture and Rural Development, under the targhet initially proposed. This was due to the lack of own financial resources of the beneficiaries and the difficulties they faced in obtaining the necessary credits to co-finance the projects, as well as because of the long period required for obtaining funding and the implementation of infrastructure projects. Also, the agro-tourism activity was influenced by the top-down approach of the various strategies, the non-involvement of the rural authorities and communities, the systematic non-allocation of the funds initially foreseen and the lack of priorities for a sufficiently long time horizon.

*The agro-tourism boarding house*are the main structure of touristic reception in the rural area financially supported with non-reimbursable European funds. With an accommodation capacity of 8-15 rooms, evaluated at 1 to 5 flowers/daisies (equivalent to the star rating system for hotels), operating in people's dwellings or in independent buildings; these structures ensure, in specially designed spaces, the accommodation of tourists, the preparation and serving of meals, as well the possibility of tourist participation in household or craft activities these tourist establishments represented an opportunity for economic development (1, 2).

The synthetic analysis of the evolution of the touristic accommodation capacity and activity of the agro-tourism pensions, during the pre-accession and post-accession period of Romania to the European Union, was carried out on the basis of statistical data (Table 2).

Table 2. The evolution of the tourist accommodation capacity and the tourist accommodation activity of agro-tourism boarding houses, in the Romanian pre- and post-accession of the European Union

Years	Structures Number	Tourist accommodation capacity		Tourist accommodation activity			
		existing no. places	in use no. places-days	arrivals no.	beds no.	utilization indices	Average length of stay
The period of the Romanian pre-accession of the European Union							
2000	400	3544	805618	28152	64588	8.0	2.29
2001	536	4843	1105724	41658	88349	8.0	2.12
2002	682	6219	1270505	64811	144135	11.3	2.22
2003	781	7510	1614497	89446	225388	14.0	2.52
2004	892	9405	2132008	149104	321168	15.1	2.15
2005	956	11151	2528316	170164	365967	14.5	2.15
2006	1259	14551	3188350	217020	459344	14.4	2.12
The period of the Romanian post-accession of the European Union							
2007	1292	15448	3625647	288508	592327	16.3	2.05
2008	1348	16906	4038887	357617	743444	18.4	2.08
2009	1412	19783	4735468	325686	673188	14.2	2.07
2010	1354	20208	4891862	289923	604606	12.4	2.09
2011	1210	20683	5378364	360696	741350	13.8	2.06
2012	1569	27453	6864934	447113	906504	13.2	2.03
2013	1598	28775	7932634	501746	996475	12.6	1.98
2014	1665	30480	8219979	549302	1081521	13.2	1.97
2015	1918	35188	9079901	672756	1368992	15.1	2.03
2016	2028	37394	10336702	813454	1597939	15.5	1.96
2017	2556	44499	11787897	1004400	1928485	16.4	1.92
2018	2821	48574	12498050	1173455	2255286	18.0	1.92
2019	2800	49053	12615982	1272878	2518605	20.0	1.98
2020	3022	52389	9195563	755436	1515305	16.5	2.00

Source: TEMPO-Online Database, 2021, http://www.insse.ro/

In the analyzed period, the agro-tourism pensions registered an increase from 400 units in 2000 to 3,022 units in 2020. At the same time, both the number of accommodation places increased from 3,544 places in 2000 to 52,389 places in 2020, as well as the degree of comfort, valued from 1 to 5 flowers/daisies, which evolved in favor of the category 3 flowers/daisies.

The index of net use of accommodation places in agro-tourism pensions (calculated by referring the number of overnight stays to the tourist accommodation capacity in operation), as well as the average length of stay in agro-tourism pensions (calculated by reporting the number of overnight stays to the number of arrivals) had a varied evolution, from one year to another, depending on the evolution of the supply (the number of places in operation) and the demand (the number of tourists who stayed overnight) in the localities Romanian countryside.

The analysis of seasonality and demand for agro-tourism (seasonality being a basic feature of the tourist activity which impactd both on the degree of satisfaction of tourists, on the environment, and on the labor force in tourism) shows that even in rural localities, as well as in urban ones, the largest number of tourists who stayed overnight was recorded during the peak of the season, in July-August, because the planning of a vacation is still dependent on weather conditions.

CONCLUSIONS

In Romania, the touristic potential is supported by the variety of natural and anthropogenic resources determined by the presence of the three major landforms (mountains, hills and plains), as well as by the preservation of cultural traditions (literary, musical, folk art, handicrafts, gastronomy, religious customs, etc.).

The main Romanian tourist destinations are located mainly in the mountain and hilly area, in the Black Sea coast and in the Danube Delta. The first signs of encouraging tourism activities in the rural area were noted in 1994, after the creation of a legislative framework on the development of accommodation structures located both in known areas and frequented by tourists, as well as in less known areas, as well as public food and leisure services.

An important segment of Romanian rural tourism is agro-tourism, which has experienced a new approach through community financial support for agriculture and rural development. Thus, through the European programs SAPARD 2000-2006, NRDP 2003-2017 and NRDP 2014-2020, the investments necessary to support and boost agro-touristic activities were established.

The context data and information included in the evaluation reports of the national rural development programmes highlighted the *positive impact of the promotion and development of the Romanian agro-tourism.* However, the evolution of supply and demand for this tourist segment shows that this opportunity to supplement the incomes from agricultural activities was insufficiently exploited, although in the areas where the agro-touristic activity developed, it had a strong favorable impact not only on the economic and touristic environment of the localities, but also on the social framework, cultural, spiritual and even ecological.

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TOURIST AND AGRO-TOURIST POTENTIAL IN THE SOUTHEAST REGION

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Abstract

The South-East Development Region is characterized by a rich and harmoniously distributed tourist potential. The presence of the Black Sea coast and the Danube Delta on the territory of the region, but also the mountainous area are some of the biggest tourist attractions. In addition, in the region we find spas - climate, agritourism pensions, monasteries, cultural relics, etc., which makes it possible to practice several forms of tourism: seaside, mountain, cruise, rural tourism, agrotourism, religious, cultural and historical (etic, Roman, Greek, Byzantine cities).

This paper was conducted in order to analyze the tourism potential of the region, using indicators that reflect the evolution of tourist units and their spread in the region.

Keywords: development region, tourism, agrotourism, tourist potential, tourist activity

JEL Classification: L83

INTRODUCTION

Romania was and will remain a paradise of valleys and mountain peaks, plains and hills, with the shore and horizon of the sea, Danube, Delta, legendary river courses, with a great variety and harmony of landforms in a geographical space no very vast.

Rich in deposits of mineral waters, skunks and other scientifically identified and certified healing factors, not yet fully exploited to their full potential in many seaside resorts throughout the country. Romania has an exceptional variety of such natural factors, especially since they are distributed in a natural setting of great beauty. In the last 30 years, with all the transformations produced, tourism remains a true ally and a source of human health.

The South-East region is located in the south-eastern part of Romania, covering 35,762 km² or 15% of the total area of the country, the region is the second largest of the 8 of Romania. The South - East region includes almost all forms of relief: the Danube meadow, the Bărăgan plain, the Dobrogea plateau with the Măcin Mountains, and the northwestern part of the region includes a part of the Carpathians and Subcarpathians of Curvature. At the same time, the region is crossed by the Danube river, includes the Danube Delta and is bordered on the east by the entire Romanian Black Sea coast. However, the plain relief, with a continental climatic specificity, is predominant.

Romanian agrotourism has a very important contribution in the development of the rural area, it contributes to the life of the village both economically, socially and culturally. The long-term development of the village is closely linked to agriculture, infrastructure and environmental protection. (Dona I., 2005)

The arrangements for carrying out various tourism activities, although they have amplified in the last 2 decades, have a varying degree of modernization and uneven distribution.

MATERIALS AND METHODS

For the evaluation of the calculations we used the main quantification indicators for measuring the potential of tourism in the development of the economy, namely:

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- the number of tourists, obtained by accumulating information from different statistical documents, efficiently calculating shorter or longer periods of time, depending on the user. The indicator can determine the tourist traffic on the total tourist area, or tourist actions.

- the number of tourist days or overnight stays is determined from the total number of days registered in the accommodation spaces, by types of accommodation units, by types of actions and the area of origin of tourists;

The indicators used in the analysis undertaken are: arithmetic mean, standard deviation, coefficient of variation, percentage changes, annual growth rate.

Arithmetic mean $\overline{x} = \frac{\sum xi}{n}$

where: Xi = values of average productions / number of years (i); n = number of years considered.

The indicators used were taken from the literature (Ceapoiu, 1968) (Snak et al., 2003), (Culmeşi and Doroi, 2016):

- The average annual growth rate is calculated according to the formula:

$$r = \sqrt[n-1]{\prod \text{pn/p0} - 1}$$

where: r = average annual growth rate; ∏pn/p0 = chained growth indicators

- Standard deviation::

$$\partial = \sqrt{\frac{\sum(\bar{x}-xi)\text{^}2}{n-1}}$$

where: ∂ = standard deviation; xi = values of average productions over a number of years; n = number of years considered

- Coefficient of variation: $C = \frac{\delta}{\overline{X}} x100$

where: C = coefficient of variation (expressed in%)

The coefficient of variation can be: between 0-10% - small variation; between 10-20% - medium variation; over 20% - big variation.

The mean square deviation and the coefficient of variation - indicators that allow evaluative assessments to the degree of uniformity of the activity of economic agents (Draghici and Mara, 2010)

RESULTS AND DISSCUSION

By Development Regions, a significant increase in the number of agritourism pensions is found in the South-West Oltenia Region, with an annual rate of 14.9%, so that in 2019 their number is 3.5 times higher compared to 2010 The only region where there are decreases is the Bucharest-Ilfov Region, with a rate of -11.5% per year, so that from 6 units in 2010 it reaches 2 units in 2019. The minimum of the period was registered in 2016 when there is only one agritourism guesthouse in this region.

At the level of the South-East Development Region, we see increases in the number of agritourism pensions, with a rate of 9.4%, so that in 2019 we have 130 units more than in 2010.

Table 1. The evolution of the number of agritourism pensions in Romania by Development Regions in the period 2010-2019

Regions of Development	2010	2012	2014	2016	2019	Min	Max	Arithmetic mean	Annual growth rate	2019/ 2010
	nr	nr	nr	nr	nr	nr	nr	nr	%	%
TOTAL	1354	1569	1665	2028	2800	1210	2821	1951,9	8,4	206,8
Region N-V	266	252	226	284	538	206	538	321,2	8,1	202,3
Region Centru	487	594	663	823	892	424	984	727	7,0	183,2
Region aN-E	229	265	288	352	458	223	458	332,8	8,0	200,0
Region S-E	104	89	88	88	234	71	234	117	9,4	225,0

Regions of Development	2010	2012	2014	2016	2019	Min	Max	Arithmetic mean	Annual growth rate	2019/ 2010
Braila	:	1	1	1	1	1	1	1	0,0	0,0
Buzau	33	42	45	47	62	30	62	46,6	7,3	187,9
Constanta	35	7	7	7	20	5	35	10,9	-6,0	52,14
Galati	:	:	:	:	3	3	3	3	0,0	0,0
Tulcea	12	18	16	15	118	10	133	36,7	28,9	983,3
Vrancea	24	21	19	18	30	13	30	21,1	2,5	125,0
Region Sud-Mun.	109	147	174	210	256	109	256	188	10,0	234,9
Region Buc. - If	6	2	2	1	2	1	6	2,2	-11,5	33,3
Region S-V Olt.	60	108	108	120	209	60	209	122,2	14,9	348,3
Region Vest	93	112	116	150	211	85	211	141,5	9,5	226,9

Source: INS data processing

Within the region, the most developed counties in terms of the number of agritourism pensions are:

- Tulcea with 118 units in 2019, with 106 more than in 2010;
- Buzau with a number of 62 units in 2019, with 87.9% more than in 2010, registering a growth rate of 7.3%;
- Vrancea occupies the 3rd place, with 30 units, in 2019, with 6 more than in 2010.
- even if in 2010 the largest share is the number of agritourism pensions in the region was owned by Constanța County, their number decreases during this period with a rate of -6%. Thus, from 35 units in 2010 it reaches 5 units in 2017, representing the minimum of the analyzed period, so that in the final year to increase to 20 agritourism pensions.

Table 2. Evolution of accommodation capacity in agritourism pensions (places), in the South-East Region, 2010-2019

Region / county	2010	2012	2014	2016	2019	Min	Max	Arithmetic mean	Annual growth rate	2019/ 2010
	places	places	places	places	places	nr	nr	nr	%	%
TOTAL	20208	27453	30480	37394	49053	20208	49053	34230,7	10,4	242,7
Region S-E	2106	2047	1930	1817	4708	1386	4708	2395,5	9,4	223,6
Braila	:	10	10	10	10	10	10	10	0,0	100,0
Buzau	499	809	867	911	1187	496	1187	877,1	10,1	237,9
Constanta	883	239	239	253	470	184	883	318,3	-6,8	53,2
Galati	:	:	:	:	26	26	26	26	0,0	100,0
Tulcea	354	588	505	358	2555	208	2649	836,6	24,6	721,8
Vrancea	370	401	309	285	460	193	460	347,7	2,4	124,3

Source: INS data processing

In the South-East Region there are increases with a rate of 9.4%, the number of places in agritourism pensions doubling in 2019 compared to 2010. In the component counties, an impressive increase is observed in the number of places in agritourism pensions in Tulcea with a rate of 24.6%, so that in 2019 it reaches 2555 places, compared to 2010 when there were only 354 places. A decline is registered in Constanța, the number of places in agritourism pensions being reduced to 470 places in 2019, representing 53.2% compared to their number in 2010.

Table 3. Evolution of the tourist accommodation capacity in operation in agrotourism pensions (place - days), in the South-East Region in the period 2010-2019

Region / county	2010	2012	2014	2016	2019	Min	Max	arithmetic mean	annual growth rate	2019/ 2010
	thousand place-days								%	%
TOTAL	4891,9	6864,9	8220,0	10336,7	12616,0	4891,9	12616,0	8960,6	11,1	257,9
Regiunea S-E	299,9	386,4	391,0	414,4	899,5	291,1	899,5	479,2	13,0	299,9
Brăila	:	2,5	3,7	3,7	3,7	2,5	3,7	3,5	4,5	149,0

Region / county	2010	2012	2014	2016	2019	Min	Max	arithmetic mean	annual growth rate	2019/ 2010
	thousand place-days								%	%
Buzău	181,8	275,2	306,2	328,7	433,3	181,8	433,3	316,8	10,1	238,3
Constanța	30,9	10,7	13,2	17,6	43,6	10,0	43,6	18,6	3,9	140,9
Galați	:	:	:	2,1	7,3	2,1	7,3	5,0	13,0	300,5
Tulcea	43,8	27,6	19,0	23,4	342,4	4,1	342,4	84,0	25,7	781,9
Vrancea	43,4	70,5	48,9	39,0	69,3	39,0	70,5	54,5	5,3	159,6

Source: INS data processing

In the South-East Development Region, there are increases in accommodation capacity in operation, the number of places-days reaching 899.5 thousand in 2019, of approx. 3 times higher than the reference year 2010, with an annual growth rate of 13%.

Among the component counties of the South-East Region, the highest share is held by Buzău County, from 60.61% in 2010, reaching 84.91% in 2017, but decreasing to 48.16% in 2019. Tulcea is a county where the accommodation capacity in operation has increased dramatically from 43.8 thousand places-days in 2010, to 342.4 thousand places days in 2019, representing over 38% of the total accommodation capacity in operation in the region.

Brăila and Galați are the least developed counties in terms of agrotourism, so that accommodation capacity is low, with a number of places-days between 2.5-3.7 thousand and 2.1- 7.3 thousand, for the analyzed period.The tourist traffic follows the evolution of the number of tourists, both Romanian and foreign, who arrived or spent the night in different geographical areas of Romania regardless of the reason for traveling.

In Romania, the number of tourist arrivals in agritourism pensions, during the period under study 2010-2019, increased at an annual rate of 17.87%, so that from 289.9 thousand people in 2010 it reached 1272.9 thousand people in 2019 (Table 4.).

Among those who visited our country, approx. 92% are Romanians and only about 8% are foreigners.

On the first place with the highest number of arrivals, in the analyzed period is the Center Development Region, which in 2010 registered 85.73 thousand people and in 2019 a number of 432.25 thousand registering a growth rate of 19 ,5%.

Table 4. Dynamics of the number of tourist arrivals in agritourism pensionsin the South-East Region, in the period 2010-2019

Region / county	2010		2012		2016		2019		annual growth rate	2019/ 2010
	thousand pers.	%	thousand pers..	%	thousand pers..	%	thousand pers..	%	%	%
TOTAL	289,92	93,21	447,11	93,25	813,45	91,99	1272,88	92,06	17,87	439,04
Region S-E	19,27	96,08	22,59	95,42	29,36	95,93	83,05	96,45	17,63	431,09
Brăila			0,19	100,0	2,28	100,0	1,26	100,0	23,21	654,17
Buzău	9,24	96,26	12,72	97,44	15,43	97,24	27,24	98,44	12,76	294,79
Constanța	3,23	96,26	1,30	100,0	2,59	99,65	5,65	99,75	6,41	174,99
Galați					0,02	100,0	1,14	94,37	38,66	5984,21
Tulcea	1,56	91,86	2,15	94,47	4,36	88,64	40,51	94,06	43,59	2595,13
Vrancea	5,23	96,90	6,23	90,52	4,69	94,33	7,26	99,45	3,70	138,64

Source: INS data processing

In the South-East Region, the number of arrivals increased at a rate of 17.6%, from 19.27 thousand people in 2010 to 83.05 thousand in 2019, most of them being Romanian, with a share of about 95-96%.

And in the component counties of the South-East Region, the number of arrivals increased, for example in Buzau county, from 9241 people in 2010 to 27242 people in 2019.

In 2019, the interest of foreign tourists was manifested, especially for Tulcea, representing 6% of the number of arrivals in the county.

The analysis of the number of overnight stays in agrotourism pensions in Romania (table 5) highlighted their increase over the analyzed period 2010-2019, with an annual rate of 17.18%.

Table 5. Dynamics of the number of overnight stays of tourists in agritourism pensions in the South-East Region in the period 2010-2019

Region /county	2010		2012		2016		2019		annual growth rate	2019/2010
	Miithousand	%	Mii	%	Mii	%	Mii	%	%	%
TOTAL	604,61	90,64	906,50	91,40	1597,94	91,19	2518,61	92,05	17,18	416,57
Region S-E	45,24	96,28	43,21	95,43	54,59	95,68	176,26	95,83	16,31	389,65
Brăila		:	0,89	100,0	2,43	100,0	1,26	100,0	3,95	141,76
Buzău	16,39	95,36	21,26	97,42	23,87	97,36	43,45	98,46	11,45	265,19
Constanța	13,67	98,57	6,47	100,0	9,13	99,70	15,42	99,82	1,35	112,83
Galați		:		:	0,06	100,0	1,83	93,44	39,08	1946,81
Tulcea	3,78	92,82	5,57	94,29	13,10	90,62	105,66	93,88	44,80	2798,28
Vrancea	11,40	96,01	9,02	87,73	6,02	92,10	8,63	99,19	-3,05	75,69

Source: INS data processing

In the South-East Development Region, overnight stays increased during the studied period with an annual rate of 16.3%, reaching in 2019 a number 3 times higher compared to 2010 (45.24 thousand overnight stays). Only 4.17% of tourists who spent the night in the region are foreigners, especially in Tulcea County.

Comparing the overnight stays to the accommodation capacity in operation in the agritourism pensions (table 6), it is found that in 2010 the annual occupancy rate was 12.36%, increasing to 19.96% in 2019, being a very high occupancy rate. small indicating the preferences of tourists to spend only the weekends in these structures of tourist reception.

Table 6. Evolution of the annual employment rate in agritourism pensions, in the South-East Region, in the period 2010-2019

Region /county	2010	2012	2014	2016	2018	2019
	%	%	%	%	%	%
TOTAL	12,36	13,20	13,16	15,46	18,05	19,96
Region S-E	15,08	11,18	12,29	13,17	17,29	19,59
Brăila	-	36,16	41,32	66,28	56,88	34,41
Buzău	9,01	7,72	6,54	7,26	8,10	10,03
Constanța	44,20	60,69	47,85	51,98	45,07	35,40
Galați	-	-	-	2,81	18,54	24,96
Tulcea	8,62	20,18	47,82	55,88	29,48	30,86
Vrancea	26,27	12,80	22,72	15,44	11,92	12,45

Source: INS data processing

In the South-East Region, in 2010 the annual employment rate was 15.08%, and in the following years it decreases to 11.18%, but at the end of the period it rises to 19.59%. In the component counties of the South-East Region, the employment rate reached the highest level in Brăila County of 73.52% in 2015 and of 66.28% in 2016, but in 2019 it decreases to 34.41%.

Also, a higher annual occupancy rate was observed in Constanța County of 60.69% in 2012, but by 2019 it decreases to 35.4%. The occupancy rate in Tulcea increased considerably, reaching 30.86% in 2019 compared to 2010 when it was 8.62%, but the maximum level was recorded in 2015 when it was 59.28%.

In the South-East Region, the duration of the stay in the agritourism pensions, registers a minimum of 1.6 days in 2017 and a maximum of 2.3 days in 2010, and in 2019 it reaches a duration of 2.1 days, decreasing during this period with a rate of -1.1%. In the component counties of the region, increases are registered only in Tulcea and Galați with a rate of 0.8% and 0.3%, respectively, the duration of the stay during this period being on average 2.6 days and 1.9 days, respectively.

Significant decreases are observed in Brăila County, which started in 2012 with a stay of 4.6 days and reaches 1 day in 2019, with an annual rate of -15.6%. And in Vrancea county the length of stay decreases, from 2.2 days in 2010 to 1.2 in 2019 with a rate of -6.5%.

The decrease of the tourist stay in the locality denotes, a low capacity of attraction of the area, high prices compared to the services offered, poor exploitation of local attractions, the locals do not know how to attract tourists in the area and those who come for the first time do not return.

Romanian tourists stay on average 2 days in agritourism pensions, decreasing in the analyzed period with a rate of -0.3%. (Table 7.).

Table 7. Evolution of the average length of stay for Romanian tourists, in the South-East Region, in the period 2010-2019

Region /county	2010	2012	2014	2016	2018	2019	Min	Max	Media	Coef. var.		Ritm anual
	nr.	nr.	nr.	nr.	nr.	nr.	nr.	nr.	nr.	%	semnf	%
TOTAL	2,0	2,0	1,9	1,9	1,9	2,0	1,9	2,0	2,0	2,2	mică	-0,3
Region S-E	2,4	1,9	1,7	1,9	1,9	2,1	1,6	2,4	1,9	10,8	mijl	-1,2
Brăila		4,6	2,2	1,1	1,0	1,0	1,0	4,6	2,1	71,4	mare	-15,6
Buzău	1,8	1,7	1,6	1,5	1,5	1,6	1,5	1,8	1,6	5,2	mică	-1,1
Constanța	4,3	5,0	3,8	3,5	3,0	2,7	2,7	5,0	3,8	17,7	mijl	-5,0
Galați				3,1	2,1	1,6	1,3	3,1	1,9	36,7	mare	0,2
Tulcea	2,4	2,6	2,2	3,1	2,2	2,6	2,2	3,1	2,6	9,8	mică	0,7
Vrancea	2,2	1,4	1,2	1,3	1,2	1,2	1,2	2,2	1,4	21,5	mare	-6,4

*Source: prelucrare date INS,*c.var<10% serie de date foarte omogenă, variația este mică, media este semnificativă; 10-20% serie de date omogenă;>20% serie de date seria este eterogenă, variație este foarte mare, media nu este reprezentativă*

In the South-East region, the length of stay decreases from 2.4 days at the beginning of the period to 1.6 days in 2017, but towards the end of the period it increases to 2.1 days. The most attractive county was Constanța, which registers in the period 2010-2019, an average length of stay of 3.8 days, but also in this county the power of attraction decreases, so that from 4.3-5 days of stay at the beginning of the period reaches 2.7 days, with an annual rate of -5%.

CONCLUSIONS

In conclusion we can say that:

- Out of the total accommodation structures, it is observed that the tourist and agrotourism pensions are representative, in the analyzed period having a growth rate of 6.5% and 8.4% respectively, which means an increase of the possibilities to spend holidays in a quiet and natural environment.
- At the level of the South-East Development Region we see increases in the number of agritourism pensions, with a rate of 9.4%, so that in 2019 we have 130 units more than in 2010.
- In the South-East Development Region there are increases in accommodation capacity in operation, the number of places-days reaching 899.5 thousand in 2019, of approx. 3 times higher than the reference year 2010, with an annual growth rate of 13%.
- The number of arrivals increased at a rate of 17.6%, from 19.27 thousand people in 2010 to 83.05 thousand in 2019, most of them being Romanian, with a share of about 95-96%.
- overnight stays increased in the studied period with an annual rate of 16.3%, reaching in 2019 a number 3 times higher compared to 2010 (45.24 thousand overnight stays
- The decrease of the tourist stay in the locality denotes, a low capacity of attraction of the area, high prices compared to the services offered, poor exploitation of local attractions, the locals do not know how to attract tourists in the area and those who come for the first time do not return .
- The tourist traffic follows the evolution of the number of tourists, both Romanian and foreign, who arrived or spent the night in different geographical areas of Romania regardless of the reason for traveling.

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ANALYSIS OF THE ORGANIZATION AND DEVELOPMENT OF THE TECHNICAL-MATERIAL BASE FOR TOURISM AND AGRO-TOURISM IN VRANCEA COUNTY

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Abstract

Vrancea County has an extremely varied relief that is suitable for practicing tourist activities. The paper aims at an analysis of the tourist and agrotourism potential in Vrancea county using the following indicators: the evolution of agrotourism pensions, tourist reception structures, accommodation capacity, etc. The analysis highlighted the fact that the county has vast natural and anthropic resources that are poorly exploited for the development of tourism and agrotourism.

Keywords: tourist and agrotourism potential, tourist activity, accommodation capacity

JEL Classification: L83

INTRODUCTION

Vrancea located at a geographical intersection, is the bridge between the largest areas of the Eastern Carpathians and Southern Carpathians, Siret Plain and Danube Plain, the connection between the historical regions occupied by Romanians: Moldova, Transylvania and Wallachia, and as the queen of transhumance in the country Bârsa to Dobrogea and the Danube (Vrancea County Council, 2019).

Vrancea County, through its geographical position, through its varied tourist potential, favors the practice of various forms of tourism: rural tourism, agrotourism, hunting, fishing, cultural, etc. Vrancea is at the junction of important road arteries that facilitate the movement from the north of the country to the Danube Delta, the coast or the Capital.

The county offers a diverse relief placed in steps: meadow, plain, hills and mountains, with an attractive landscape and a rich cultural heritage with a lot of historical monuments and a valuable treasure of civilization and popular culture.

The research carried out in this paper aimed to capitalize on and promote the tourist and agrotourism potential of Vrancea County, a less known area but with potential.

MATERIALS AND METHODS

The indicators used in the analysis are: arithmetic mean, standard deviation, growth index, percentage changes, annual growth rate, regression function and correlation coefficient that measures the relationship between the dependent and the independent variable. (Draghici and Mara, 2010)

In the elaboration of this paper, statistical data from the specialized literature were used (INS, FAOSTAT, EUROSTAT, university courses, specialized magazines, etc.).

In order to assess the tourism potential of an area / region or a country, its degree of exploitation, all research and analysis is done using specific research methods, in which different indicators are used (Balaure V. 2000). Among the main research methods are:

- direct - the information is collected directly from the information carriers;
- indirect - information collected from the office from statistical, financial and accounting bases.

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There are a multitude of direct research methods, depending on the conduct, place and profile of the research, etc. of which the investigation and the observation differ (Dănciulescu D., 2019).

RESULTS AND DISSCUSION

The development of Vrancea County, from an agrotourism point of view, is highlighted in the detailed analysis of the infrastructure and the tourist circulation in the agrotourism pensions for a period of 10 years.

Analyzing the data from table 1, it is observed that the tourist pensions have an increasing trend throughout the analyzed period with an annual growth rate of 4.8%, the coefficient of variation having an average significance of 18.9%. During this period in Vrancea county there is a maximum in 2019 with 11 tourist pensions and a minimum of 5 pensions in 2010.

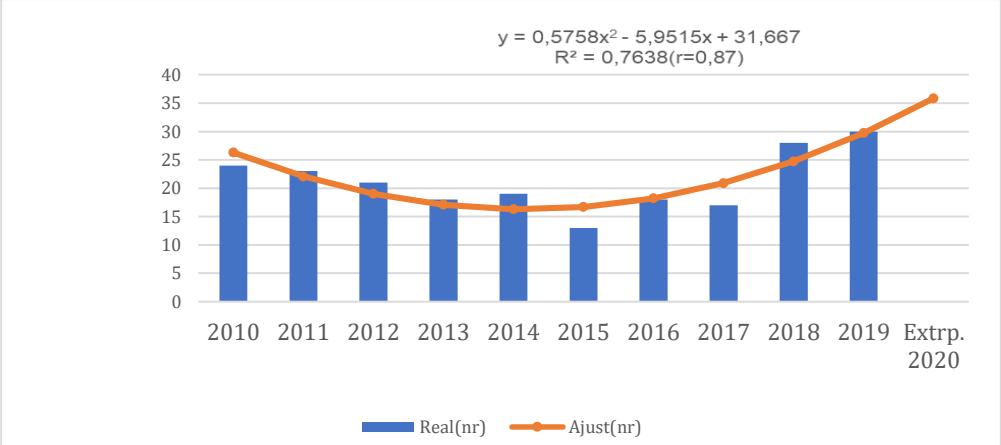
Regarding the agritourism pensions, they have a large increase in 2019 with a number of 2821 Agrotourism pensions, which results in an annual growth rate of 6.2%.

Table.1. The evolution of the number of tourist and agrotourism pensions in Vrancea County for the period 2015-2019.

Specification	2010	2013	2015	2017	2019	Min	Max	Media	Stdev	Cvar	Semnif	annual growth rate
Tourist pensions -total	949	1335	1527	1666	1669	949	1709	1400.5	264.8	18.9	medium	4.8
Vrancea	5	8	9	7	11	5	11	7.9	1.8	22.7	grande	6.8
Agrotourism pensions - total	1354	1598	1918	2556	2821	1210	2821	1951.9	587.7	30.1	grande	6.2
Vrancea	24	18	13	17	30	13	30	21.1	5.2	24.7	grande	1.9

*Source: vrancea.insse.ro, * c.var <10% very homogeneous data series, variation is small, average is significant; 10-20% homogeneous data series;> 20% data series series is heterogeneous, variation is very high, the average is not representative*

Figure 1. Calculation of the trend equation of the number of agritourism pensions in Vrancea county, in the period 2010-2019(Source: vrancea.insse.ro)



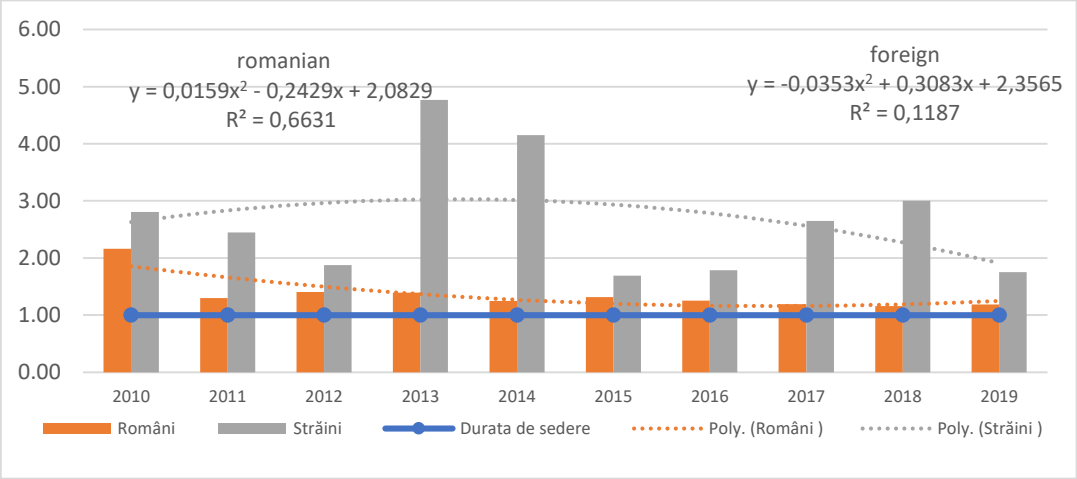
During the analyzed period, the equation of trend of the number of agritourism pensions, expects that, in 2020, their number will reach 36 units. There is a strong link between the two variables so that the variation in the number of pensions from year to year can be explained in proportion of 76.4%, the rest being the influence of other factors.

The duration of the stay in the agrotourism pensions in the county (Figure 2), had a decreasing trend from 2.18 days in 2010 to 1.19 days in 2019, and the shortest stay was registered in 2018 of 1.16 days .

Among Romanian tourists, the length of stay had a continuous decrease throughout the period, starting from 2.16 days in 2010 and up to 1.16 zle in 2018 and 2.19 days in 2019. By extrapolation, a slight increase is expected. of the duration of the stay among Romanian tourists in 2020 at 1.34 days.

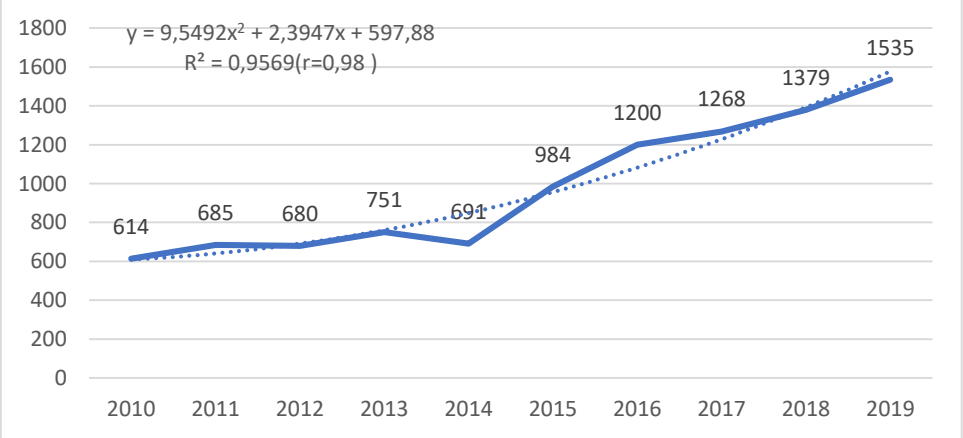
Regarding the length of stay in agritourism pensions of foreign tourists, throughout the period there were increases of up to 4.77 days in 2013, but also decreases of up to 1.69 days in 2014. In 2019 the duration of the stay was 1.75 days.

Figure 2. Calculation of the trend equation of overnight stays in agrotourism pensions in Vrancea county, in the period 2010-2019(Source: vrancea.insse.ro)



The trend equation indicates that in 2020 the length of stay in agritourism pensions among foreign tourists will decrease to 1.48 days. Analyzing the labor force in hotels and restaurants in Vrancea County, statistical data show an increase in the number of employees in this sector of the economy with a rate of 10.7% over the analyzed period 2010-2019.

Figure 3. Calculation of the trend equation of the number of employees in hotels and restaurants in Vrancea County, in the period 2010-2019*(Sursa: www.insse.ro)*



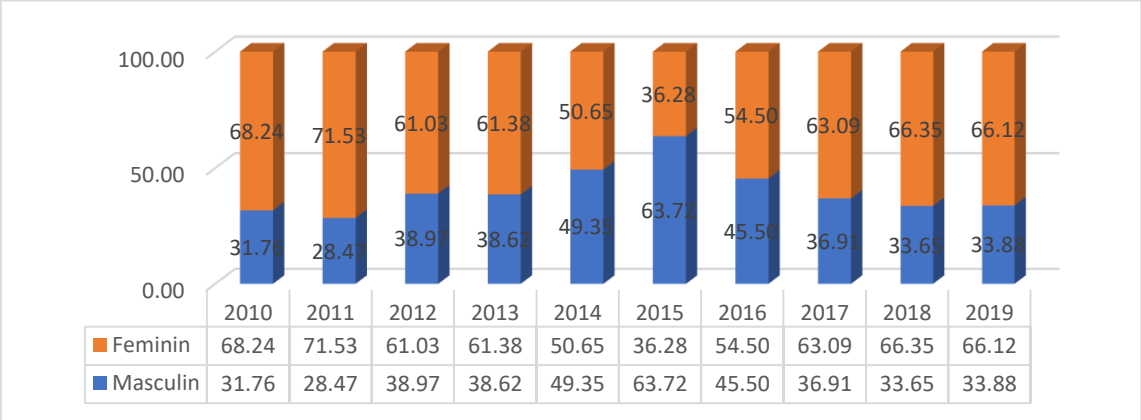
Starting with 2010, when 614 employees were registered in hotels and restaurants, their number increased significantly, reaching 1535 employees in 2019, except for 2014, when a slight decrease was observed. (Figure 3)

In the total number of employees in the county, the share of those in this sector is very small, starting from 1.22% as it represents in 2010, with small oscillations it increases to 1.86% in 2015, and in 2019 it represents 2.66%.

The trend equation y = 9.5492x2 + 2.3947x + 597.88 predicts that in 2020 the number of employees in this sector will increase to 1780 people. The correlation ratio, r = 0.98, shows a strong link between the two variables.

More than half of the employees in the hotel and restaurant sector are female, except for 2015, when the ratio is reversed, male employees representing over 66.7% of the total.

Figure 4. The share by sex of the number of employees in hotels and restaurants in Vrancea County, in the period 2010-2019*(Sursa/Source: www.insse.ro)*



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Feminin	68.24	71.53	61.03	61.38	50.65	36.28	54.50	63.09	66.35	66.12
Masculin	31.76	28.47	38.97	38.62	49.35	63.72	45.50	36.91	33.65	33.88

We conclude with the observation that regarding the human base in Vrancea County, used in the tourism sector, during the analyzed period the trend is an ascending one, which means an evolution in the professional training of employees.

CONCLUSIONS

In order to modernize the existing infrastructure and to reach a high level of comfort in terms of leisure activity, a more detailed analysis of the existing functions in the already existing centers must be made. At the same time, depending on the detected needs, it is possible to analyze the possibilities of extension regarding the development of a diversified range of leisure activities in the rural area.

These activities can be: practicing sports activities in specially designed outdoor halls; specially designed routes. In today's competitive environment, the strategies adopted in the field of tourism must help create a favorable environment for this sector. This requires a bold strategy, specific to the sector, which provides a vision, a model capable of guiding the production and marketing of tourism products.

Vrancea County is shaping up as a Romanian space with a cultural and tourist potential of wide interest, attractive and still insufficiently fruitful.

Motions

Regarding the capitalization of the tourist potential of Vrancea county as well as the current situation, I admit the tracing of the main ways of developing agrotourism from the point of view of the estimates made from the vision of tourists who will be interested in the Vrancea area.

All these can be integrated in the medium and long term in the development strategies in order to include / integrate the agrotourism product from Vrancea area in national and international rural tourism programs.

The promotion of the forms of tourism and agrotourism as well as of the tourist products can be done with a total modernization of the infrastructure, of the roads, water and sewerage as well as of the electricity network, namely:

- Mountain tourism in the Tulnici-Lepșa, Soveja, Jitia - Vintileasca mountain massifs;
- Spa tourism in Soveja resort with the improvement of accommodation conditions and comfort;

- Valorization of the bioclimate and mineral waters (Vizantea);
- Establishment of leisure resorts;
- Scientific valorization of tourism in Vrancea nature reserves;
- Improving the material base regarding the activities and services of agrotourism with the possibility for each ethno-folk locality to become a cultural tourist center;
- Improvement and development of tourist and agrotourism accommodation structures;
- Promoting association tourism programs for the benefit of local communities;
- Attracting as many tourists as possible by setting up an institutional framework.

In order to modernize the existing infrastructure and to reach a high level of comfort in terms of leisure activity, a more detailed analysis of the existing functions in the already existing centers must be made. At the same time, depending on the identified needs, it is possible to analyze the possibilities of extension regarding the development of a diversified range of leisure activities in the rural area.

These activities can be: practicing sports activities in specially designed outdoor halls; specially designed routes.

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EVALUATION OF THE TOURIST AND AGRO-TOURIST POTENTIAL OF VRANCEA COUNTY

PETRUȚA ANTONETA ENACHE (TUREK-RAHOVEANU)[1], DIANA-MARIA ILIE[2]

Abstract

Vrancea, the land of natural wonders, the land of old stories, the land of ancestral song and poetry unsurpassed by any Romanian land, is the most beautiful part of the Carpathian depression. This blessed land is a miniature Romania.Vrancea County has an extremely varied relief that is suitable for practicing tourist activities. The paper aims at an analysis of the tourist and agrotourism potential in Vrancea county using the following indicators: the evolution of agrotourism pensions, tourist reception structures, accommodation capacity, etc. The analysis highlighted the fact that the county has vast natural and anthropic resources that are poorly exploited for the development of tourism and agrotourism.

Keywords: tourist and agrotourism potential, tourist activity, accommodation capacity

JEL Classification: L83

INTRODUCTION

Vrancea is the "country" of legend and history, the "cradle of Miorița", it is the old land of Răsăș, with a troubled past and a unique identity of Romania. located outside the Curvature Carpathians with an area of 4,857 km2. The county is located at the intersection of the borders of three "Romanian countries": Moldova, Muntenia and Transylvania.

It has a tourist potential closely related to the cultural heritage, which includes historical vestiges, religious structures and cultural buildings, monuments, museums. The values of this heritage represent a capacity for social and economic development of the provinces, and highlights the tourist potential it constitutes.

With a significant architectural value are historical monuments, places of worship (churches, monasteries, religious ensembles, hermitages and bell towers, chapels, crosses), old settlements from the eighteenth and nineteenth centuries and the first half of the twentieth century, buildings with a particularly important architectural aspect. and as locations of social and administrative interest - Victoriei Monument from Tișița, Focșani Theater - "Maior Gheorghe Pastia", Unirii Obelisk from Focșani, Museum of Natural Sciences - Focșani. (Vrancea County Council, 2019)

MATERIALS AND METHODS

As a method of analyzing the evolution of agrotourism in Vrancea County, we used statistical data taken from the website of the National Institute of Statistics, respectively statistics performed over a period of 10 years, statistics containing the number of agritourism pensions and the number of tourists who used as leisure spaces in the years studied.

The indicators used in the analysis are: arithmetic mean, standard deviation, growth index, percentage changes, annual growth rate, regression function and correlation coefficient that measures the relationship between the dependent and the independent variable.

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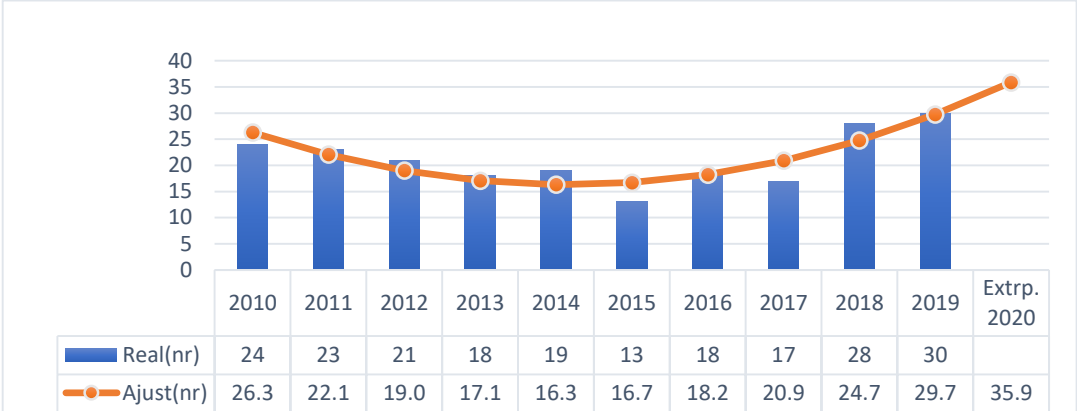
RESULTS AND DISSCUSION

The development of Vrancea County, from an agrotourism point of view, is highlighted in the detailed analysis of the infrastructure and the tourist circulation in the agrotourism pensions for a period of 10 years.

The following graph shows the evolution of the number of agritourism pensions in Vrancea County for the period 2010-2019.

Figure 1. Calculation of the trend equation of the number of agritourism pensions in Vrancea county, in the period 2010-2019



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Extrp. 2020
Real(nr)	24	23	21	18	19	13	18	17	28	30	
Ajust(nr)	26.3	22.1	19.0	17.1	16.3	16.7	18.2	20.9	24.7	29.7	35.9

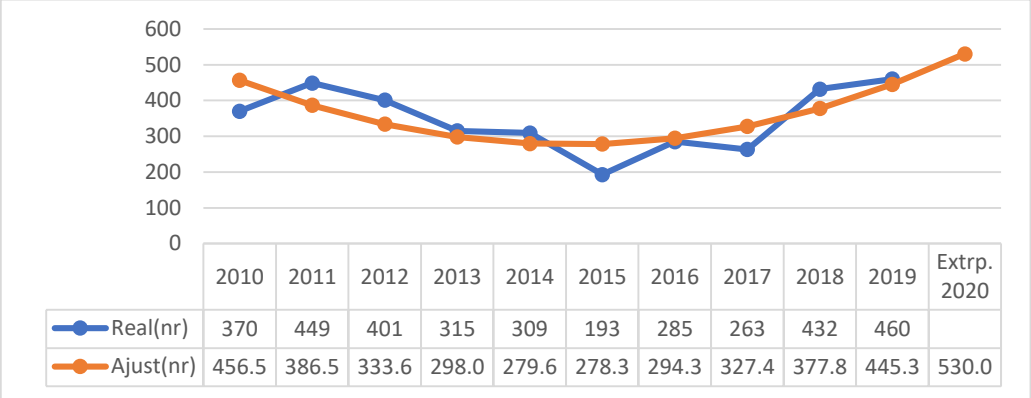
Source: vrancea.insse.ro

Following the analysis of statistical data, it is found that their number has a decreasing trend until 2015 and then increase in the next period to a number of 30 pensions in 2019, with an annual rate of 2.5%. The trend equation of the number of agritourism pensions, for the analyzed period (Y = 8.59x2 - 95.8x + 543.7) predicts that in 2020 their number will reach 36 units.

There is a strong link between the two variables (correlation ratio r = 0.87), so that the variation in the number of pensions from year to year can be explained in proportion of 76.4%, the rest being the influence of other factors.

Regarding the accommodation capacity, the same trend is observed as in the case of the number of pensions, decreasing until 2015 when a number of 193 places were registered, so that in the next period it will increase reaching 460 places in 2019. average growth for the analyzed period was 2.4%, with an average period of 347.7 accommodation places. (Figure 2.) The equation of the tendency of the accommodation capacity in the agro-tourist boarding houses expects that in 2020 they will increase to 530 places. The correlation ratio between the accommodation capacity and the analyzed time period, r- = 0.74, shows a significant connection between the two variables.

Figure 2. Calculation of the trend equation of accommodation capacity in agritourism pensions in Vrancea county, in the period 2010-2019

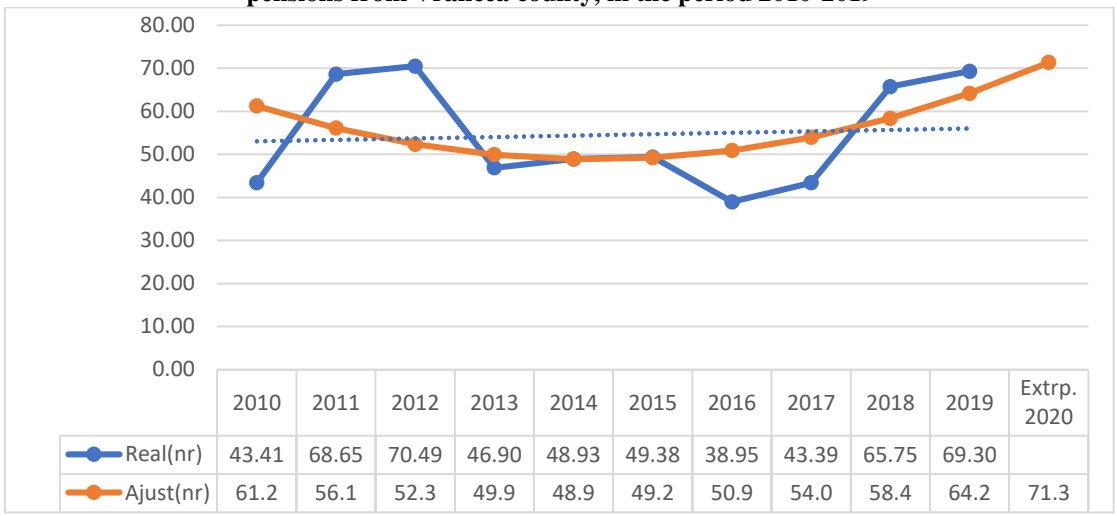


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Extrp. 2020
Real(nr)	370	449	401	315	309	193	285	263	432	460	
Ajust(nr)	456.5	386.5	333.6	298.0	279.6	278.3	294.3	327.4	377.8	445.3	530.0

Source: vrancea.insse.ro

In 2020, by calculating the trend equation, y = 0.6835x2-7.1919x + 67.757, an increase to 71.3 thousand places-days is expected. The analysis of the regression and correlation equation shows a significant connection between the two variables, the correlation ratio having the value of 0.74.

Figure 3. Calculation of the trend equation of the accommodation capacity in operation in agrotourism pensions from Vrancea county, in the period 2010-2019

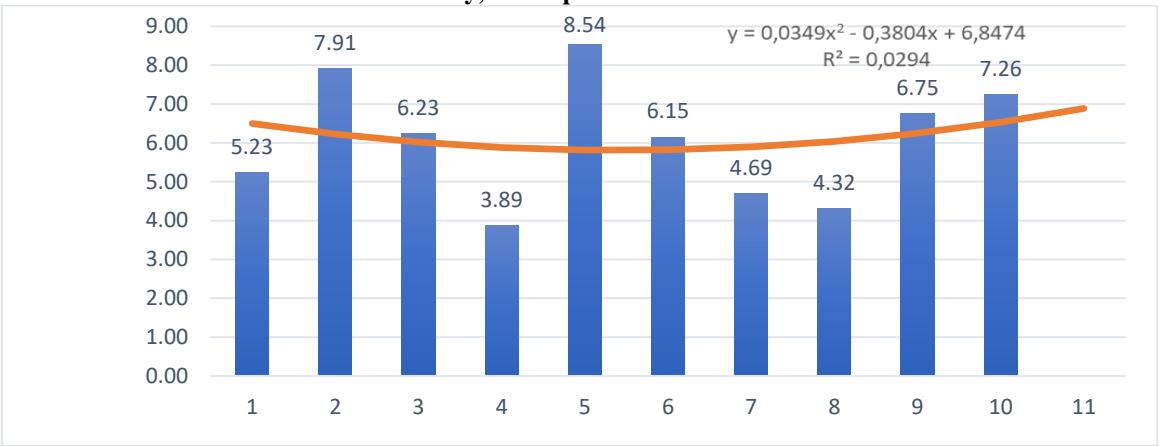


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Extrp. 2020
Real(nr)	43.41	68.65	70.49	46.90	48.93	49.38	38.95	43.39	65.75	69.30	
Ajust(nr)	61.2	56.1	52.3	49.9	48.9	49.2	50.9	54.0	58.4	64.2	71.3

Source: vrancea.insse.ro

Regarding the evolution of arrivals in agritourism pensions, we can see from Figure 4. that the number of tourists oscillated in the period 2010-2019, with a minimum in 2013 of 3.89 thousand arrivals, so that in the next year to increase to 8.54 thousand arrivals, representing also the maximum number of persons arriving in the agritourism pensions from Vrancea during this period.

Figure 4. Calculation of the trend equation of tourist arrivals in agrotourism pensions in Vrancea county, in the period 2010-2019



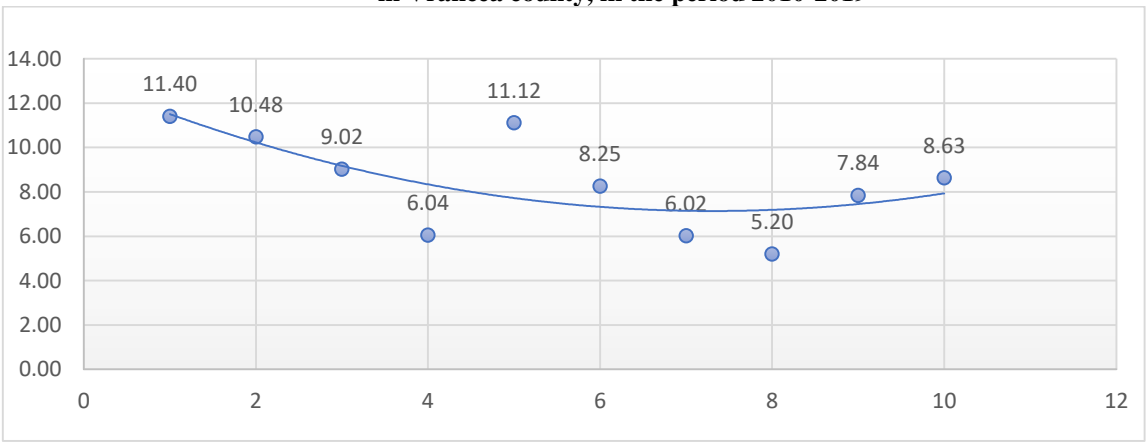
Source: vrancea.insse.ro

By calculating the trend equation y = 0.0349x2-0.3804x + 6.8474, it is estimated that the number of arrivals will decrease in 2020 to 6.89 thousand people. The correlation ratio, r = 0.17, between the number of arrivals and the time period, shows that there is no connection between the two variables, other factors influencing the arrivals of tourists in the county.

Another analysis of the overnight stays in the agritourism pensions in Vrancea County (Figure 5), for the period 2010-2019, highlighted the fact that they reached a minimum point in 2107 (5201 overnight stays) and then increased until 2019 at 8631 overnight stays, of which 99.2% were Romanian tourists.

The decrease in the number of overnight stays in the county had an annual rate of about -3.1%. The difference compared to 2010 was 2772 overnight stays representing a decrease of -24.3%.

Figure 5. Calculation of the trend equation of overnight stays in agrotourism pensions in Vrancea county, in the period 2010-2019



Source: vrancea.insse.ro

The trend equation, y = 0.1097x2 - 1.6039x + 12.997, predicts for 2020 a stagnation in the number of overnight stays in 2019. Also, the correlation ratio, r = 0.67, does not indicate a strong link between the analyzed time period and the number of overnight stays.

CONCLUSIONS

In the current situation, tourism and agrotourism are supported exclusively by natural resources and historical heritage, and the contribution to infrastructure is minimal.

It is also necessary to modernize tourism products to develop the offer and increase competitiveness on the national and international market.

That is why investments are needed for the development and modernization of territorial infrastructure. If the measures in the Strategy are respected, a priority result will be the increase in the medium and long term of the economic competition in the tourism sector.

Through multiple methods, plans can be developed for the conservation of heritage, historical monuments and their capitalization. Creating partnerships between Vrancea County and neighboring areas to develop programs that can promote local culture, national and even international partnerships.

The strengths of the county are the extensive wine and hunting fund, attractive landscapes, diversified tourist objectives and the weak ones: the accommodation units are unevenly distributed, are insufficient, non-existent in some localities, the infrastructure is not at present standards, insufficient tourist promotion, tourist services low quality.

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STRATEGIES FOR FEEDING THE WORLD MORE SUSTAINABLY WITH ORGANIC AGRICULTURE

RADU GHEORGHE ANTOHE*[1], NICOLAE SUVOROV[2]

Abstract

Global hunger and insufficient nutrient intake are worldwide debated issues. The present paper aims to identify the main problems in the agri-food sector and to find solutions for achieving sustainable food systems. Organic farming is proposed as a promising approach. A better understanding of the role that organic agriculture could play in the sustainable development of the food system, helps us to establish the environmental externalities related to the 100% conversion in organic agriculture. It needs more land than conventional agriculture but can drastically reduce the use of nitrogen and plant protection products. However, due to the problem of world hunger, food waste due to inappropriate consumer behaviour, but especially insufficient production, the global conversion to organic farming remains in the scenario stage. Another aspect that requires an interdisciplinary approach is the correlation between high-performance food systems that protect the environment and the interdependencies between crops, animals, and human consumption.

Keywords:*green economy,organic agriculture, hunger, sustainable development*

JEL Classification: *Q1, Q18, Q19*

INTRODUCTION

In recent decades, the availability of food on the agri-food market has increased considerably due to the escalation of agriculture and the launchof new, high-performance inputs that generate a more significant amount of food, are more diversified, and of superior quality. The intensification of conventional agricultural systems had a negative impact on the environment and the ability of ecosystems to regenerate. Some of the adverse effects on the environment that intensive agriculture systems bring to the fore are eutrophication of land and water bodies, over-supply of reactive nitrogen, biodiversity loss, and greenhouse gas (GHG) emissions. Several scientific studies in the literature show that by 2050, global food security can be ensured only by increasing agricultural production by 50% if the population reaches 9 billion people. If the intensification of agriculture will be so aggressive and the generation of negative environmental externalities will continue to occur at the same level, it is easy to understand that irrecoverable imbalance of both agricultural and natural ecosystems will occur but especially the increase of pollution indices at the global level. Therefore, it is crucial to identify strategies that reduce the negative impact of agriculture on the environment, which does not endanger food security.

To achieve this goal, the efficiency of agricultural systems must increase, and the adverse effects and risks related to the environment must decrease drastically. Efficient resource management, agroecology, reducing the consumption of animal products, and solving problems related to food waste isnecessary to improve the global situation regarding environmental protection. A prominentproposal is organic farming which, although still a controversial topic, can significantlyimprove the sustainability of agri-food systems. The main characteristics of organic agriculture are promoting crop rotation, improving soil fertility, and reducingfertilizers and synthetic PPP. The positive performance of organic farming has been widely reported to be correlated with the most important environmental indicators. However, the issue of the larger train size train needed for organic farming compared to conventional agriculture for the same amount of production remains unresolved. The environmental benefits of organic farming are lower if the unit of product is taken into account and not the area unit. Another issue that brings organic farming to the forefront is the

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risk that the soil will be left without the nutrients needed to grow legumes; therefore, organic farming is not the best option for feeding the entire population.

MATERIALS AND METHODS

The present research is approached in order to focus on the production yields of conventional agriculture and the unitary impact on the environment in the context of the conversion to organic agriculture. This requires two additional changes to the food system: reducing human consumption of animal products, reducing the amount of feed on arable land, and reducing food waste. The present researchaims to answer the question of whether organic agriculture can produce valuable food with more nutrients, in orderto stabilizethe balance between the quantities produced by conventional agriculture. This assessment involves identifying the main issues and risks related to the conversion to global organic agriculture as a determining factor in sustainable development. The evaluation of the result of combining several synergistic sustainability strategies is necessary to consider the probability of expanding the number of organic food systems, which, although considerably expanding the demand for arable land, protect the environment from excess nitrogen, also reducing the amount of GES.

RESULTS AND DISCUSSIONS

Effect of Organic Nutrition on Crop Productivity

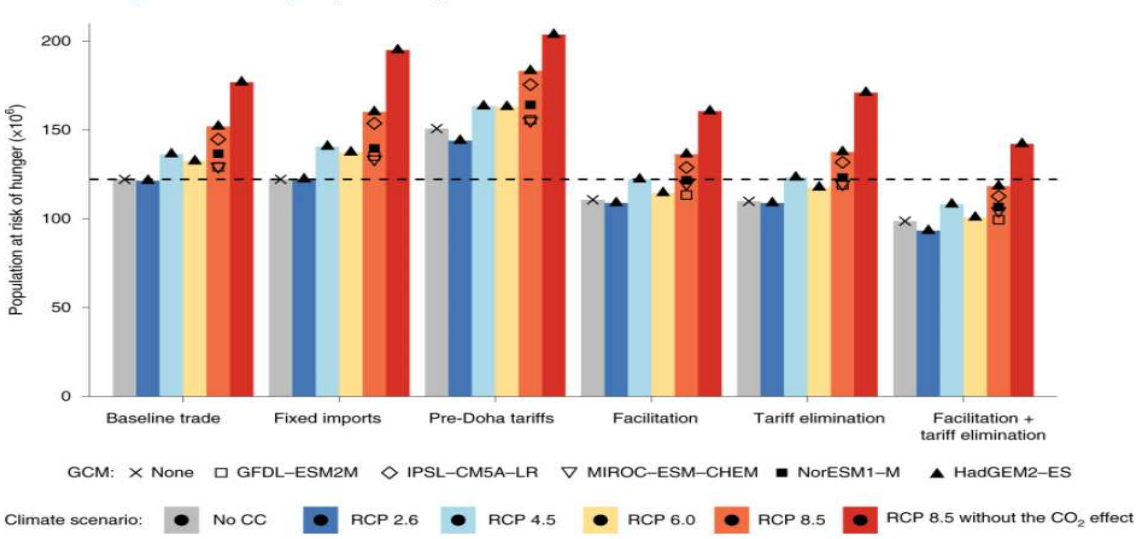
Enhancing the earth with organic compound is a well-known strategy that can increase soil fertility and can improve the nutritional quality of food. This practice involves the application of manure (FYM) on areas cultivated with legumes to the detriment of inorganic substances often used in conventional agriculture (Flaig, 1975). Natural fertilizer contains all the micro- and macronutrients of aromatic plant growth and development (Hesse, 1984) and also contributes to the preservation and improvement of soil structure.

The results of Sharma and Mitra's research on the addition of organic matter to showed that yields for straw cereals and rice have increased considerably. Ranganathan and Selvaseelan found, contrary to previous findings on the possibility of organic farming to dry out nutrient soils by abandoning nitrogen-based fertilizers, that composting can increase legume yields. In the same research, an increase of yield by 20% is reported due to the compost from straw, mushrooms and used rice being compared with the fertilizer based on the macro-elements nitrogen, phosphorus and postassium.

(NPK). Stockdale highlights through its research the benefits that organic farming brings to the global environment, namely: reducing energy consumption, reducing food waste, reducing greenhouse gas emissions and preserving biodiversity. Emerging countries, which face the impossibility of bringing new inputs to agriculture and improving soil quality by transforming conventional agriculture into smart agriculture, pose an increased risk of inability to ensure food security and safety. Crop productivity can be comparable to that of conventional agriculture if it respects the principle of continuity and uses soil enrichment practices with mineral fertilizers and manure (Tamaki et al., 2006).

Even though we are in a time when technological progress is continuous and unstoppable, world hunger still exists in many regions. Currently, over one billion undernourished people suffer from hunger and poverty and their numbers are growing (Fan 2010). Statistics show that a steady 70% increase in agricultural production is needed to cover the food needs of the entire population from 2009 to 2050 (FAO 2009). Developing countries are the first on the blacklist because here are the highest birth rates and with the increase in the number of people, the demand for food will increase in direct proportion. For these reasons, an analysis of all the possibilities for growing agricultural products through different strategies and systems is needed.

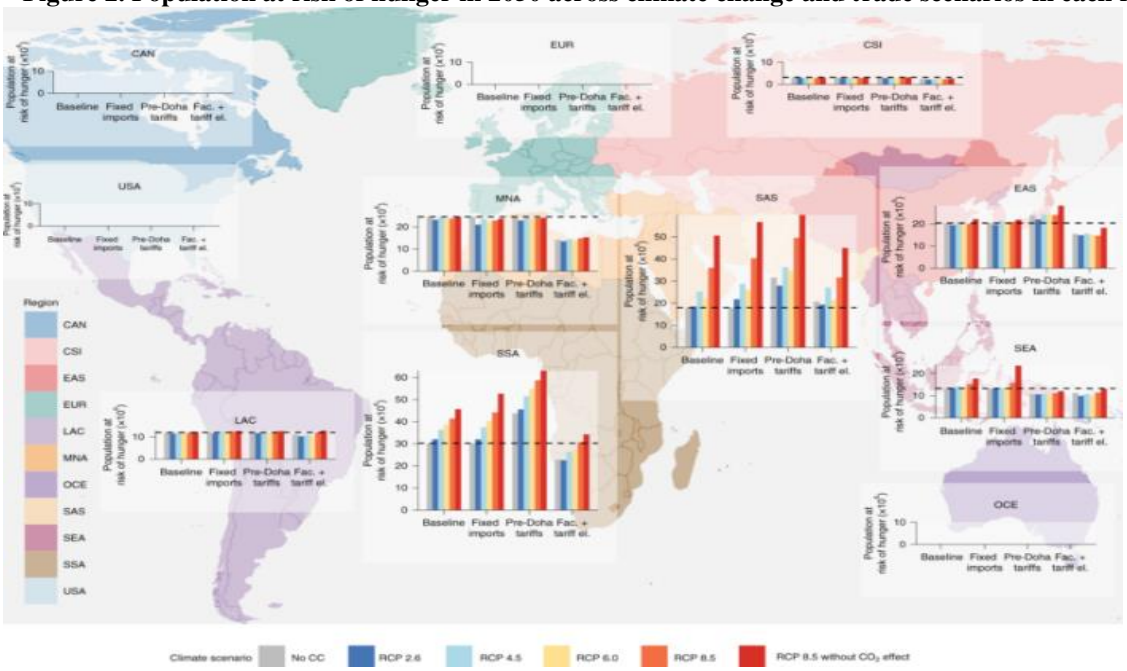
Figure 1. Global population at risk of hunger in 2050 across climate change and trade scenarios



Source: From 'Global hunger and climate change adaptation through international trade', by C. Janssens, P. Havlík, T. Krisztin, J. Baker, S. Frank, T. Hasegawa, D. Leclère, S. Ohrel, S. Ragnauth, E. Schmid, H. Valin, N. Van Lipzig& M. Maertens,2020

The global outlook for climate change in areas where humanity continues to face hunger and excessive poverty highlights that climate change is having a harder effect in emerging countries where temperatures are usually above average. Maintaining high crop yields is the only way for these countries to ensure food security and reduce the risk of malnutrition. If imports remained at a fixed value, hunger would spread to more territories than at present and the ability of developing countries to ensure efficient management of resources so that available monetary quantities would not fall is close to 0..

Figure 2. Population at risk of hunger in 2050 across climate change and trade scenarios in each region.



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Increasing export prices is not an option because food must meet sufficient nutritional conditions for daily food, must be safe and fresh. Figure 2 shows a scenario in which crop yields remain constant and price fluctuations are felt due to climate change and the anthropogenic effect on the environment

Green Economy Perspectives of Organic Agriculture

Agriculture is the sector that has the most in common for the concept of green economy. It is the main food provider for the entire population of the globe, it is a source of income for most people and also the largest consumer of resources. Thus, 40% of the global land area and 70% of water is used by this sector. Besidessupplying aliments, agriculture also delivers us with material goods, useful to society and the agricultural sector.

The practices of organic farming are based on the least possible use of plant protection products and the prohibition. The division of chemically synthesized substances that can influence human health in cooking if consumed. Through the practices of organic farming the soil is less negatively influenced by the use of synthetic products. Nothing to remove diseases and pests and genetically modified organisms and their derivatives are not allowed. And standardization by organic farming. The definition of organic agriculture in Romania is to obtain agri-food products without the addition of synthesized substances. And without chemical food additives, so that it complies with food quality and safety standards.

Ecological agriculture as a secondary branch of Agriculture and as an engine for sustainable development of rural areas in Romania. It is growing and it is a real opportunity for another branch of export to Romania.

Farmers oriented towards organic farming and those with studies in agriculture are inclined towards new technologies that do not use harmful substances for human consumption.

The potential of organic farming in Romania exceeds 20% of the total agricultural area.

In order to improve the agro-ecological sector and develop it, the competitiveness of organic products for export markets must meet the following:

-expanding production and markets by creating organized producer groups;

-identifying new export markets as well as consolidating the existing ones by promoting Romanian ecological products;

-orientation of production and sales towards primary products and their processing prom maintaining a higher value on the national component of the value chain;

- the implementation and development of the legislative system in order to consolidate the control system by implementing new measures in order to supervise the control and certification bodies, in order to increase the quality of the Romanian exported products;

-allocation of funds for research activities to promote exports of Romanian organic products;

-satisfaction of internal and external needs by creating a system of production, processing and marketing of organic products at an appropriate level;

- bringing added value to the professional training of all those involved in the ecological sector.

Following the application of statistical methods "Analysis of main components" and "Regression and correlation method" we reached the conclusion that ecological farming is much more expensive but the products are sold at much higher prices both on the domestic market and especially on foreign market compared to those obtained through conventional agriculture. In recent years, in Romania, there has been an important market segment that is interested in organic agricultural products, even if prices are higher. Also, the same positive results were obtained in the case of canned organic fruits and vegetables. Although they were sold on the market at higher prices than those obtained by conventional methods, organic preserves were highly sought after on the Romanian market. Following the use of the same statistical method, we made comparisons between products in different countries of the European Union.

Thus, we found that Italy is the European country with the most organically cultivated areas with over 1 million hectares (Sicily and Sardinia representing half), i.e. 1/5 of the total EU-25, followed by Germany, Spain, France and Austria. At the same time, in Italy are found the most organic farms representing 31% of the total EU-25, being left by Austria, Spain and Germany.

Compared to Romania, in 2002 only 0.2% of agricultural areas were cultivated by organic farming methods (43,000 ha were cultivated through organic agriculture, 20,000 ha were pastures, 12,000 ha were wheat crops, and 10,000 ha were crops).

Environmental impact of organic agriculture

To demonstrate the need for efficient production systems and responsible management of natural resources, it is useful to identify the effects of traditional agriculture on the environment. These environmental externalities affect the massive and irresponsible deforestation, pollution and contamination of soil, water and air with pesticides or chemically synthesized substances and most importantly - greenhouse gas emissions. The latter are the main driver of problems related to climate change that not only influence the natural balance but can destroy the economic and social systems.

Adaptation of agriculture to climate change depends very much on the approach of farmers to future agricultural practices. Immediate gains exclude sustainable strategies and we are currently facing an exaggerated and accelerated exploitation of non-renewable natural resources. The construction of organic matter in the soil can be the sustainable basis of a high-performance agricultural system that also takes care of the environment. If the soil is enriched with organic matter and free of chemicals that force unnatural plant growth, it can serve to increase resistance to drought, floods and extreme temperatures. The literature tells us that carbon accumulation is three times lower in organized agricultural practices than in conservation. (Robertson andcolab. 2000).

According to the 2007 IPCC report, deforestation is one of the main factors influencing greenhouse gas emissions and is constantly driven by increasing agricultural land area. (Baker et al. 2007).

The increase of the agricultural production can be determined in two ways: the increase of the surfaces of the agricultural exploitations and the increase of the yield per ha on the same surface. As the expansion of the agricultural area determines the need for deforestation and other negative effects on the environment, it is preferable for the yield to increase in direct proportion to the degree of mechanization.

Discussion

Implementation in a food system designed at the optimal parameters of organic agriculture can lead to sufficient food supply and also can reduce the impact on the environment in agriculture. Therefore, it is necessary to calculate as accurately as possible the feeding ratios of the animals, the reduction of the number of animals, the consumption of animal products and as much as possible the best management of the food in order to limit their waste. Transforming organic production into an agricultural production system that provides the same quantities is not viable, having the impact of increasing the use of agricultural land. The overall conversion to organic farming could be properly assessed by modelling the consequences and should be based on an appropriate forecast of food systems. To the detriment of objectives through which to produce maximum crop yields, the global perspective is to maintain soil fertility, ecosystem services and nutrient recycling. It is found that the global average demand for animal products is declining, which leads to a more sustainable alimentary system centred on the use of natural resources with a low impact on the environment and also improving human health.

The present research shows that through organic agriculture can contribute both to provide sufficient food and to improve the impact on the environment. The condition is the production of sufficiently large proportions of legumes as well as the reduction of quantities of animal products and food waste. The development of organic farming should not focus strictly on sustainable production

as it would reduce the need to increase yields, and a set of efficient production and consumption measures could provide an optimal food system.

Developingthe world's food system in a sustainable way by applying in part and in combination the following: increasing organic yields, increasing organic production, reducing food waste and reducing the number of animals and consumption of animal products.

The certification process

In order to obtain certification in the field of organic farming, local producers of vegetables, fruits or animal breeders must comply with the rules established by both national and Community legislation. Producers must facilitate the visits of the control and certification bodies in order to inspect and give assurances regarding the conformity of the agricultural activities carried out in accordance with the provisions of the laws in force regarding the ecological production.

The inspection and certification bodies in Romania were approved by the Ministry of Agriculture and Rural Development in accordance with the criteria of independence, impartiality and competence, established in Order no. 895 from 2016 for the authorization of the regulations on the coordination of the investigation and certification system and the supervision of the activity of the control bodies.

It is important to note that certified organic products contain at least 97% organic ingredients. We also consider it very important to know that a large part of local producers in Romania grow vegetables, fruits or animals in an organic system, but do not have information channels to capitalize on their organic products at the right price.

CONCLUSIONS

The most important fact to note from the present research is that organic agriculture and the integral conversion of the practices of agricultural production systems to ecological standards is the surest way to return to the values of traditional agriculture but with modern techniques. The legislation in force and the regulation on the export of organic products oblige the emerging states belonging to the European space to take important steps in order to convert traditional agriculture to agriculture based on modern technologies.

The success factors that contributed to the development of the agri-food market based on organic products are: consumer behavior and daily shopping cart component with strong external influences, compliant labeling and standardization of organic products, economic and social welfare of farmers who practice eco-friendly alternatives.

In order to increase the competitiveness of domestic organic food producers compared to foreign ones, the recommendations for the sustainable development of Romania are:

- constant information of consumers on the benefits and advantages of full consumption of organic products.
- actions of physical and online promotion of organic agriculture so that consumers understand the benefits of consuming organic products
- creation of online platforms for trading organic products

Additionally to the advantages it generates to human consumption, organic farming, as a secondary branch of the economy, has an important role to play in the general economic development and conservation of the environment.

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CHALLENGES AND BARRIERS IN IMPLEMENTING AN INTEGRATED SUSTAINABLE NITROGEN MANAGEMENT POLICY ON THE ROMANIAN GRASSLANDS

MIHAI CONSTANTINESCU [82], NICUSOR-FLAVIUS SIMA[83]

Abstract

The nitrogen management on the Romanian permanent grasslands is dependent on various factors, but the traditional practices and agri-environment EU funded payment schemes are playing the most important roles. At the same time, policies and farmers are mainly acting against reducing the nitrogen losses especially by implementing measures for avoiding water pollution with nutrients, while the concept of improving nitrogen use efficiency through integrated practices for reducingboth water and air nitrogen losses remains a topic insufficiently addressed. Nevertheless, the situation is not specific only to Romania, as the country is merely applying the international agreements and EUlegislation. Therefore, this article is focusing on the analysis of the challenges and barriers in implementing an integrated sustainable nitrogen efficiency use at policy and farmer level, thus identifying possible options in promoting good practices that should lead at the reduction of nitrogen losses in both water and air in an integrated manner.Grasslands are particular challenging for Romania as are largely extensively and traditionally managed. Furthermore, manure cannot be incorporated in soils by ploughing, as in case of arable land, thus remaining more prone to nitrogen air losses.

Keywords: nitrogen use efficiency, integrated nitrogen management, sustainable nitrogen management, manure, nitrates leaching, ammonia volatilization

JEL Classification: Q1, Q15, Q24

INTRODUCTION

Nitrogen is part of the atmosphere, as most common colorless and odorless inertgas (not entering in chemical reactions in normal temperature and pressure conditions). Nitrogen cycles from soil to plants and animals to air and water bodies, and back again, and from one region to the other, as a results of natural drivers and human activities, and all these flows should considered for an effective N management (Oenema et al., 2019).

Human activity is generating important reactive nitrogen emissions, out of which 65 Tg N / year (meaning 1/3 of total human reactive-N emissions) isproduced by livestock (Uwizeye et al., 2020). At the same time, is estimated that half of World population is alive due to nitrogen fertilisers (Galloway et al., 2008; Sutton et al., 2013), but nitrogen losses in water and air are reducing the efficiency of fertilisers and leading to significat pollution, while signals of reaching critical limits of a safe use for humanity are considered be touched (Uwizeye et al., 2020).

Nitrogen can take various forms (Figure 1). Reactive nitrogen (Nr) includes all forms of nitrogen that are biologically, photochemically, and radiatively active. Compounds of nitrogen that are reactive include the following: nitrous oxide (N_2O), nitrate (NO_3^-), nitrite (NO_2^-), ammonia (NH_3), and ammonium (NH_4^+). Reactive forms of nitrogen are those capable of cascading through the environment and causing an impact through smog, acid rain, biodiversity loss, etc. (Amon et al., 2019).

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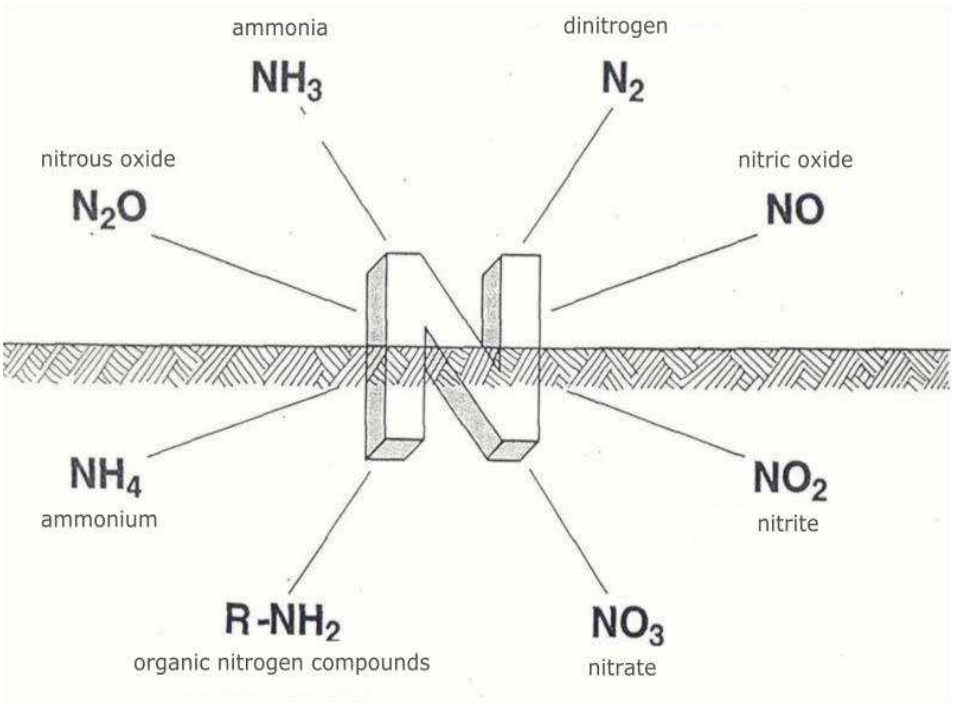
Figure 1: Forms of reactive nitrogen

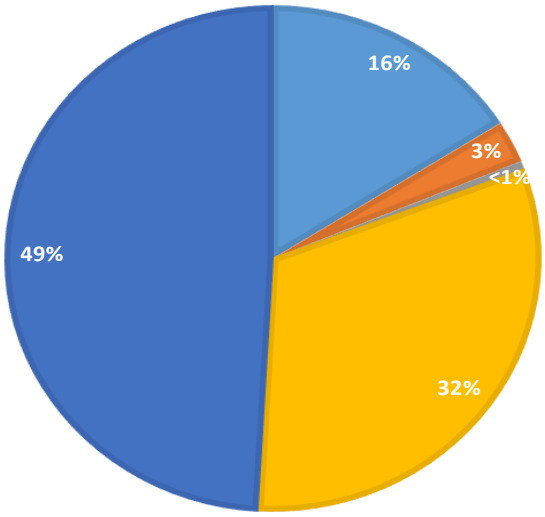


Source: (Barbara Amon et al, 2019)

Nitrogen losses cannot be completly avoided by improving agricultural practices, but may be reduced. The losses estimates are subject to large uncertainties but imply that 50% or greater of N inputs to agricultural soils in the EU28 (including atmospheric deposition) are subsequently lost to the environment through gaseous emissions, leaching and runoff, with the remaining 50% being recovered by crops.

Figure 2. Estimates of N losses from agricultural soils in EU28 (Gg N yr^{-1}) for the year 2014. Values derived from the 2016 GHG inventory submission to UNFCCC by the European Union

	Gg N yr^{-1}
NH3 emission	2,075
N2O emission	350
NOx emission	75
N2 emission	4,100
Leaching and runoff	6,365
Total	12,965



Source: (T. Misselbrook et all, 2019) .

Of the losses, almost half is via leaching and run-off and another third as dinitrogen via denitrification. Losses via ammonia volatilisation was estimated at 16%. (Misselbrooket et al., 2019).

In its efforts on preventing and avoiding water and air pollution, Romania became part of several international agreement and is applying the EU legislation, as described below.

MATERIALS AND METHODS

The study is focusing on the analysis of the challenges and barriers at the level of international, EU and national framework. Particularly, were under screening the relevantinternational agreements and legislative acts, as well the national legislation and national implementing acts for the EU legislation, together with the administrative structures set in place for the administration of the existent regulatory framework.

Thus, at international level, the policiesconcerning the nitrogen management were developedprimarily aiming at environment protection, setting certain international obligations and, in some cases, including also reduction targets/pollution limits. The relevantinternational agreements and EU legislationfor Romania are on:

a) prevention and reduction of **air pollution** (Convention on Long-Range Transboundary Air Pollution - CLRTAP, Gothenburg Protocol and EU Directive no. 2284/2016),

b) prevention and reduction of **water pollution** (Nitrates Directive).

It is worth mentioning that ammonia and nitrogen oxides are not GHG, thus not related to Green Deal. Part of GHG is only the nitrous oxide, but Green Deal is not yet producing effects.

Consequently, the administration is ensured by different structures, as follows:

- At global level, the CLRTAP Secretariat is under the United Nations headquarters in Geneva, through the Economic Commission for Europe (UNECE), and the Secretariat of the GPNM is located at the United Nations headquarters in Nairobi;

- At EU level, although environmental policy is managed by the Directorate-General for Environment, the water and air policies are managed by different compartments (Clean Water and Clean Air) and nitrates have remained under the responsibility of the unit for land use and management.

RESULTS AND DISCUSSIONS

The only international agreement on nitrogen integrated management is UNEA Resolution 4/L.16 — Sustainable Nitrogen Management, a resolution which has yet limited effect at international and national level. Through direct interviews at the level of Romanian Ministry of Environment, Waters and Forests wasacknowledged that the UNEA Resolution is currently at the stage of UN Members States appointing representatives to establish an international coordination mechanism and actions are in place for setting-up a Secretariat. However, the international coordination mechanism cannot lead to mandatory provisions for the UN Member States, like, for example, inthecase of EU Regulations or Directives (which in case of infringement will lead to sanctions for the EU Member States), thus tending to act more as an exchange of good practices platform. Nevertheless, is encouraging the strong support that UNEP is having under the '*Targeted Research for improving understanding of the global nitrogen cycle towards the establishment of an International Nitrogen Management System (INMS)'* project or – '*Towards INMS',* which gather over 70 global project partners involved in research, aiming at evidence-basedoptions for effective good practices to be promoted in national policies and further be applied world-wide for reducing nitrogen losses.

At national level, the environmental policy reflects the structure of the European Commission.Thus, despite reactive nitrogen emissions andnitrates pollution are being managed by the same institution (through the Ministry of Environment, Waters and Forests), the responsibility falls underdifferent departments, leading to a non-integrated policy on nitrogen. The only exception is the Code of Good Agricultural Practice which,starting with August 2021, includes in addition to the measures for reducing nitrates pollution, also a sub-chapter related to the reduction of ammonia and nitrous oxide emissions;however, these provisions are only recommendations of good practices and not legally bounding.

Beyond the administrative structures and legal provisions, are the farmers. At national level, farmers are under the supervision of institutions responsible with the compliance with Nitrates Directive measures in some specific cases: as direct payments beneficiaries (subsidies for agriculture), if applying for investments grants or if owning animals equivalent of more 100 livestock units (LUs). The small and medium-size farmers applying traditional shepherding practices / applying extensive management of grasslands are particularly important for the local communities, as are representing the most important farming category and the activity is one of the most important income source. Is worth mentioning that large areas of grasslands are under agri-environment voluntary commitments financed under the National Rural Development Programme (with 750,513 ha of grasslands under commitments, according to MARD data from the 2021 campaign for the Single Area Payment Claim). Under these areas, chemical fertilisers are banned and N from organic fertilisers is limited at 40 kg per ha and year. Whilethe Romanian shepherds are still facing significant financial challenges in ensuring the means for proper manure storage (for preventing nutrients leaching) and simple equipment for manure field-application,there are no legal provisionsin force for this category of farmers for limiting the reactive nitrogen emissions at the level of manure management in stables and while manure is applied on the field / adopting good farming practices with this scope.

The nitrogen regulatory framework at both international and national level is fragmented, in the sense that it aims to reduce losses of reactive nitrogen on either water or air.

While the legislation on water protection is more comprehensive and advanced in terms of implementation, the provisions on air emissions are less regulated and applied at both international and national level.

The progress so far in promoting an integrated nitrogen management approach is represented at international level only by the UNEA Resolution 4/L.16 on Sustainable Nitrogen Management (from 2019), while at national level only by the new introduced (August, 2021) provisions on preventing ammonia and nitrous oxides emissions into the Code of Good Agricultural Practices (for avoiding water pollution with nitrates having agriculture as source). Furthermore, both the UNEA Resolution and the national Code are not leading to mandatory provisions. Nevertheless, the Global Partnership on

It thus appears that an important barrier in adopting integrated N management practices it relies in the international set-up of agreements and subsequent legislation, which has been developed throughout the yearson either water and air protection.Thus, despite the scientific literature is clearly indicating that an integrated N management is essential for an effective N management/improving nitrogen use efficiency, the national authorities are not yet sufficiently encouraged and mobilised for adopting an integrated sustainable N management policy that would be able to trigger farmers' behavioural changes and interest in investing in modern equipment.

The main challenge stays with the small and medium-size farmers and especially the grasslands users. Nevertheless, the technical challenges for an integrated manure management for improving nitrogen use efficiency by limiting both air and water nitrogen losses are more difficult in case of grasslands, as is not possibleto incorporate the manure in soil by simple agriculture practices, as ploughing in case of arable land, neither being feasible the promotion of sophisticated stable designs or equipment for reducing air emissionsfor manure field-application.

CONCLUSIONS

Research is currently ready to provide consistent evidence-based effective integrated good agricultural practices proposals for the reduction of nitrogen losses, but without an administrative system ready to uptake the knowledge, the progress remains slow. The solutions are relying on a better promotion of integrated nitrogen management through consolidated Codes of good practices / guidelines, thus gradually raising the level of awareness at institutional and farmers' level. Furthermore, awareness campaigns and training sessions through knowledge transfer networks should be financed and implemented with public financial support, as well investments in farming infrastructure. Once the level of awareness is raised and the farmers readiness to adopt integrated nitrogen good practices is improved, the voluntary good practices should be approved as mandatory legal provisions.

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THE EVOLUTION OF THE FIRST- SALE PRICE IN COMMERCIAL FISHERIES IN THE INLAND TERRITORIAL WATERS OF ROMANIA

ERZSEBET OLARIU[84]

Abstract

The policy of the fishing sector in Romania, in terms of commercial fishing, it envisages measures that ensure the sustainable exploitation of living aquatic resources, efficient management, stimulating those who work in this sector to unite in associative forms, the collection of statistical data, inspection and control.The policy on fishing in natural fish habitats is carried out by the National Agency for Fisheries andAquaculture.This paper studies the national average fish prices for the first- sale for commercial fishing in the inland territorial waters. How to change the value of these prices for the years 2016-2020, regarding the species and the quantity. They were used the statistical data were provided by NAFA, and the quality interview. The first- sale prices are established at the first- sale points based on negotiation. The average price of the total catch of fish in Romania from 2016 to 2019 do not show large fluctuations, but in 2020 had an increase of over 30%, compared to 2019, while the amount of fish caught decreased by 25% in 2020 compared to 2019.

Keywords: fishery, first-sale price,

JEL classification: Q22, Q31

INTRODUCTION

According to the objective of the common fisheries policy (CFP) determined by Council Regulation No 2371/2002 to taking account of sustainable exploitation for the living aquatic resources, the Council Regulation No 1224/2009, based on the fact that the success of CFP requires the application of an effective control system, targets to establish a community control system, respecting the principle of proportionality.

The European agency which promotes the common standards for surveillance, inspection and control is the European Fisheries Control Agency (EFCA). In Romania the main legal regulation regarding the commercial fishing in natural fisheries habitats are the Government Emergency Ordinance No 23/2008 on fisheries and aquaculture (OUG 23), and the Order of the Ministry of Agriculture and Rural Development No 807/2016 for the approval of rules on access to living aquatic resources in the public domain of the State for the purpose of commercial fishing in natural fisheries habitats, with the exception of protected natural areas (OM 807).

The access to this living aquatic resources, for the purpose of commercial fishing in Romania is granted by the National Agency for Fisheries and Aquaculture (NAFA) directly to professional fishermen/divers - authorized natural persons, organized or not in professional associations, production cooperatives, associations/ organizations of fisherman, individual enterprises and family enterprises which have as their object commercial fishing. The access shall be granted on the basis of fishing permits, licenses and authorizations. The commercial fishing permit is an individual and non-transferable document which is concerned annually.

The fishing licenses shall give the right to use a certain fishing capacity for the purpose of commercial exploitation of living aquatic resources and contains the minimum requirements for identification, technical characteristics and the equipment of a European Union fishing vessel.

The commercial fishing authorization is an official document issued for a commercial fishing vessel/craft, in addition to the commercial fishing licence, which authorizing it to carry out specific fishing activities for a specified period, in a given area or for a given fishery area under specified condition.

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The catch from commercial fishing in natural fisheries habitats, excluding protected natural areas, is landed in ports/mooring points/landing points or in approved first-sale centers. From the ports/mooring points/landing points the catch is transported to the first-sale centers. In these first-sale centers takes place the first sale of the catch,with the first price set. This paper analyzes the average first sale -price for 1 kg of fish for five years in Romania, according to the quantity of catch, from 2016 to 2020. The value of paper is that this data were first presented in Romania in a paper, and the influence of the first year of Covid-19 pandemic on these prices, as well as how the catch quantity was influenced.

MATERIALS AND METHODS

The date were collected by inspectors from NAFA, of the basis of sale notes. According to article 22 of Order No 807/2016, the economic operator engaged in fishing and marketing of fish, or the administrator of the firs-sale center are required to draw up the sales note for each delivery and to transmit its to NAFA until 05 of each month. In the research was used the in-depth interview. Interviews were conducted from three regional service heads from NAFA.

RESULT AND DISCUSSION

The sales of the fish is done an a contract basis, but the price in not fixed by the contract. For each sale is a negotiation between the seller and the buyer. At present the first sale centers are owned by fishing organizations.

Usually the first sale centers sell the products, collecting their value, and only then made the payment to the sellers. This has lead dissatisfaction from fishermen, generating the desire to have their own space for sale. There are discussions for the Territorial Administrative Units to provide independent spaces for fishermen, but so far it has not materialized.

The table bellow shows the data collection result, in terms of the average price for 1 kg of fish and the catch in tonnes from 2016 to 2020 for the commercial fisheries in the inland territorial waters of Romania.

Table 1 The average price per kg and the catch by fish species from 2016 to 2020

	Species	2016		2017		2018		2019		2020	
		Medium price /kg lei	Catch tons	Medium price /kg lei	Catch tons	Medium price /kg lei	Catch tons	Medium price /kg lei	Catch tons	Medium price /kg lei	Catch tons
1	Freshwater bream	4.83	273.10	4.85	367.3	4.07	387.25	4.07	220.10	5.08	250.92
2	Common carp	11.30	245.75	12.00	177.4	13.20	138.20	13.20	187.93	14.24	203.71
3	Tench	5.00	25.44	5.00	29.10	4.60	34.15	4.60	38.62	6.00	6.10
4	Bleak	3.90	2.26	2.50	16.20	4.53	15.58	4.53	12.17	5.00	7.10
5	Barbel	5.50	22.47	5.50	29.30	4.77	38.90	4.77	53.01	5.25	55.28
6	Common nase	4.00	1.00	4.00	6.30	1.25	4.90	1.25	8.90	5	4.93
7	Gold fish	4.60	1815.7	5.00	1485.5	4.87	1608.51	5.00	1659.14	5.44	1317.66

8	Roaches nei	3.56	259.5	4.00	202.6	1.92	249.14	2.50	201.59	4.59	143.84
9	Rudd	3.30	24.75	3.5	39.00	3.00	53.94	3.00	27.99	4.00	14.09
10	Grass carp (=White amur)	9.53	12.50	10.00	0.10	5.40	3.71	5.00	1.80	7.48	3.64
11	Silver carp	5.78	69.5	6.00	30.40	4.72	13.17	5.00	33.19	5.56	48.63
12	Bighead carp	5.82	55.3	6.00	17.00	3.05	19.47	3.50	30.22	6.33	23.27
13	Vimba bream	4.83	34.9	5.00	37.5	2.38	39.67	3.00	28.89	5.09	45.27
14	Asp	6.40	25.20	6.50	17.70	4.34	21.75	5.00	34.63	5.51	20.28
15	White bream	4.73	31.00	5.00	48.80	2.25	28.03	3.00	30.50	5.25	38.33
16	Northern pike	10.90	150.10	11.00	185.70	10.47	220.87	11.00	191.32	10.98	102.86
17	Catfish	11.92	184.40	12.00	156.70	14.21	150.29	14.00	164.94	17.33	140.46
18	European perch	4.90	63.40	5.00	52.10	1.91	45.60	2.00	57.16	5.00	38.51
19	Pike-perch	12.25	149.64	12.5	104.80	14.42	61.65	14.00	54.76	15.96	53.92
20	Freshwater fish nei	4.33	16.10	5.00	15.00	1.65	6.48	2.00	10.35	4.16	22.61
21	Pontic shad	14.25	406.50	16.00	481.00	17.56	178.67	16.00	634.50	18.21	204.03
Medium price/kg -lei Total capture - tons		6.74	3868.51	6.96	3499.50	5.93	3319.92	6.02	3681.64	7.98	2756.43

Source: NAFA

CONCLUSIONS

The conditioning of a certain fishing area as well the establishment of total allowable catches, are factors which have a negative impact on production, but sustainability is paramount. The average first-sale price for 1 kg of fish for total catch was the lowest in 2018. The first year of the pandemic led to decrease in catch and an increase the average price.

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COMPARATIVE STUDY OF THE AGRICULTURAL SECTOR IN ROMANIA AND THE MAIN MEMBER STATES OF THE U.E.

IONUȚ LAURENȚIU PETRE [85]

Abstract

To identify the problems faced by the Romanian agricultural sector and to identify viable development solutions, a comparative analysis of the competitiveness of the Romanian sector with the other member states of the European Union is necessary. In this regard, in the present research, a quantitative analysis of the statistical data taken from the Eurostat databases was performed, to determine the competitiveness of the sector compared to other Member States. The main technical-economic indicators from the last statistical publication (structural survey) from 2016 were analyzed. Following the determination of the positioning of Romanian agriculture, recommendations and solutions can be identified to develop it and increase competitiveness.

Keywords: Romanian agriculture, competitiveness, vegetable sector, comparative study

JEL classification: Q01, Q10.

INTRODUCTION

Given that in each country can be identified several types of relief, climate difference from natural resources, the greater the gap between the Member States of the European Union, so the agricultural structure in these countries varies depending on all these factors (geology, topography, climate, natural resources, as well as the diversity of regional activities (Buzioanu et al., 2017).

The same paper mentions that "*the study on the structure of agricultural holdings, known as the Farm Structure Survey (FSS), helps to assess the situation of agriculture across the EU, to monitor trends and transitions in the structure of agricultural holdings*".

In Gavrilescu's paper, 2005, it is considered that Romania has an advantage compared to the European Union, before Romania's accession, given the fact that in Romania the agricultural area had a share of 62%, compared to the agricultural area throughout the Union, since then, which owned only 41%, so the author said that "*Romania has an advantage of a much larger agricultural area, namely 62% of the total. Under these conditions, Romania has an essential advantage over EU countries, namely a much higher share of agricultural land in the country*. However, it remains to be seen whether Romania has reaped this advantage or, unfortunately, has remained at a lower level of development of the agricultural sector than the rest of the EU Member States.

Cotelnic and Cimpoieș, considers that "*agriculture cannot compete on equal terms with other branches of the national economy given the privileged position of agriculture that is linked to both natural factors, transparency of production of important vital products, raw materials and food*", but on the other hand, no other sector is subject to a higher risk, such as the one to which the agricultural sector is subject, being conditioned by pedo-climatic factors, if we do not intervene with certain measures of stability on agricultural production, production value, market measures. Thus, we can ask ourselves whether agriculture is a privileged branch of a state's economy or not? I believe that this question can also be based on the following analysis and on the level of competitiveness of each state from an agricultural point of view.

MATERIAL AND METHOD

In this paper we want to make a comparative analysis of the agricultural sector in each member state of the European Union, highlighting Romania's position and the degree of

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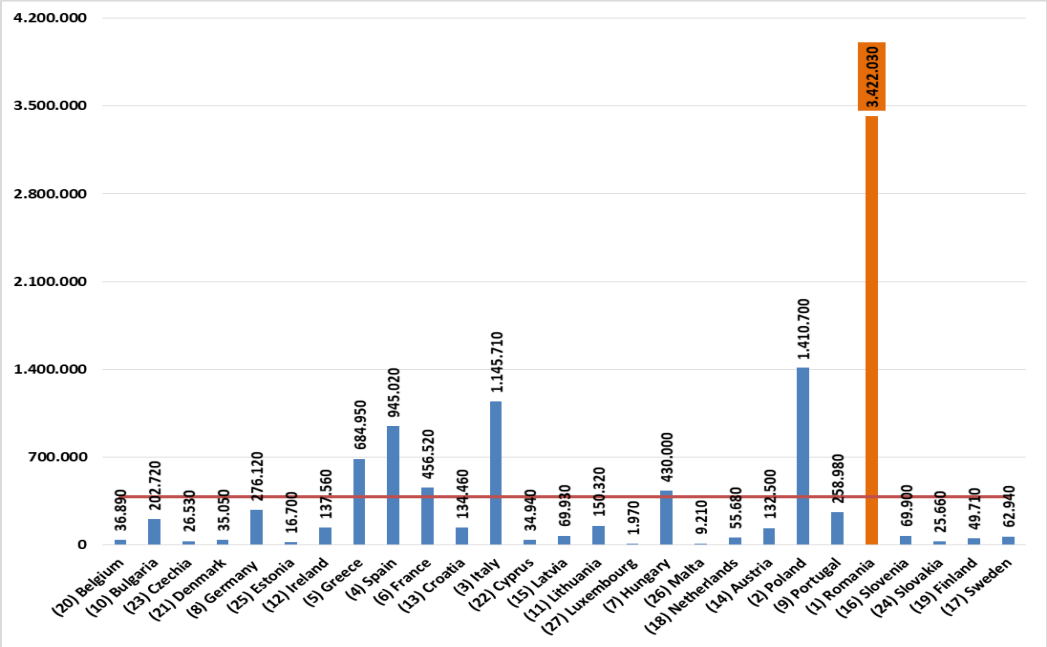
competitiveness it has. For this purpose, European statistical databases were used with the help of Eurostat to identify data on the agricultural sectors of the Member States, corresponding to the last agricultural survey in 2016. The number of farms, the agricultural areas used, the number of farms holding animals, the standard output value of farms and the number of farms whose household consumes more than half of the obtained production were considered, depending on these data other indicators were determined. which can capture competitiveness in the sector. These data were analyzed quantitatively and qualitatively, as well as comparatively intra-Community.

RESULTS AND DISCUSSIONS

In order to determine the competitiveness of the Romanian agricultural sector, a comparison was needed with the other members of the European Union on the main indicators of the agricultural structure, analysis conducted using the latest surveys in 2016. , economic size and yield per hectare.

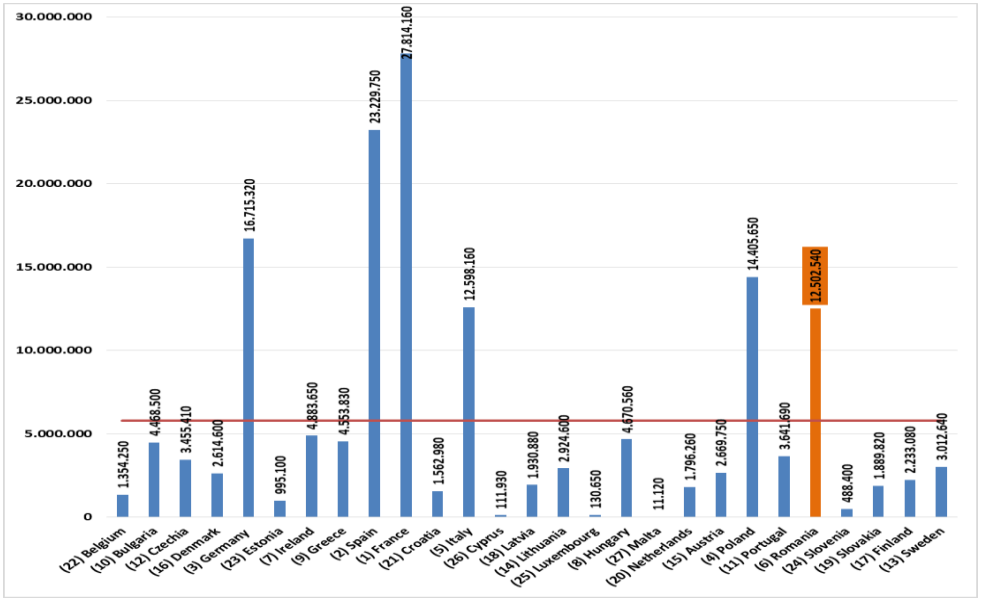
Figure 1. Number of agricultural holdings in EU Member States



Source: own processing based on Eurostat data (survey 2016)

Analyzing the number of farms in all 27 states and ranking them in descending order, we can see the following. In 2016, Romania stands out with the most farms in the European Union, the total being about 3.422 million farms. In second place is Poland with 1.41 million farms, followed by Italy with 1.145 million farms. At the opposite pole, Luxembourg has the fewest farms, about 2,000 farms. Although Romania has the most farms, this aspect is not necessarily a positive one, given the distance between this value and the European Union average, it is observed that the EU average is about 381 thousand farms per Member State, which means that Romania exceeds this average by almost 9 times, this situation leading to a very small size of the farm in Romania. Of the 27 Member States, only the first 7 exceed the Union average, the closest to the average being Hungary with 430 thousand farms.

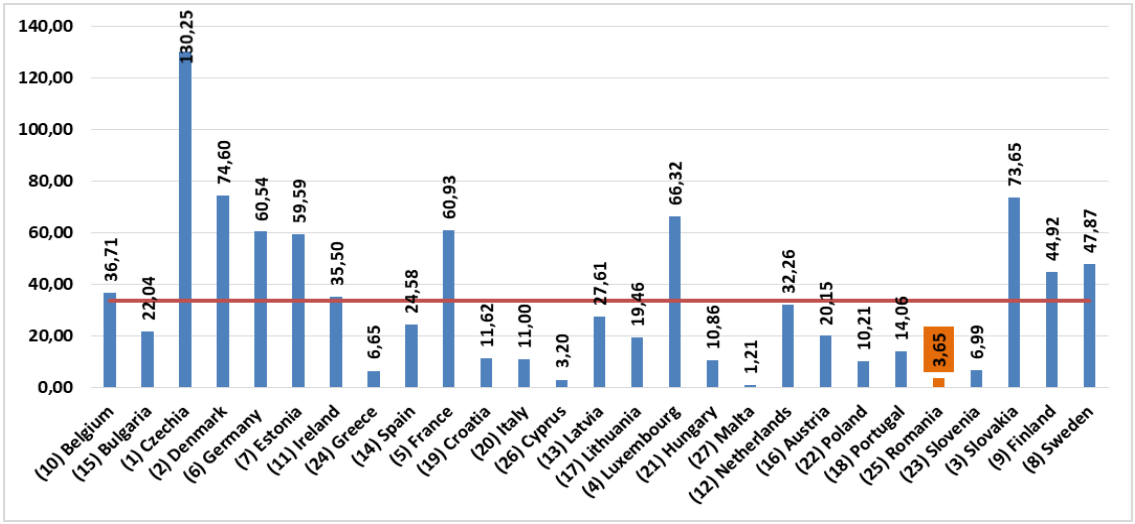
Figure 2. Agricultural area used in EU Member States (hectares)



Source: own processing based on Eurostat data (survey 2016)

Although Romania holds the first position in terms of the number of farms, in terms of agricultural area used, Romania occupies the sixth position with an area of 12.5 million hectares, which once again strengthens the idea of excessive fragmentation of farms. At European level, France has the largest agricultural area of 27.8 million hectares, followed by Spain with 23.23 million hectares, and at the opposite pole Malta has only 11 thousand hectares. Realizing the average at the level of the 27 states, regarding the agricultural area used, it would be about 5.8 million hectares, Romania exceeding this average by 115%.

Figure 3. Average (physical) size of farms in EU Member States (ha / farm)

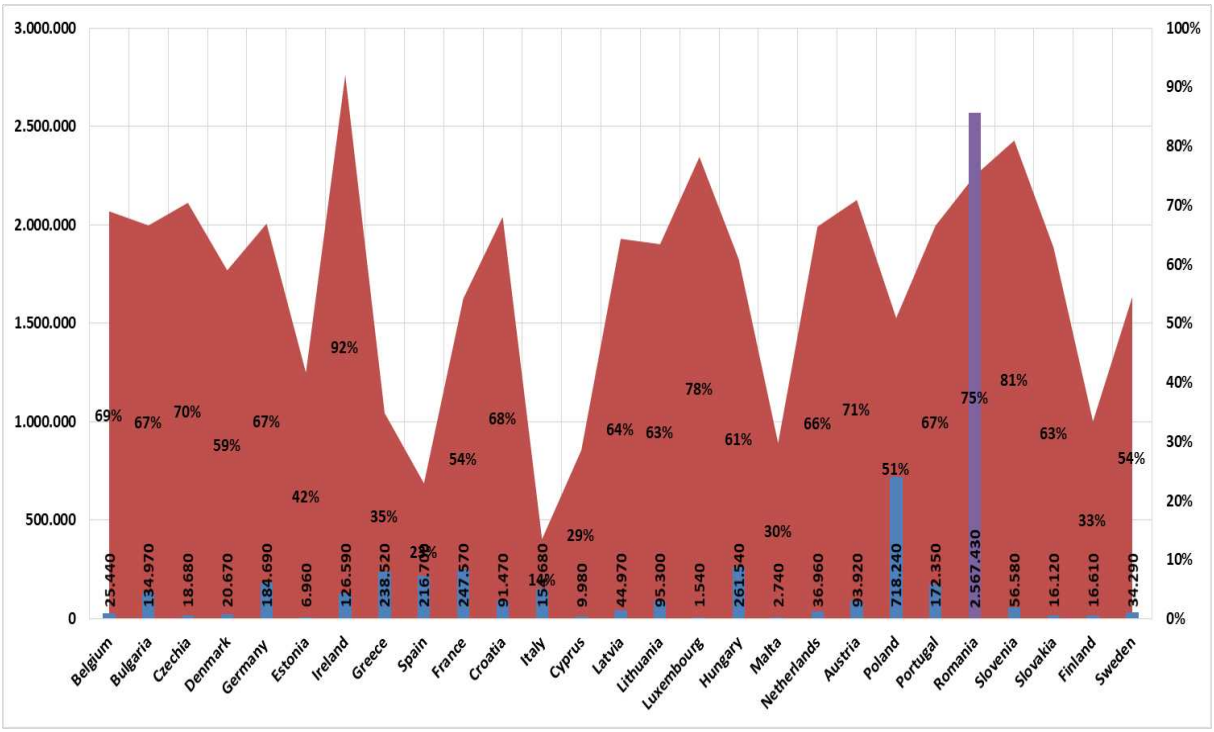


Source: own processing based on Eurostat data (survey 2016)

By making the ratio between the second indicator, compared to the first one can determine the average (physical) size of farms in the European Union, in order to determine its size and degree of fragmentation. Given that Romania has the most farms, but does not have the largest area of agricultural area used, this led to the positioning of Romania, in terms of average size, at the bottom of the ranking, respectively on the 25th place out of 27 states, with an average size of 3.65 hectares per farm, Romania surpassing countries such as Cyprus and Malta. As for the country with the most

compact holdings, the Czech Republic has a farm size of 130 hectares, followed by Denmark with 74.6 hectares per farm. Regarding the average of the 27 states, the average size at European level of a farm is about 34 hectares, being almost 10 times larger than in Romania.

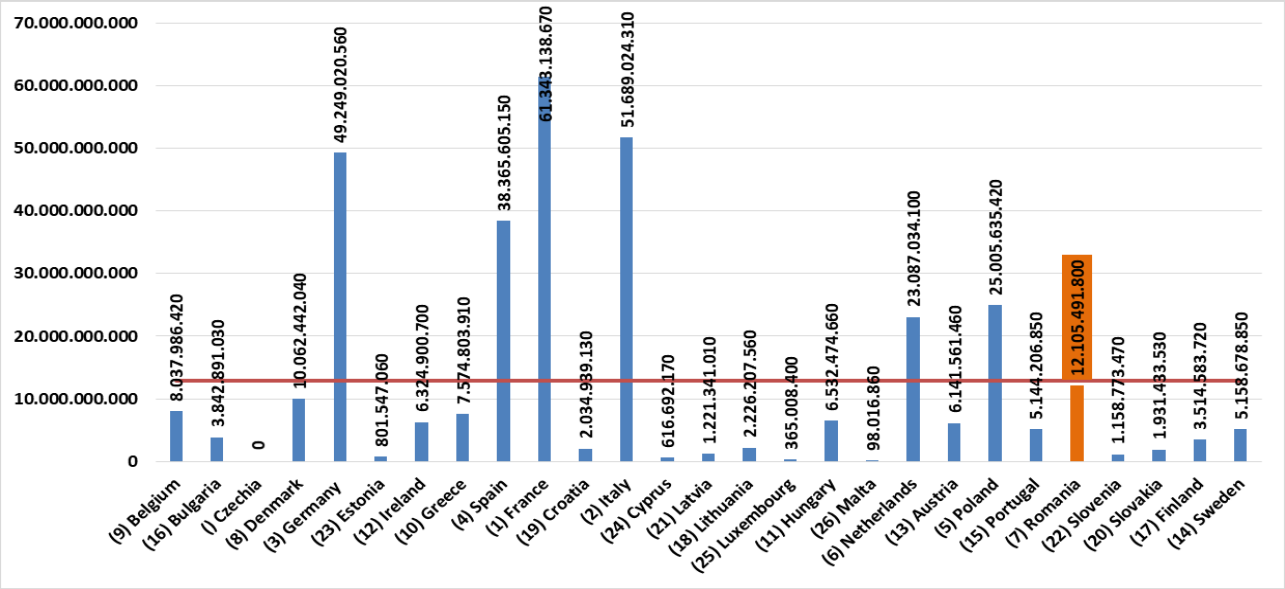
Figure 4. Number of livestock farms and their share in total holdings in EU Member States



Source: own processing based on Eurostat data (survey 2016)

The figure above shows graphically the number of farms in each of the 27 Member States raising animals, as well as their share of total farms in the Member States. Thus, it can be observed, once again, that Romania holds the first position, out of the total holdings, 75% are holdings with animals, respectively about 2.57 million farms. Also, the ranking of farms is maintained in this case, Poland occupying the second position with a number of 718 thousand farms, representing, however, 51% of the total farms. At European level, the average number of farms raising animals is 207 thousand farms, representing 57.2% of the average number of total farms. It should be noted that, although Italy ranks first both in terms of the total number of holdings and in terms of the agricultural area used, it is noted in this situation that only 155 are registered in Italy. thousands of farms with animals, representing only 14% of the total holdings.

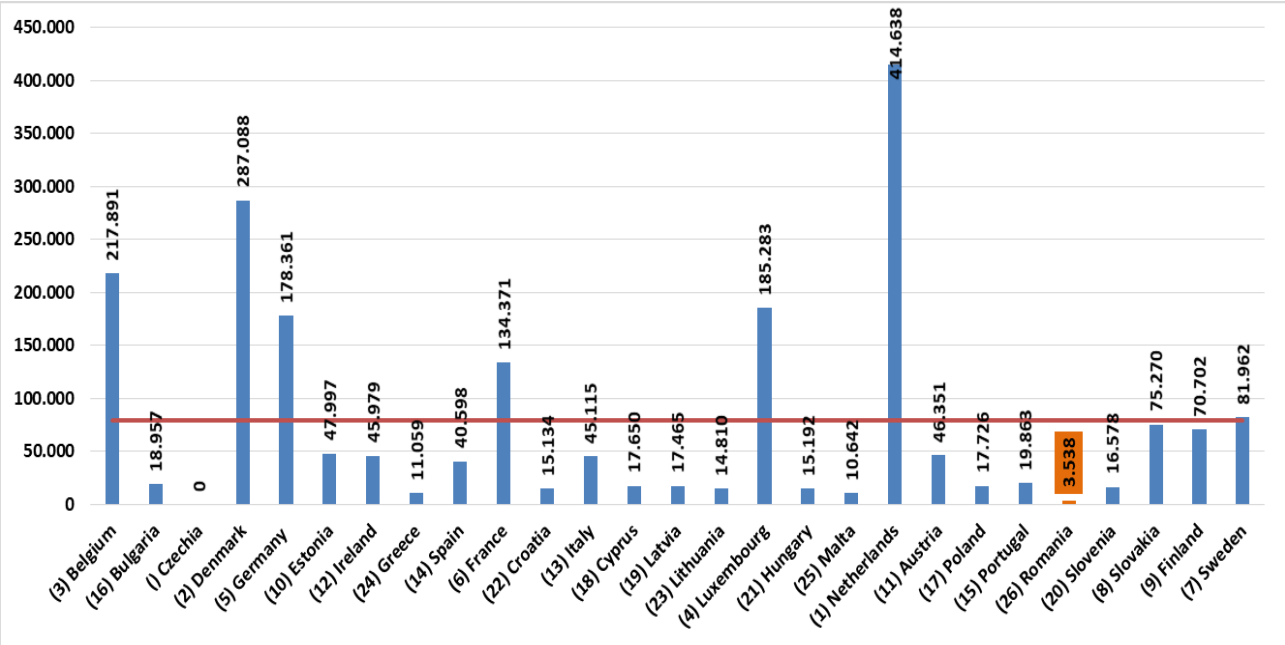
Figure 5. Value of standard production (SO) of farms in EU Member States (euro)



Source: own processing based on Eurostat data (survey 2016)

A comparison of the standard value of farm production at EU-27 level shows that the highest value in France is around 61.34 billion euros, the country with the largest agricultural area used, in second place. positions Italy with 51.69 billion euros, followed by Germany with 49.3 billion euros. Romania ranks seventh in terms of Standard Output, reaching about 12.1 billion euros, close to the European Union average, the position being almost correlated with the agricultural area used, but not the value. The country with the lowest value of agricultural production is Malta with 98 million euros and on the penultimate place Luxembourg with 365 million euros. The EU-27 average per Member State is about 12.83 billion euros, Romania being 5.7% below this average.

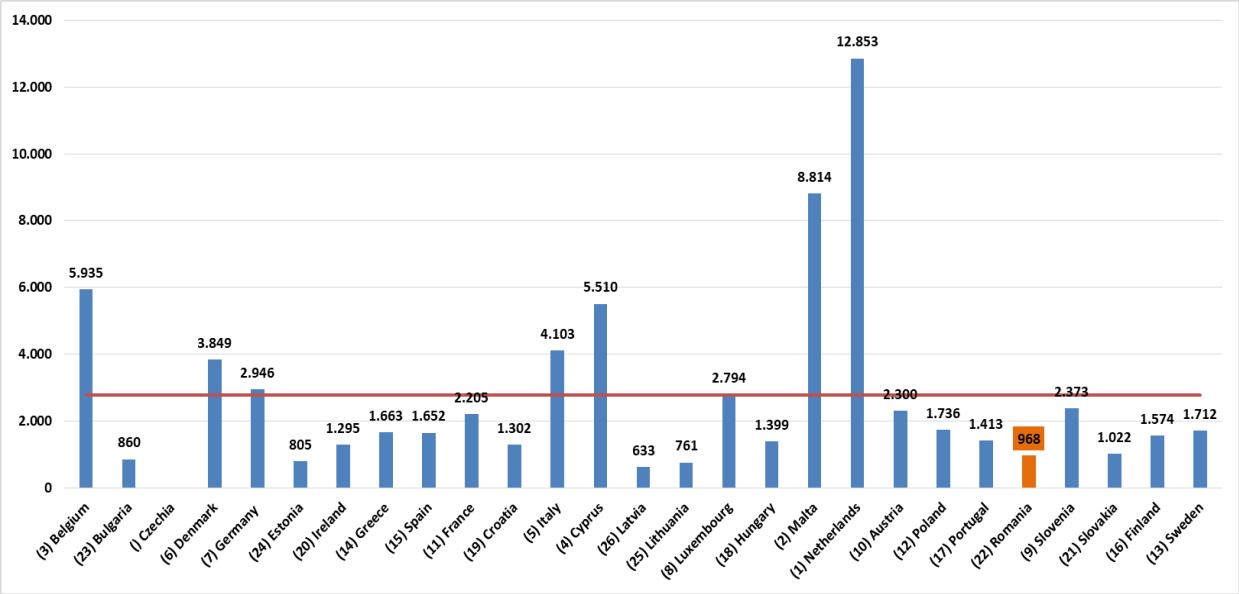
Figure 6. Average (economic) size of farms in EU Member States (euro / farm)



Source: own processing based on Eurostat data (survey 2016)

Depending on the value of agricultural production for each Member State and the number of farms, the average economic size of the farm could be determined. In terms of this indicator, the Netherlands is in first place with an average size of 414.6 thousand euros, followed by Denmark with 287 thousand euros and Belgium with 218 thousand euros. Unfortunately, it can be seen that at the opposite pole, Romania ranks last with an average value of agricultural production per farm of 3,538 euros. At the average level, each member state reaches a threshold of the economic dimension of 78.8 thousand euros, Romania being well below this threshold, the average being more than 22 times.

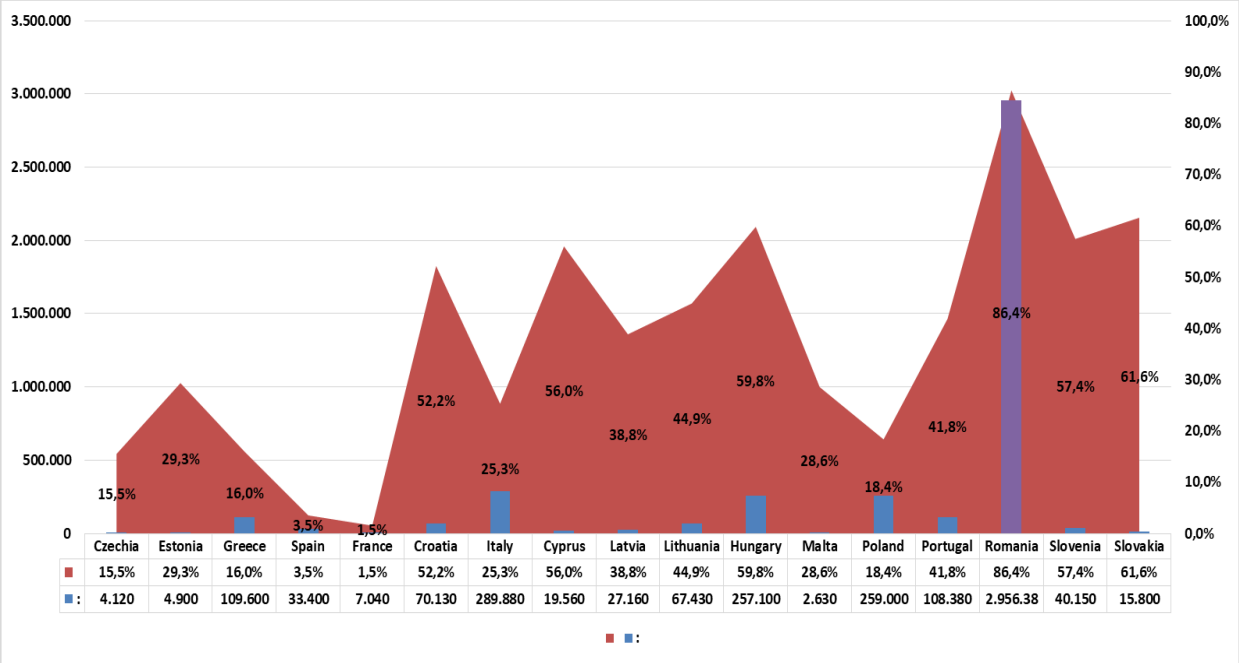
Figure 7. Average (economic) yield per hectare in EU Member States (euro / ha.)



Source: own processing based on Eurostat data (survey 2016)

Depending on the value of agricultural production and the agricultural area used, the average economic yield per hectare could be determined for farms in the Member States of the European Union. The Netherlands maintains its leading position with an average yield per hectare of 12,853 euros, followed by Malta with 8,814 euros / hectare and Belgium with 5,935 euros / hectare. In this case, Romania is no longer at the bottom of the ranking, but it is still in the last 5, being on the 22nd position with an average value per hectare of 968 euros, on the last position being Latvia with 633 euros / hectare. At the average level, in the European Union an SO value per hectare of 2,788 euros is obtained, Romania being below this average by 65%.

Figure 8. Number of farms whose household consumes more than 50% of final production and their share of total farms in EU Member States



	Czechia	Estonia	Greece	Spain	France	Croatia	Italy	Cyprus	Latvia	Lithuania	Hungary	Malta	Poland	Portugal	Romania	Slovenia	Slovakia
■	15,5%	29,3%	16,0%	3,5%	1,5%	52,2%	25,3%	56,0%	38,8%	44,9%	59,8%	28,6%	18,4%	41,8%	86,4%	57,4%	61,6%
■:	4.120	4.900	109.600	33.400	7.040	70.130	289.880	19.560	27.160	67.430	257.100	2.630	259.000	108.380	2.956.38	40.150	15.800

Source: own processing based on Eurostat data (survey 2016)

Analyzing the last indicator, respectively the number of farms whose household consumes more than 50% of the final production, calculating their share in the total number of farms, can explain the situation presented by the previous indicators, in which Romania is. As it can be seen, about 2.956 million farms consume more than 50% of the final production in their own household, in Romania, representing over 85% of the total farms at national level, thus, it is not possible to discuss a very competitive sector. The next country according to the number of farms is Italy with 290 thousand farms (10 times less than Romania) but these representing only 25% of Italian farms, and depending on the share, the next country is Slovakia with a share of farms which consumes more than 50% of production in its own household of 61.6%, representing 15,800 farms. France has 7,000 farms in this situation, representing only 1.5%, being the country with the lowest share of these types of households, and Poland, the country with which we can compare, has 260,000 farms (being on the third position in number), but representing only 18.4% of all farms.

CONCLUSIONS

Although Romania has the most farms, this aspect is not necessarily a positive one, given the distance between this value and the European Union average, it is observed that the EU average is about 381 thousand farms per Member State, which means that Romania exceeds this average by almost 9 times, this situation leading to a very small size of the farm in Romania.

Although Romania holds the first position in terms of the number of farms, in terms of agricultural area used, Romania occupies the sixth position with an area of 12.5 million hectares, which once again strengthens the idea of excessive fragmentation of farms.

Given that Romania has the most farms, but does not have the largest area of agricultural area used, this led to the positioning of Romania, in terms of average size, at the bottom of the ranking, respectively on the 25th place out of 27 states, with an average size of 3.65 hectares per farm, Romania surpassing countries such as Cyprus and Malta.

Romania ranks seventh in terms of Standard Output, reaching about 12.1 billion euros, close to the European Union average, the position being almost correlated with the agricultural area used, but not the value.

Given the relatively small value of agricultural production compared to the extent of agricultural land used, there is a very small economic dimension in the case of Romania, among the smallest in the EU, being 3.5 thousand euros.

Regarding the economic yield per hectare, Romania obtains for each hectare from the agricultural area used on farms a value of standard production of about 970 euros, quite low compared to the EU average of 2,800 euros.

All these aspects that do not favor the agricultural sector in Romania lead to the decrease of competitiveness in the single free market at EU level, the main reason being the extensive nature of agriculture and the high share of subsistence and semi-subsistence farms presented graphically in the last part. 85% of farms in Romania consume more than 50% of their own production.

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ACCESSING EUROPEAN FUNDS THROUGH SUB-MEASURES 16.4 AND 16.4A UNDER NRDP 2014-2020

DAN CONSTANTIN ȘUMOVSCHI [86]

Abstract

The financing of the Romanian agriculture and rural space through the SAPARD program created the technical and financial premises necessary for the process of accession to the European structures. Thus, the funds developed through the SAPARD Agency have directly contributed to the economic and social development of the rural environment, by supporting private producers, supporting agricultural associations, and financing investments made by local councils in rural areas. Subsequently, after Romania's accession to the European Union, the Paying Agency for Rural Development and Fisheries is the institution that fulfills the payment function for investment projects, financed from the European Fund for Agriculture and Rural Development. The investments made have directly contributed to economic growth and convergence of rural incomes by increasing productivity, stabilizing markets and ensuring a fair standard of living for the agricultural population. In the current budget year of the NRDP 2014-2020, according to existing analyzes, it is observed that farmers' interest in accessing grants differs from one region to another, from one sub-measure of funding to another and even from one farmer to another in the same community. Given the importance of cooperation between the actors involved in agri-food supply chains, in this paper, we conducted an analysis that seeks their interest in accessing sub-measures 16.4 and 16.4A of the NRDP 2020. In order to achieve this approach, I consulted relevant articles and specialized studies on the subject of accessing European funds for the agricultural sector and I carried out an analysis of the data provided by the Agency for the Financing of Rural Investments.

Key words: rural financing, NRDP 2014-2020, sub-measures 16.4 and 16.4A, cooperation, agri-food supply chains.

JEL classification: O18, P25**,** R51

INTRODUCTION

Despite the many debates, the importance of cooperation remains too little understood in terms of technical aspects, but especially in terms of opportunities. This scientific article aims to assess the interest of actors involved in agri-food supply chains (small farmers, non-governmental organizations, local councils, schools, health, leisure and public catering units) in establishing partnerships to contract funding, targeting the activities supported by sub-measures 16.4 and 16.4a - *Support for horizontal and vertical cooperation between actors in the supply chain in the agricultural and fruit sectors* in the financial years 2014-2020.

The use of European funds is both an opportunity and an obligation. The opportunity obviously consists of obtaining an important and essential source of financing necessary for the development, optimization and/or diversification of the activity carried out. At the same time, the signing of the financing contracts entails the obligation to respect for the entire duration of the project implementation the terms assumed at the time of signing the financing contract.

The innovative and atypical nature of these sub-measures has raised multiple issues for both applicants and experts of the Agency for Financing Rural Investments.

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MATERIAL AND METHOD

Reviewing the specialized literature dedicated to the topic of accessing European funds, it is easy to see that most articles and studies contain mainly qualitative data.

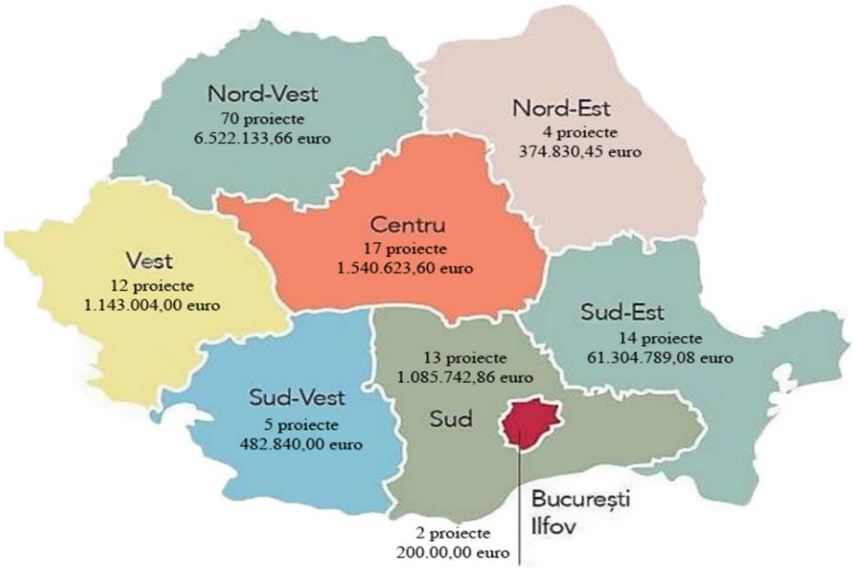
Regarding the stages of the scientific approach, they have as starting point the analysis of the literature, regarding the horizontal and vertical cooperation between the actors in the supply chain in the agricultural and fruit sectors. Subsequently, the information from the databases provided by the Ministry of Agriculture and Rural Development on the main page of the Agency for the Financing of Rural Investments and on the Open Data page of AFIR were used.

Within the material, an analysis was performed through which I aimed to identify the factors that influenced the contracting on sub-measures 16.4 and 16.4a of the NRDP 2014-2020 and which led to an uneven distribution of projects.

RESULTS AND DISCUSSIONS

At the level of Romania, within the four submission sessions of the 2014-2020 program, a total number of 137 projects with a total value of 12,653,963.65 euro were contracted through Sub-Measure 16.4 and Sub-Measure 16.4a, of which 100 projects through sub-measure 16.4, with a total value of 9,162,190.08 euro and 37 projects through sub-measure 16.4a, with a value of 3,491,773.57 euro, unevenly distributed throughout the country (Figure 1). Of note is the high degree of contracting in the North-West region, with a total of 70 projects and a value of 6,522,133.66 euro. The North-West and Center regions, which form macro-region 1, have a total of 87 projects with a value of 8,062,757.26 euro, representing over 63.5% of the number of projects financed at national level. At the opposite pole are the regions Bucharest-Ilfov, with 2 projects and a value of 200,000 euro, North-East with 4 projects and a value of 374,830.45 euro and South-West with 5 projects and a value of 482,840.00 euro, together they represent only 8% of the total projects financed at national level.

Figure 1. The situation of projects contracted through Sub-measures 16.4 and 16.4a of the NRDP 2014-2020



Comprising Bucovina and most of Moldova, the North-East Region consists of the counties: Bacău, Botoșani, Iași, Neamț, Suceava and Vaslui. OJFIR experts subordinated to CRFIR 1 Nord-Est IAŞI evaluated a total number of 30 projects, of which 26 projects concerned sub-measure 16.4 and 4 projects sub-measure 16.4a. Regarding the distribution by counties of the submitted projects, that reached the evaluation stage, it had a relatively uniform distribution: Iași and Suceava with 7 projects each, Bacău 5 projects, Vaslui and Neamț 4 projects and Botoșani 3 projects. In Iași and Suceava, higher values of the number of projects reached in the evaluation stage were registered, a situation that can be explained by the fact that in the two counties the research centers of the Romanian Academy as well as profile universities operate.

Following the analysis of the selection reports, we identified the main eligibility criteria that were not met, which led to the rejection, in proportion of 87%, of the funding projects. These were attempts to circumvent the maximum threshold set by the measure sheet, the submission of identical projects both in terms of project budget and in terms of marketing plans, the creation of artificial conditions and the inability to provide clarification on the additional information requested.

Only a number of 4 projects with a total value of 374,830.45 euro have reached the contracting phase, three of them being implemented in Iași County and one in Suceava. In the North-East Region, the rural communities from four counties did not contract any project through the 2 sub-measures. The low number of contracted projects places the North-East Region in last place in terms of the number of contracted projects compared to the number of farmers registered in the APIA database.

Comprising Dobrogea, as well as parts of Moldova and Muntenia, the South-East Region consists of the following counties: Brăila, Buzău, Constanța, Galați, Tulcea and Vrancea. In the South-East region, a total of 40 projects were evaluated, of which 32 projects concerned sub-measure 16.4 and 8 projects under sub-measure 16.4a. Regarding the distribution by counties of the submitted projects reached the evaluation stage, this was uneven, Tulcea county had 13 projects, Constanța 9 projects, while Buzău and Vrancea had 5 projects each, and Brăila and Galați 4 projects each.

Following the analysis of the selection reports, we identified the main eligibility criteria that were not met, which led to the rejection, in proportion of 65%, of the projects from funding. The reasons for granting ineligibility were the following:

- submission of projects with many identical aspects in order to create artificial conditions.
- non-correlation of the information from the marketing plan with those from the attached documents.
- multiple inconsistencies between the information in the grant application and the Cooperation Agreement.
- lack of supporting documents.
- discrepancy between the beneficiaries of these investments and the data about the building in which the investments will be located.
- lack of concrete information on the actions carried out within the project, on the investments to be made, on the promotional activities to be carried out and the rights and obligations of the members after the completion of the project.
- marketing plans made in an incomplete manner, without clear and personalized information about the activities to be carried out in terms of the following aspects: description of specific objectives, lack of information on how to achieve the objectives, the role of each member, etc.
- the total amount of co-financing was not correlated with that of the financial plan related to the indicated budget, as well as the lack of information on the amount of partners' participation to ensure the co-financing of projects.

- omissions regarding the defining information of the activity in the marketing plans.

- lack of information on how the concept of short supply chain will be set up and developed, starting from the areas cultivated by the members of the cooperation agreement, their processing and marketing of the proposed products.

- the value of the support was not justified in correlation with the complexity of the project, the quantity of products marketed, and the added value generated by it after implementation.

- failure to respond to requests for additional information requested.

Only 14 projects with a total value of 1,304,789.08 euro reached the contracting phase, as follows: Tulcea 7 projects, Constanța 4 projects, Vrancea two projects and Buzău one project. In the South-East Region, the rural communities from Brăila and Galați counties did not contract any project through the 2 sub-measures.

Being entirely in Muntenia, the Southern Region is made up of the following counties: Argeș, Dâmbovița, Giurgiu, Prahova and Teleorman. As in the South-East Region, a total of 40 projects were evaluated in the South Region, as follows: 27 projects targeted sub-measure 16.4, and 13 projects targeted sub-measure 16.4a. The similarities with the South-East Region continued in terms of the distribution by county of the submitted projects, which have reached the evaluation stage. As can be seen, the distribution was uneven, Dâmbovita County having 27 projects, more than double the total values of all other counties of the development region: Prahova 5 projects, Arges 4 projects, Giurgiu 3 projects and Teleorman 1 project.

It can be seen that of the total number of projects that reached the evaluation stage, the percentage of those that were contracted was 32.5%. Thus, the rural communities from Prahova and Teleorman counties failed to contract even one project, while the difference between the number of contracted projects in Dâmbovita county -10 projects and the other counties Arges -2 projects and Giurgiu - one project, creates major discrepancies on development opportunities.

Following the analysis of the selection reports, we identified the main eligibility criteria that were not met, which led to the rejection, in proportion of 67.5%, of the projects from funding. These were mainly due to the non-transmission of the answers to the requested additional information, the non-compliance with the principles of short agri-food chains and the lack of information on the justification of the expenses related to the investments provided in the Marketing Plan.

Only 13 projects with a total value of 1,085,742.86 euro reached the contracting phase, distributed as follows: DâmbovitaCounty 10 projects, Giurgiu County 2 projects and Arges county one project. In the Southern Region, the rural communities from two counties, although they had projects under evaluation, did not contract any project through the 2 sub-measures.

Comprising the entire Oltenie and a small part of Muntenia, the South-West Region is made up of the following counties: Dolj, Gorj, Mehedinti, Olt and Valcea. In the South-East region, a total number of 20 projects were evaluated, of which 15 projects targeted sub-measure 16.4 and 5 projects sub-measure 16.4a. Regarding the distribution by counties of the submitted projects reached the evaluation stage, it was uneven, Dolj and Olt counties had 8 projects and 6 projects, Gorj county 3 projects, Valcea county 2 projects and Mehedinti county had one project.

It can be seen that of the total number of projects that reached the evaluation stage, the percentage of those that were contracted was 25%. Thus, the rural communities from Mehedinti and Olt counties did not manage to contract even one project, while at the level of the entire region, 5 projects with a total value of 482,840.00 euro were contracted.

Following the analysis of the selection reports, we identified the main eligibility criteria that were not met, which led to the rejection, in proportion of 75%, of the funding projects. These were

mainly represented by non-compliance with the presence at the confirmed date and time in order to perform field verifications, creating artificial conditions by submitting several projects during the same session, attempts to circumvent the contractual clauses by submitting the application for funding documents that do not reflect reality, the use of the deregistered companies identified by elements that no longer express reality and the presentation of information in order to mislead the assessor.

Comprising the entire Banat as well as parts of Crisana and Transylvania, the West Region has the following counties: Arad, Caras-Severin, Hunedoara and Timis. A total of 26 projects were evaluated in this region, of which 22 projects concerned sub-measure 16.4 and 4 projects under sub-measure 16.4a. Regarding the distribution by counties of the submitted projects reached in the evaluation stage in the Western region, it was relatively uneven, in Hunedoara and Timis counties they had 12 and 11 projects respectively, while Caras-Severin and Arad counties had 2, respectively 1 project.

It can be seen that of the total number of projects that reached the evaluation stage, the percentage of those that were contracted was 46%. Thus, the rural communities in Arad and Caras Severin counties failed to contract even one project, while the difference between the number of projects contracted in Hunedoara county 9 projects and Timiș county 3 projects creates major discrepancies regarding the development opportunities of local communities.

Following the analysis of the selection reports, we identified the main eligibility criteria that were not met. The reasons for granting ineligibility were related to the lack of correlation between the complexity of the project, the quantity of products sold, and the added value generated by it after implementation, non-compliance with deadlines for providing additional information and non-correlation of objectives in the Marketing Plan with the Cooperation Agreement. Only 12 projects with a total value of 1,143,004.00 euro have reached the contracting phase.

Comprising Maramures and important parts of Crisana and Transylvania, the North-West Region has the following counties: Bihor, Bistrita-Nasaud, Cluj, Maramureș, Satu-Mare and Salaj. According to the analyzed statistical data, we noticed that the distribution of projects is uneven in the region. This situation is due to the fact that out of the 120 projects evaluated in the North-West region, 50 of them are related to Cluj County. Of the total number of projects evaluated, 93 projects targeted sub-measure 16.4, while 27 projects targeted sub-measure 16.4a. As we mentioned regarding the distribution by counties of the submitted projects, that reached the evaluation stage, Cluj County leads detached with 50 projects, following the counties of BistritaNasaud, Bihor, Satul Mare with 18, 17 and 16 projects, respectively, while Maramures registered only 10 projects.

At national level, the North-West Region has the best territorial distribution, being the only one in which there was not even a county in which at least one project was contracted through the 2 support sub-measures. Moreover, the North-West Region has the most projects within the 2 sub-measures, both in terms of the number of projects evaluated and contracted (70 projects, of which 50 projects on Sub-measure 16.4, respectively 20 projects on Sub-measure 16.4a), with a value total contracted of 6,522,133.66 euro.

Following the analysis of the selection reports, we identified the main eligibility criteria that were not met, which led to the rejection, in proportion of 42%, of the funding projects. The reasons for granting ineligibility were the following:

- it has not been demonstrated the creation of at least one short chain in a food chain configuration capable of marketing farmers' products from the Cooperation Agreement.

- the members of the Cooperation Agreement also hold membership in other agreements related to several projects submitted for support in order to promote the same product categories,

considering that the necessary artificial conditions have been created to benefit from multiple support and thus obtain an advantage that runs counter to the objectives of measure 16.4.

- the establishment of Cooperation Agreements between members of the same family.

- farmers do not have equipment specific to the activity, in the sense of preparing the products for marketing and do not prove compliance with the sanitary-veterinary norms.

- lack of a clear and personalized presentation of the project proposed for funding.

- non-fulfillment of the conditions of the guide by the partnership leader.

- partnerships structured identically / almost identically in several projects submitted on sub-measure 16.4, where the project leaders are the Local Councils of the territorial units, a few farmers.

- errors in budgetary calculations regarding the proportion of VAT eligibility.

- lack of farmers in the Partnership Agreement.

- lack of information on the substantiation of expenditure.

- the structure of the partnership does not involve school, health, leisure, public catering, farmers.

- submission of incomplete feasibility studies that do not present information on the technological flow, the investment opportunity, sketches showing the location of the equipment, forecasts on the evolution of the activity.

- lack of information in the Marketing Plan on how the implementation of the project brings added value for farmers and the local community, compared to the situation in which the project would not be implemented.

- multiple inconsistencies in the submitted documents.

Being in Transylvania, the Center Region consists of the following counties: Alba, Brasov, Covasna, Harghita, Mures and Sibiu. A total of 40 projects were evaluated in this region, of which 32 projects concerned sub-measure 16.4 and 8 projects under sub-measure 16.4a. Regarding the distribution by counties of the submitted projects that have reached the evaluation stage in the Center region, this was uneven. The counties of Brasov and Harghita had 16 and 13 projects, respectively Alba and Mures, 9 projects each, while Covasna had 8 projects and Sibiu only 4 projects.

It should be noted that the region is in second place in terms of both the number of projects evaluated and contracted through the two sub-measures, with a total of 17 projects contracted with a total value of 1,540,623.60 euro, of which 13 projects on Sub-Measure 16.4, respectively 4 projects on Sub-Measure 16.4a. In this regard, we cannot fail to notice that out of the total number of projects reached in the evaluation stage, only a percentage of 28.8% were contracted in relation to the North-West Region region, where the contracting percentage was 58.3%.

Following the analysis of the selection reports, we identified the main eligibility criteria that were not met, which led to the rejection, in a proportion of 71%, of the funding projects. The main reasons for granting ineligibility were the following:

- the lack of correlation of the data mentioned in the Marketing Plan with the attached documents.

- providing erroneous data in the application for funding.

- the non-existence of the NACE authorized codes specific to the activity in the agricultural field for the partner-farmers in the Cooperation Agreement.

- the lack of price offers within the Financing Application and the documents attached to it.

- lack of a clear and personalized presentation on the project proposed for funding.

- submission of projects in which a mixture of information and documents taken over from other projects submitted under the same measure was made.

- providing insufficient and omitted information in the answers provided to requests for additional information aimed at clarifying the submitted project.

- lack of compliant offers required for renting the goods.

Being in Muntenia, Bucharest - Ilfov Region includes the city of Bucharest and the counties: Calarasi, Ialomita and Ilfov. A total of 15 projects were evaluated in this region, of which 10 projects covered sub-measure 16.4 and 5 projects under sub-measure 16.4a. Regarding the distribution by counties of the submitted projects reached the evaluation stage in the Bucharest - Ilfov region and in this case the distribution was uneven, as follows: Bucharest 7 projects, Ialomita 4 projects, Calarasiand Ilfov 2 projects each. Subsequently, only one project from Bucharest and one from Ialomita reached the contracting stage.

Following the analysis of the selection reports, we identified the main eligibility criteria that were not met, which led to the rejection, in proportion of 87%, of the funding projects. The high proportion of projects rejected from funding is the same as in the North-East Region, with the two regions recording the worst results in contracting projects on the two sub-measures. Regarding the Bucharest - Ilfov Region, the reasons that were the basis for granting the ineligibility of the projects were the following:

- various deficiencies regarding the submitted documents: those related to agricultural lands, the documents of the legal representative, the certifications attesting that the production is obtained in an ecological system, etc.

- marketing plans that do not present in a clear, concise, detailed and personalized way the proposed activities.

- the lack of authorized NACE codes for the activities that the partners declare to carry out within the framework of the Cooperation Agreement.

- the requirements of the applicant's guide were not taken into account in drawing up the Funding Application.

- the eligibility criteria were not met.

- the members of the Cooperation Agreement also hold membership in other agreements relating to several projects submitted for support in order to promote the same categories of products, considering that the necessary artificial conditions have been created to benefit from multiple support.

CONCLUSIONS

The two sub-measures of financing through which support is provided for horizontal and vertical cooperation between actors in the supply chain in the agricultural and fruit sectors have attracted the interest of farmers working in the surrounding areas of large cities. Possible explanations for this situation are:

- the level of education of farmers in peri-urban areas which gave them the opportunity to develop long-term relationships with partners in various fields.
- easy access to information and the specialist consultancy market.
- reaching a certain degree of entrepreneurial maturity.

At the moment, small farmers are not yet ready to cooperate and do not understand the real advantages of joining a functional associative form. The costs of joining an associative form, in the perception of farmers, are not reflected in the advantages offered by it. In this context, the emergence of a funding competition to support cooperation between actors in the supply chain is welcome, as project results can become models of good practice for local communities.

The mountainous area of Romania includes 658 teritorial units, totaling an area of 71,341 km2, respectively 30% of the country's territory (238,391 km2). As agriculture is the main economic activity in the mountainous rural area, 18.5% of the people directly involved in agriculture work here. The vulnerability of small farms in the mountain area, with limited prospects for improving economic performance, can only be counteracted by stepping up the process of cooperation in agriculture. In this way the disruptive effects can be successfully inhibited, allowing the increase of the production yield as well as the optimization of the production capitalization.

Taking into account the particularities of the rural mountain area of Romania, through sub-measures 16.4 and 16.4a real progress can be obtained in terms of consolidating the agri-food sector even in the competitive conditions of the market economy. This could reduce the gap in terms of economic and social development, creating a favorable climate in which young people no longer seek easier living conditions and higher incomes, in urban areas or in other countries.

The involvement of the Romanian Academy through the National Institute for Economic Research "Costin C. Kiritescu" and the Romanian Mountain Forum in supporting the establishment and development of cooperation between actors in the supply chain in the agricultural and fruit sectors in the mountain area is appreciated. However, it should be noted that in the context of a funding competition with clearly established and quantifiable rules, special attention must be paid to eligibility criteria, which will lead to superior results in terms of the ratio between the number of projects reached in the evaluation phase and the number of which were also contracted.

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INFLUENCE OF COUPLED SUPPORT ON LIVESTOCK FARMING SECTOR DEVELOPMENT IN ROMANIA

MARIANA GRODEA[87]

Abstract

Coupled support is one of the main payment schemes in the category "direct payments", introduced at EU level in the year 2015, funded from the European Agricultural Guarantee Fund (EAGF). In the EU-28, the highest share of coupled support payments in the year 2019 went to the livestock farming sector (73.2%), of which 39.7% in the beef cattle sector, 20.9% in the dairy cow sector and 12.6% in the sheep and goat sector.

In the period 2015-2019, the livestock farming sector in Romania benefited from coupled support worth 668.9 million euros, out of which 60.7% in the dairy sector, 30.5% in the sheep and goat sector, 7.8% for beef cattle and 1% in the dairy buffalo sector. The results obtained following the analysis of statistical data for the period when this payment scheme was implemented (2015-2020) reveal that in the case of cattle sector, there was a non-significant impact on this sector development, in the sense that the decline continued both in terms of the total number of animals (-217 thousand heads), of meat production (-27.1 thousand tons live weight) and cow milk production (-2.8 million hl). The sheep and goat sector had a positive evolution in the same period, both as regards the number of animals (+629 thousand heads), meat production (+11 thousand tons live weight), yet with the decrease of slaughters in specialized units (-4.7 thousand tons live weight).

Key words: coupled support, beef cattle, dairy cows, buffalo cows, sheep, goats

JEL Classification: Q10, Q13, Q19

INTRODUCTION

In the new CAP 2014-2020, the EU member states had the possibility to allocate part of the direct payment package (up to 13%+2%) to the ***coupled support scheme*** on the basis of Article 68 of previous CAP 2007-2013 (OECD iLibrary, 2020). Coupled support is one of the main payment schemes in the category "direct payments" introduced in the year 2015, funded from the European Agricultural Guarantee Fund (EAGF).

According to Article 52 (paragraph 3), Regulation (EU) 1307/2013 on direct payments, the capacity of Member States to provide ***coupled support*** was been limited to those sectors or regions where certain types of agriculture or agricultural sectors are particularly important for economic, social or environmental reasons and are facing certain difficulties (Matthews 2018) .

In the initial regulation, there was a provision (Article 52 paragraph 5) according to which ***coupled support*** should only be granted to the extent necessary to create an incentive to maintain current levels of production in the sectors or regions concerned; Article 52 paragraph (6) provides that coupled support shall take the form of an annual payment and shall be granted within defined quantitative limits and based on fixed areas and yields or on a fixed number of animals (Matthews 2018).

Subsequently, this paragraph (Article 52 paragraph 5) was removed, and paragraph 6 was modified as follows: *"coupled support is a production-limiting scheme that takes the form of an annual payment based on fixed areas or yields or on a fixed number of animals that are to be established by member states for each measure and notified to the Commission"* (Matthews 2018). In other words, there is no longer any obligation to have a ceiling for the number of hectares or

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animals that can be supported. The only constraint would be the financial limit established in CAP regulation (Matthews 2018).

Member States' options for allocating coupled support vary widely, both in terms of the sectors / products supported and the level of support. On several occasions, member states revised their budgets for coupled support and types of products, yet they made some minor adjustments. All member states (except for Germany) opted for this payment scheme, although the value of support and the sectors covered significantly vary across countries (Diana-Maria Drigă, 2020). Thus, this budgetary limit is 8+2%, up to 13+2%, and an increase from these ceilings is still possible, only if needed, and only by the approval of the European Commission (European Commission 2017).

Thus, since 2015, nine member states have allocated maximum 8% to this scheme (Cyprus, Denmark, Estonia, Greece, Ireland, Luxemburg, the Netherlands, Austria, United Kingdom), three member states allocated more than 8%, but less than 13 (+2)% (Spain, Italy, Romania), eleven member states allocated the maximum percentage of 13 (+2)% (Bulgaria, Czech Republic, France, Croatia, Hungary, Lithuania, Latvia, Poland, Sweden, Slovakia, Slovenia), and three member states (Belgium, Finland, Portugal) needed Commission's approval, given their decision to allocated more than 13% (+ 2%) (European Commission 2019).

More than 70% of the total amount for coupled support was allocated to the three livestock farming sectors (40% for beef, 20% for dairy products and about 12% for sheep and goat meat) (European Commission 2019). At the same time, member states decided to allocated significant amounts for protein crops, fruit and vegetables, sugar beet, rice, grain legumes, potatoes, nuts, hops, hemp, oilseeds, silk worms (European Commission 2019). In the year 2021, after the budget review, the three sectors (beef, dairy products, sheep and goats), have remained the top three beneficiaries of coupled support, with 73% of the total amount dedicated to coupled support (European Commission 2021).

As regards the continuation of coupled support in the period 2021-2027, some experts do not rule out the use of coupled payments, but correlate this support for production with specific environmental benefits, being less convinced that these coupled payments would be justified out of social or economic reasons (Matthews 2018). Therefore, these authors consider that it is very important when analyzing the redistribution of coupled support to Member States, to analyze not only the economic impact of such a measure, but also the environmental impact in terms of climate change and greenhouse gas (GHG) emissions.

As regards the environmental impact, there are studies that show that coupled support may determine harmful environmental changes (increase of greenhouse gas emissions), by stimulating overpopulation and surplus production in the livestock raising sector, with the exception of situations when the coupled support has contributed to raising animals in ***extensive system***, to maintaining a high natural value farming system (Hart et al. 2018).

There are also other studies that mention that livestock production is the main contributor to environment pollution in EU agriculture and consequently it has the greatest potential to reduce greenhouse gas emissions (Latka 2021). In this sense, it is interesting to signal out that among the reform proposals of the European Commission for the period 2021-2027, published in June 2008, it is mentioned to introduce an eco-scheme, mandatory to implement by member states under Pillar 1, yet voluntary for farmers, which represents a significant innovation in the current green architecture of the Common Agricultural Policy (Meredith 2019).

Other authors (Jansson et al. 2018) investigated the impact of CAP measures on GHG emissions in a global perspective. Given that the livestock sector (ruminants in particular) has the highest intensity of GHG emissions in agriculture, (Jansson et al. 2018), using the CAPRI model, simulated the effect of eliminating the *Voluntary Coupled Support* (*VCS*) for the sector of ruminants in the European Union and evaluated the impact on production, prices and gas emissions. The results of the study revealed that removing the *Voluntary Coupled Support* (*VCS*) for the ruminants in the EU would have a modest impact (-0,4%) on the emissions coming from these. These findings could

contribute to the formulation of CAP measures and strategies aimed at reducing the global GHG emissions and therefore to reaching the objective of limiting global warming.

Having in view the current issues, the paper's main objective is to analyze the distribution of coupled support on the development of herbivores sector in Romania (dairy cows and buffaloes, beef cattle, sheep and goats). The analysis of statistical data for the period 2015-2020 on the evolution of specific indicators for the livestock farming sector results in the assessment of impact, effectiveness and efficiency of coupled support implementation.

MATERIAL AND METHOD

The methodology used for the study on the distribution of coupled support in the period 2015-2019, in the livestock farming sector (dairy cows and buffaloes, beef cattle, sheep and goats) in Romania includes methods that combine the consultation of literature (studies and articles, scientific treatises and other scientific materials published in Romania and abroad) with the processing and analysis of data from national (APIA, MARD, NIS), Community (Eurostat) or international (FAOSTAT) databases, as well as from specialized websites.

The consultation of literature represents the method used for the preliminary analysis of the European context, which highlight the most relevant results, which could be used as benchmarks for a deeper context analysis at national level.

The processing of statistical data on the distribution of coupled support for dairy cows and buffaloes, beef cattle, sheep and goats, in the period 2015-2019, made it possible to calculate indicators such as: total amount authorized for payment to the sector, total number of animals determined for payment, value of payment / head of animal, number of heads / number of farms eligible for coupled support, by size classes. These indicators were analyzed in terms of impact, effectiveness and efficiency of coupled support.

RESULTS AND DISCUSSIONS

Given that in the period 2015-2020, Romania was to benefit from important financial support from the European Union and that the Common Agricultural Policy Reform represented a fundamental change compared to the period 2007-2014, with new regulations that farmers had to take into account urgently in their future activity, as well as for the creation of an adequate and efficient national framework for the management and technical and financial implementation of the Community funds, the Government of Romania adopted the *Emergency Ordinance no. 3 of March 18, 2015 for approving the payment schemes to be implemented in agriculture in the period 2015-2020* (Romania's Official Gazette no. 191/2015).

This emergency ordinance approved the payment schemes in agriculture, as mechanisms to support farmers, as direct payment schemes and transitional national aids, for the period 2015-2020. Thus, Romania decided to introduce the ***coupled support*** from the category *"direct payments"* and notified the European Commission on the list of crops and animal species affected by difficulties and important in economic, social and environmental terms, to receive coupled support in the period 2015-2020.

In Romania, from the perspective of the sector to which coupled support was granted, it can be mentioned that the sector of herbivores (dairy buffalos and cows, beef cattle, sheep and goats) received a total amount of 668.9 million euros in the period 2015 - 2019, which increased as share in total coupled support value (crops and livestock) from 52% in 2015 to 67% in 2019 (Table 1).

Table 1. Evolution of the amount authorized for payment (Coupled Support Livestock – VCS) in the livestock sector – million euros

Item	2015	2016	2017	2018	2019	total	%
Dairy cows	68.6	75.6	83.2	86.2	92.3	405.8	60.7
Dairy buffalo cows	1.2	1.3	1.4	1.5	1.6	7.0	1.0
Beef cattle	9.5	10.1	10.7	10.8	10.9	52.0	7.8
Sheep and goats	21.5	25.9	47.3	50.2	59.2	204.1	30.5
Total	100.8	112.9	142.6	148.7	164.0	668.9	100.0

Source: author's calculations based on data from the Agency for Payments and Intervention in Agriculture

The financial support granted to the livestock sector in Romania, through the coupled support scheme, aimed to cover the production costs and increase farm production efficiency, to increase production quality and ensure a competitive level on the market.

The Voluntary Coupled Support to the livestock sector reached 164.0 million euros in 2019, as against 100.8 million euros in 2015 (+62.6%). In the period 2015-2019, the largest amount (405.8 million euros) was allocated to the dairy cow sector (60.7%). The sheep and goat sector comes next, with 204.1 million euros (30.5%), followed by beef cattle with 52.0 million euros (7.8%) and dairy buffalo cows (7 million euros).

As it can be seen in Table 2, the number of animals eligible for coupled support increased as follows: dairy cows from 80.7 thousand heads (2015) to 248.5 thousand heads (2019), buffalo cows from 4.2 thousand heads (2015) to 9.6 thousand heads (2019), beef cattle from 7.5 thousand heads (2015) to 52.6 thousand heads (2019) and dairy buffalo cows from 4.2 thousand heads (2015) to 9.6 thousand heads (2019). The total number of sheep and goats decreased instead, by 1280 thousand heads in 2019, as compared to 2015, from 4.7 million heads to 3.4 million heads.

Table 2. Evolution of the number of animals determined for payment (thousand heads)

Item	2015	2016	2017	2018	2019	total
Dairy cows	80.7	103.7	212.3	250.9	248.5	896.0
Dairy buffalo cows	4.2	6.5	8.4	9.2	9.6	38.0
Beef cattle	7.5	14.0	24.6	36.6	52.6	135.4
Sheep and goats	4709.2	850.1	1941.5	3202.1	3429.1	14132.0

Source: author's calculations based on data from the Agency for Payments and Intervention in Agriculture

The increase of the number of determined animals, of the number of farmers authorized to receive coupled support payments, in the period 2015-2019, was possible by a better information of farmers on the eligibility conditions by the representatives of associations accredited with maintaining the Genealogical Register, as well as by the relaxation of eligibility conditions. The relaxation of eligibility conditions, in the case of dairy cows, consisted in the fact that, since 2017, in the administrative territorial units (ATUs) in the mountain area, coupled support has been granted for a herd of 5 to 250 dairy cow heads, aged maximum 10 years, as against the previous period (2015-2016), when coupled support was granted for minimum 10 to maximum 250 dairy cow heads, aged maximum 8 years at the deadline for submission of single payment request.

In these conditions, the number of farmers in the dairy cow sector increased to 14662 in 2019, from 3447 in 2015, the number of farmers authorized for payment in the buffalo cow sector reached 2594 in 2019, from 1553 in 2015, and the number of beef cattle farmers was 1413 in 2019, as against 198 in 2015 (Table 3).

Table 3. Evolution of the number of farmers authorized for payment

Item	2015	2016	2017	2018	2019	total
Dairy cows	3447	4606	12346	15398	14662	50459
Dairy buffalo cows	1553	2240	2642	2711	2594	11740
Beef cattle	198	394	778	1113	1413	3896
Sheep and goats	18161	2872	6910	11900	12942	52785

Source: author's calculations based on data from the Agency for Payments and Intervention in Agriculture

In the sheep and goat sector, we can notice a decrease in the number of farmers from 18161 in 2015 to 12942 in 2019, with the most significant decrease in the year 2016, as compared to 2015. This because in the year 2015, out of communication and information reasons, the eligibility conditions were not very carefully checked by decision makers. The livestock farmers associations easily issued certificates attesting the belonging to the breed registered in the Genealogical Register, necessary for farmers to complete the files for APIA, so that in the year 2015 a very large number of sheep and goats and farmers respectively benefited from coupled support. After the decrease in the year 2016, the number of animals and farmers eligible for coupled support increased in the next period.

CONCLUSIONS

Even though the introduction of ***coupled support*** payment scheme was intended to stop the decline of livestock herds and the exit of farms from crisis, together with the increase of livestock farmers' incomes, the bovine herds continued their decline. Thus, in the period 2015-2020, both the total cattle herds and the dairy cow herds decreased by 9.5% and by 4.2% respectively.

The declining trend of **bovine herds**, of **dairy cow herds** respectively, was also reflected in the decrease of beef production (*live weight of slaughter animals for human consumption*) and of cow milk production. Thus, the production of beef and veal was down to 172.6 thousand ton in 2019, from 199.7 thousand tons in 2015 (-13.6%), and cow milk production decreased to 3.7 million tons in 2019, from 4 million tons in 2015 (-7.8%).

From the analysis of the evolution of (***live weight***) beef production obtained ***in industrial units***, it results an increase in the period 2015-2017, when the largest volume of animal slaughters was recorded (120.8 thousand tons in 2017). After 2017, production continued to decline, and in the year 2020 production was down to 63.8 thousand tons, from 89.6 thousand tons in 2015.

One of the causes that led to the diminution of bovine herds (mainly of those in the population's backyards) is the insufficient labour force in the rural area (old-aged population and depopulation of rural areas by labour migration from the countryside), diminution of farmers' incomes that are not sufficient for a living standard to motivate them to remain active in the sector, poor organization into farmer associations to sell their production and the prevalence of livestock herds with low genetic value.

Although after Romania's accession to the EU our country has benefited from several forms of support under (CAP) Pillar I and II, from state aids and from the coupled support introduced in 2015, progress in improving the productive potential of dairy cows has been delayed. Thus, the average milk yield in Romania, ***the lowest*** in the European Union has not increased, but it has even decreased in the investigated period.

As regards the production of raw cow milk delivered to processing, an increase can be noticed in the period 2015-2020 (+22%). However, this evolution, even though not spectacular, reflects an improvement in the organization, collection and processing activities.

In Romania, the low level of production performance is the consequence of technology used, of inadequate maintenance and exploitation conditions, mainly of poor nutrition in terms of quality, which do not allow the expression of the genetic potential of breeds. These add to the fragmented structure of farms, where small-sized holdings prevail that cannot apply performant raising and exploitation technologies (80% of dairy cow farms have 1-2 cow heads and account for 41% of cow herds).

Unlike the cattle farming sector, the **sheep and goat farming sector** in Romania has continued its upward trend since the country's accession to the EU, so that in the investigated period the number of animals increased to 13.7 million heads in 2020, from 12.6 million heads in 2015 (+8.7%). Romania's tradition in sheep raising and the increasing export demand, mainly from the well-established partners of Romania, as well as the increasing consumer demand have represented stability factors of the sheep and goat sector.

The total sheep and goat ***(live weight)*** meat production had a positive evolution, to reach 120.6 thousand tons in 2020, as against 109.6 thousand tons in 2015 (+10%). An upward trend was also noticed in the production of slaughtered (***live weight***) meat in the period 2015-2019 ; this amounted to 27.9 thousand tons in 2019, as compared to 20.6 thousand tons in 2015.

However, in the year 2020, under the background of the decrease in the total number of sheep and goats slaughtered in slaughterhouses from 842381 heads (2019) to 467838 heads (2020), meat production in industrial units reached 15.9 thousand tons, from 27.9 thousand tons in 2019.

In the trade with milk and dairy products, Romania has constantly had a deficient trade balance. The deficit increased after 2015, with a maximum value (-449 million euros) in 2020. Cheese represented more than half of the structure of imports. Imports almost exclusively originated from the intra-Community area, the main countries being Hungary, Poland and Germany. Exports had as main destination the EU-28 member states, Greece, Germany, United Kingdom as well as Moldova Republic from the extra-Community area.

The balance of trade in live bovines was permanently positive in the investigated period, with the largest balance of trade in the year 2017 (184 million euros), with the highest value of exports at 203.2 million euros.

Imports exclusively came from the intra-Community areas in the year 2020 the main European suppliers (accounting for 65.9% of Romania's imports of bovines) were Hungary (26.7%), the Netherlands (23.6%) and Lithuania (15.7%).

As regards exports, an increase in the exports of live bovines to the extra-Community area could be noticed, alongside with the decrease of exports to intra-Community countries. From the analysis of Romania's exports to non-EU countries, it results that more than half, i.e. 55% of the exports of live cattle had Israel and Turkey as main destinations. We can also mention some other partners outside the EU area, such as Jordan and Libya.

Unfortunately, Romania's exports mainly consist of live animals and less of carcasses and processed meat products, due to the insufficient slaughtering/processing network.

In value terms, according to the calculations made on the basis of EUROSTAT data, in the year 2019, Romania ranked first among the EU-28 countries in the *export of live sheep* with 50.6 million euros (29.6%), followed by Spain with 39.2 million euros (22.9%) and Hungary with 32.4 million euros (18.9%), exports being almost entirely dependent on the demand from the North Africa and Middle East markets. Thus, in the year 2019, three countries in these regions, namely Jordan (26.8%), Saudi Arabia (25.7%) and Libya (21.6%) absorbed 74.1% of total extra-Community exports).

Sheep imports mainly came from EU member states. The main intra-Community suppliers, from which Romania imported live sheep, were Spain, Hungary and France. In the year 2019, the cumulated imports from Spain (70.5%) and Hungary (20.3%) summed up 90.8% of total intra-Community imports.

The insufficient slaughterhouses in many livestock farming areas (in the mountain area in particular) represents a critical problem in Romania. In the event of a blockade on the export of live animals, Romania risks being blocked in terms of exports.

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CONTRIBUTIONS TO THE DEVELOPMENT OF THE PIG SECTOR IN ROMANIA

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Abstract

In Romania, pork represents 50% of the total types of meat consumed per capita, which places it in the first place in the hierarchical distribution of the most consumed types of meat nationally. These data underline the importance of the pig sector and the relevance of studying the economic actors in this field of activity, which is essential for meeting the consumption needs of the population. This article aims to obtain a correct and general picture of the pig sector in Romania, by determining the variables involved in the productivity of the most important pig farms on the domestic market. The approach, based on the analysis of financial results, analyzes indicators of the trend generated by the average (average, standard deviation, standard error, coefficient of variation, growth rate, etc.) and the function Cobb-Douglas, used to know the productivity of the production factors involved. The analysis also seeks to determine how and how much t labor and capital, as production factors influence the turnover and other economic indicators.

Keywords: pork, producers, Cobb-Douglas, Romania

JEL classification: Q11, Q12

INTRODUCTION

The pig farming sector is a dynamic sector that has undergone enormous changes in recent years. Pork is one of the significant sources of animal protein, being appreciated globally for its characteristics, an aspect also revealed by the widespread consumption. This fact is also highlighted by the Food and Agriculture Organization of the United Nations (FAO), which, in a hierarchy of the most consumed types of meat, ranks it first. [16, 28]

Through its gastronomic valences, pork enjoys a special popularity all over the globe, but especially in Romania, where it is part of the traditional culinary culture. Thus, of all types of meat, it is the most consumed by Romanians, the average annual consumption being 38 kg / capita in 2019, according to INSSE, close to the EU average, but well below the average consumption in Germany (58.05 kg / capita / Portugal (44 kg / capita / year), as shown by Eurostat data. [32, 33]

Despite the increased consumption of pork, the number of pigs in Romania had a downward trend, reaching 57.13% in 2020 compared to 2007, the year 2020 registering a total number of 3750 thousand heads. [33]

Pig farmers have had to adapt to market demands, and their efforts have been aimed at increasing efficiency, reducing costs and preventing potential pathologies. These challenges have been doubled by the new European directives, which have required farmers to reorganize their production process in order to reduce ammonia emissions and waste management. Particular attention has been paid in European regulations to the living conditions of animals, to ensuring their welfare and safety, and to limit the actions of stressors. [5]

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Since 2017, farmers have had to face a new challenge amid the spread of the African swine fever virus (ASF). This affects the entire process of production and distribution of pork, representing a serious problem especially on the Romanian market, already dominated by the challenges mentioned above. [16]

In this context, imports have become the main means of meeting consumer needs at the national level. ITC data (International Trade Center) show an increase of over 20.55% in the quantities of imported pork and 23.86% in its value between the reference years 2017, the year of the spread of African swine fever, and 2020, the year of the new coronavirus spread. [34]

The most important countries of pork origin were Spain (with 27.18% of total imports; 161.5 million euros), Hungary (20.26%; 120.4 million euros) and Germany (18, 58%; 110.4 million euros). The report from 2020 to 2007, as the moment of Romania's accession to the European Union, indicates an increase in value by 84.94%, from 321.3 million euros to 594.1 million euros, and quantitative by 45.96% in quantity, from 191.9 thousand tons to 280 thousand tons. [34]

THE STAGE OF KNOWLEDGE

1. Market situation

The main factors that produced significant negative effects on the activity of Romanian pig farmers were the African swine fever (ASF), which has reached alarming proportions since 2017, and the Covid-19 pandemic, which caused major problems in 2020 and 2021. [1.5]

The ASF epidemic has resulted in losses of more than 900 million euros for pig farmers, the problems being exacerbated by the virulent spread of Covid-19 and the restrictions imposed by the authorities to stop the pandemic. [22, 36] The pandemic has left a strong mark on the pig sector, already fragile at the beginning of the pandemic, after more than 2 years (2017-2019) in which it had to face the challenges imposed by the ASF. [5]

At present, we can talk about a real decline in the pig sector, which is based on a multitude of factors. It should be borne in mind that the two moments of crisis (ASF in 2017 and Covid-19 in 2020) only exacerbated pre-existing structural deficiencies, which were based on causes such as:

1. Significant price differences between meat supplied by domestic producers and that imported from the European Union, the latter being sold at much better prices for consumers. [27] Market inequities make it virtually impossible for fair competition between local and foreign producers. [36]
2. The data presented by roaliment.ro indicate a significant decrease in the price of pork, reaching 1.52 euro / kg live in 2020, which translates into a decrease of 7% compared to 2019. [23] Moreover, the cumulation of adjustments negative value in the case of the animal stock reached -10.7 million euros. [2. 3]
3. Romania's dependence on the European Union in terms of purchasing piglets, their prices being particularly high. [14, 15]
4. High prices for fodder and breeding sows, respectively. [14,15]
5. In addition to the high costs of imports, the costs involved in the production process make the activity even less profitable. [15]
6. The fluctuating nature of the market translates into the unpredictability of the sector, with significant price fluctuations. [18]

The two major epidemiological crises, namely the African swine fever crisis (ASF) and the Covid-19 pandemic, overlapped with these causes related to the way the market is structured and functions in this field of activity, making production and capitalization of porkeven more difficult.

1.1. African swine fever (ASF)

Data provided by ANSVSA (National Sanitary Veterinary and Food Safety Authority) for 2020 indicate that 24 commercial holdings and 610 households were forced to slaughter pigs on the ASF fund, receiving compensation from the authorities. [35] According to the same institution, the costs generated by the ASF amounted to 190.2 million lei in 2020, their value since the outbreak of the crisis, so for the period 2017-2020, being not less than 600.4 million lei. [35] On the other hand, estimates provided by the Association of Romanian Pork Producers (APCPR) indicate losses of more than one billion euros during the ASF crisis, i.e. in the period 2017-2020. [17, 36]

African swine fever has once again raised the issue of the profitability and predictability of the activity of pig farms and has necessitated the development of innovative solutions to stop the epidemic and prevent such events in the future. Among the most frequently cited measures were biosecurity, which would have the ability to limit the spread of ASF and mitigate its devastating effects. Even if such measures cannot be categorized as salutary, we must not lose sight of the fact that, in the case of ASF, we are not only talking about a health problem related to the contagious disease, but also an economic problem involving complex structural mechanisms. Firms implementing biosecurity strategies are and will continue to be affected by overcrowding as a result of restricting the movement of livestock. [12]

1.2. Covid Pandemic 19

The effects of the pandemic crisis have overlapped with the effects of the swine fever epidemic crisis, but also by the structural problems of the market, mentioned above, which make pig farming an activity that is too unprofitable. It is not surprising that, in the absence of regular subsidies received from the European Union, many Romanian farmers would not be able to carry out their activity, given the differences in market prices and their variability, as well as the high costs involved in production. Romanian pig farmers could not function in a self-sustaining way anyway, and the Covid-19 pandemic meant the failure of some of them [21,24] and the danger of bankruptcy for others. [10, 25]

The financial support received from the authorities is an important but not sufficient support for the revitalization of the sector, which has been hit successively by the two crises. In this context, OUG 150 / 27.08.2020 is published in September 2020, by which the state undertakes to financially support pig farmers to correct the devastating economic effects of the spread of the new coronavirus. The amounts allocated in 2020 reached the value of 100 euro / UVM, at a conversion rate equal to 0.3 UVM – „fat pig" and 0.5 UVM – „*breeding animals"*. The number of beneficiaries was 292 in 2020, with an average allocation of 62,940.75 Euro / farm, according to information published by APIA. The maximum amount available for a farmer was 100,000 euros, with the possibility of cumulation with various other sources of financial allocations to support the activity and reduce the effects of the pandemic. [31]

The Covid-19 pandemic has had and continues to have a detrimental effect on economic life as a whole, but especially in the pig sector, where consumption needs have outpaced domestic production capacity. The increase in imports has increased significantly, with the vicious circle

leading to an increase in the difficulties faced by domestic producers [16]. A crisis in the pig sector would result in a significant food crisis.

MATERIAL AND WORKING METHOD

1. Profitability of production factors in the pig farming sector

The economic concept of combination refers to the fact that the same result can be achieved by different ways of combining factors of production. In the case of the pig sector, the combination of factors of production aims to identify the most efficient combination in order to maximize productivity and profit. The combined action must consider both markets demands and available resources, understood as the totality of the means and tools that can be used to increase productivity in the services provided or the goods produced. [7, 26]

Substitution, on the other hand, is about replacing factors. Productivity is analyzed, from the perspective of substitution, in relation to labor and capital, according to the formula:

$$\mathbf{Q = f (L, K)}$$

Productivity (Q) is the result of the combination of labor (L) and capital (K). This function mathematically expresses the relationship between productivity and how the two determinants were combined (the amount of labor and the amount of capital) in order to maximize profit, to connect to market requirements and reduce costs. [7, 26]

In economic theory, there are many ways to combine these variables to get the best results. Among the extremely complex theoretical models, we mention the model proposed by Cobb-Douglas, which sees the correlation between capital and labor as one of the important sources of productivity. [3,4,11] In times of crisis and economic unpredictability, such as the Covid-19 pandemic, it becomes imperative to study the various ways of combining them to determine their effectiveness in specific sectors of economic activity, such as pig farming. [11]

2. REFERENCES, methods and indicators used

The study is based on data available from the National Institute of Statistics (INSSE), Eurostat and data obtained from the Ministry of Finance for the period 2005-2020.

The following were used as statistical indicators for analysis and projection: mean, standard deviation, annual growth rate [2] , and second degree trend equations and correlation coefficients (R and r) [19]. The **Cobb-Douglas function of the form** $\mathbf{Q = A * K^{\alpha} * L^{\beta} * e^{\lambda t}}$ was used to calculate the coefficients of elasticity, **where:** [7,8]

Q = turnover of the company;

A = scale parameter;

α, β, λ = coefficients of elasticity of real gross value added in relation to each of the influencing factors used

t = time variable (1, 2, 3,… n)

In the technical progress Cobb-Douglas model, the parameters α and β represent the coefficients of elasticity of the real value in relation to the two factors, capital (K) and average number of employees (L), which measure the relative variation of real value added in depending on the relative variation of the factors of production, and λ expresses the influence of the technical progress on the increase of the turnover. [7,8,20]

RESULTS AND DISCUSSIONS

The following tables show various indicators that characterize the situation of the pig sector, from the beneficiaries of subsidies to the determination with the help of the Cobb Douglas function of the increase in production factors.

Table 1 shows the first 30 beneficiaries of grants, out of a total of 219, according to the amount paid for measure 215/14 - Animal welfare payments - package a) - pigs for the 2020 Campaign. [31] As it can be seen, these companies managed to absorb 32.12 million euros in 2020 (66.54% of the total amounts paid by APIA for this measure: 48.27 million euros) (APIA, 2021). Among the companies presented in table 1, Smithfield Romania SRL is the only one that has CAEN declared at the Ministry of Finance as 1011 „*Meat processing and preservation"* (Caen mainly, from which most of the revenues are obtained). The rest of the companies under analysis declared CAEN Code 0146 – „*Pig breeding"*. [29]

For the calculation of the profitability rate, the indicator of *net profit* results was reported to an indicator that reflects a „*net turnover* " activity flow . [6] The financial indicators of the companies have been extracted from the website of the Ministry of Finance. The calculations show that subsidies play an important role in the profitability of the sector. Of the 30 companies, seven reported financial losses in 2020 compared to 2013 when only two companies reported losses.

Through a simulation we deducted from the realized profit the amount of the subsidy and we found that another 13 companies out of 30 would pass on the loss (66.67%). [9, 29] We find that subsidies received by farmers are vital both for animal welfare and for improving financial performance.

Table 1.The beneficiaries top of subsidies for pigs sector welfare in 2020

No..	Company name	2020 grant	**2020**				**2013**				Evolution of the profit rate 2013-2020
			Turnover	Advantage	Loss	Profit rate	Turnover	Profit	Loss	Profit rate	
		Thousands €	Thousands €	Thousands €		%	Thousands €	Thousands €		%	
1	Smithfield România S.R.L.	8.54	269.5		-14.93	-	172.99	23.75		13.73	-
2	Degaro S.R.L.	2.34	36.43	1.83		5.03	13.91	1.98		14.23	↓
3	Suinprod S.A. Roman	1.72	18.27	2.45		13.43	10.88	0.07		0.63	↑
4	Premium Porc Sibiu S.R.L.	1.7	21.12		-3.49	-	-	-		-	-
5	AgrisolInternațional RO	1.52	59.28	22.49		37.94	63.8	0.69		1.08	↑
6	Nutricom S.A. Oltenița	1.31	17.95		-2.78	-	48.89	1.22		2.49	-
7	Landbruk S.R.L.	1.21	14.22	0.11		0.76	4.83	0.47		9.73	↓
8	Porcellino Grasso S.R.L.	1.15	15.54	0.93		5.98	14.9	0.85		5.74	↑
9	Premium Porc S.R.L.	0.87	21.14		-0.22	-	13.82	1.13		8.18	-
10	Latini Com S.R.L.	0.79	5.46	1.01		18.44	2.51			0.02	↑
11	Repro Farm S.R.L.	0.78	5.02	0.05		1.04	0			-	-
12	Agrikilti S.R.L.	0.78	9.03	0.02		0.24	0		-0.03	-	-
13	Veres Agro Prod Com S.R.L.	0.74	7.1	2.44		34.39	3.14	0.18		5.63	↑
14	Eurospațial S.R.L.	0.73	7.88	0.56		7.13	6.24	0.48		7.64	↓
15	Abo Mix S.A.	0.7	6.65	0.56		8.43	11.31	0	-6.46	-	-
16	Consinterfin S.R.L.	0.69	13.22		-0.86	-	12.17	1.97		16.18	-
17	Premium PorcNegreni S.R.L.	0.67	14.28		-3.43	-	0.59	0.03		5.45	-
18	Cirrus Comexim S.R.L.	0.58	8.86		-1.08	-	7.51	0.14		1.9	-

19	Europig S.A.	0.54	14.69	0.02		0.14	12.79	0.01		0.08	↑
20	FermaPorcul De Băilești S.R.L.	0.53	7.32	1.38		18.85	1.32	0.02		1.33	↑
21	CombinatulAgroindustrialCurtici S.A.	0.51	6.06	0.81		13.31	2.56	0.03		0.99	↑
22	Tebu Consult Invest S.R.L.	0.5	18.8	3.5		18.61	3.53	0.33		9.39	↑
2. 3	Agro Pig S.R.L.	0.44	4.4	0.08		1.77	5.4	0.31		5.7	↓
24	Porkprod S.R.L.	0.42	7.03	0.13		1.88	3.57	0.25		6.95	↓
25	Nutripig S.R.L.	0.42	3.86	0.04		1.06	3.08	0.04		1.36	↓
26	Fermeplus S.R.L.	0.42	4.18	0.31		7.51	5.71	0.68		12	↓
27	Zoosab S.R.L.	0.41	7.7	2.24		29.15	4.09	0.79		19.33	↑
28	SuinprodSiret S.R.L. Bacău	0.4	3.99	0.58		14.6	5.11	0.02		0.46	↑
29	Nutrisuin S.R.L.	0.37	5	0.04		0.89	8.66	0.03		0.36	↑
30	Agrova Pork Farm S.R.L.	0.34	4.25	0.04		0.91	-	-		-	-
TOTAL		**32.12**	**638.23**	**41.62**	**-26.79**		**443.31**	**35.47**	**-6.49**		

Source: Own calculation based on data obtained from APIA (personalized address no. 198 / SIIP / 10.092021) and the Ministry of Finance, https://mfinante.gov.ro/persoane-juridice/informatii-fiscale-si-bilanturi

In absolute figures, it can be seen that the profit obtained by the 30 companies increased in 2020 compared to 2013 from 35.47 million euros to 41.62 million euros (+ 17.33%). The recorded loss increased from -6.49 million euros in 2013 to -26.79 million euros in 2020 (+20.3 million euros). From table 1 it can be seen that the loss of 2020 is caused mainly by Smithfield Romania SRL (-14.93 million euros). [29]

Table 2. Evolution of CANE 0146 indicators –„*Pig breeding*"

Indicator	**Turnover**	**Pr.**	**Profit rate**	**Loss**	**No employees**	**Fixed assets**
MU	Thousands €	Thousands €	%	Thousands €	**Nr.**	Thousands €
2016	474.10	32.71	6.90	-4.60	3,590	336.92
2017	547.95	75.89	13.85	-4.44	4,021	389.44
2018	499.73	43.34	8.67	-9.00	4,339	411.73
2019	555.21	53.06	9.56	-12.20	3,931	425.54
2020	495.86	45.94	9.26	-18.26	3,562	452.11

Source: Own calculation based on data obtained from the Ministry of Finance, https://mfinante.gov.ro/persoane-juridice/informatii-fiscale-si-bilanturi

The turnover (Q) registered on CAEN 0146 – „*Pig breeding*" at the level of 2020 was 495.86 million euros with $ 59.35 million less than the value registered in 2019 (-10.69%). [29]

In 2020, the profit of the pig breeding sector in Romania was 45.94 million euros, 13.42% less than in 2019. Compared to 2017, the net profit decreased by 39.47% from 75.89 million in 2017 to € 45.94 million in 2020.

The net loss in 2020 was -18.26 million euros, 6.06 million euros more than in 2019 and four times higher than in 2017 (-4.44 million euros).

The number of employees (L) increased in the period 2016-2018 by 20.86% from 3,590 people to 4,339 people. African swine fever along with the Covid 19 pandemic caused the number of employees in the sector to fall below 2016 (-777 people).

Fixed assets (K) increased by 34.19% between 2016 and 2020, from 336.92 million euros to 452.11 million euros.

Only companies that were at least 15 years old were selected for the accuracy of the analysis of the coefficients of the **Cobb Douglas** function. Through this selection criterion the number of companies was reduced from 30 to 20.

When we talk about the dependence of turnover (**Q**) on certain factors, in this case the number of employees (**L**) and fixed assets (**K**), we are actually talking about the elasticity of the turnover of the fixed assets factor and the elasticity of turnover of the labor factor. [7]

We have the relationship of the type:

$Q = A * K^{\alpha} * L^{\beta} * e^{\lambda t}$

After performing logarithmic transformations, we obtain:

$\ln (Q) = \ln (A) + \alpha \ln (K) + \beta \ln (L) + \lambda t$

By estimating the regression model for each selected company, the results in Table 3 are obtained.

Thus, for Smithfield Romania SRL, the estimated model is:

$Ln (Q) = 4.49 + 0.12 \ln (K) - 0.17 \ln (L) + 0.11 * t$

Table 3. Cobb Douglas function estimated value for the companies analyzed

No.	Company name	A	K	L	λt	R^2	r	$F_{calc.}$	significance
			α	β					
1	Smithfield Romania SRL	4.49	0.12	-0.17	0.11	0.86	0.93	22.64	S
2	Degaro SRL	-6.76	-0.18	2.29	0.01	0.98	0.99	253.52	S
3	Suinprod SA Roman	-0.91	-0.52	0.77	0.08	0.7	0.84	9.44	S
5	Agrisol International RO	-9.57	-0.01	1.94	0.02	0.88	0.94	28.45	S
6	Nutricom SA Oltenita	-7.09	0.18	1.57	0.07	0.58	0.76	5.55	S
9	Premium Porc SRL	2.35	1.81	-1.44	0.16	0.89	0.94	28.91	S
10	Latini Com SRL	-4.72	-0.2	1.65	0.02	0.78	0.89	14.53	S
13	Veres Agro Prod Com SRL	-1.73	-0.6	-1.48	0.69	0.83	0.91	19.22	S
14	Eurospatial SRL	1.23	0.12	-0.06	0.07	0.77	0.88	13.18	S
15	Abo Mix SA	3.36	-0.32	0.14	-0.12	0.64	0.8	7.25	S
16	Consinterfin SRL	-4.85	1.31	0.93	0.1	0.82	0.91	18.4	S
17	Premium PorcNegreni SRL	-4.41	0.27	1.09	0.2	0.8	0.89	11.97	S
18	Cirrus Comexim SRL	-4.54	0.27	2.33	-0.17	0.96	0.98	104.62	S
19	Europig SA	-2.97	0.22	0.87	0.04	0.93	0.97	54.44	S
21	CurticiAgroindustrial Plant	-2.36	0.51	0.66	0.06	0.86	0.93	24.49	S
24	Porkprod SRL	0.47	0.02	-0.37	0.2	0.88	0.94	27.07	S
25	Nutripig SRL	0.08	0.07	0.2	0.02	0.44	0.66	3.13	S
27	Zoosab SRL	0.68	0.33	-0.19	0.12	0.81	0.9	17.34	S
28	SuinprodSiret SRL BACAU	-4.92	0.79	1.33	-0.01	0.9	0.95	34.51	S
29	Nutrisuin SRL	-8.43	1.14	3.33	0	0.59	0.77	5.76	S

Source: Own calculation based on data obtained from the Ministry of Finance, https://mfinante.gov.ro/persoane-juridice/informatii-fiscale-si-bilanturi

Based on the results obtained for Smithfield Romania SRL we can conclude the following:

- the dependence between turnover (Q) and the two factors (labor and capital) is about 86% (R^2 = 0.86), which attests to a functional link between the dependent variable (Q) and the independent variables (K, L , technical progress (λ)).
- The elasticity of turnover (Q) with respect to the fixed assets factor (K) is 0.12, respectively if the fixed assets factor increases by 1%, then the turnover will increase by 0.12%;
- The elasticity of turnover (Q) compared to the number of employees' factor (L) is -0.56, respectively if the number of employees' factor will change by 1%, then the turnover will change by -0.56%;

Theoretically, forecast production functions are used for the following purposes:

„1. to calculate the activity result (Q / CA) that can be obtained at the forecast horizon based on the available factors of production under the allowed conditions of elasticity;

2. to determine the rate of increase of the factors necessary to obtain the predicted Q;

3. for the design of an efficient combination of factors of production.

4. to determine the differential efficiency of the factors of production;

5. to analyze the relationship between labor productivity, the endowment of fixed-capital labor and the efficiency of the use of fixed capital." [13]

Table 4 Extrapolation of production factors by 1% according to the estimated Cobb-Douglas function

No.	Company name	Cobb-Douglas function	Δ 1% K	1% L	Δ1% λt	Δ1% K, L, λt
			thousand € / expl	thousand € / expl	thousand € / expl	thousand € / expl
1	Smithfield Romania SRL	$Q = e^{4,49} \cdot K^{0,12} \cdot L^{-0,56} \cdot e^{0,11}$	2.95	-3.45	-52.86	-54.24
2	Degaro SRL	$Q = e^{-6,76} \cdot K^{-0,18} \cdot L^{2,29} \cdot e^{0,01}$	-7.80	5.01	-0.55	4.11
3	Suinprod SA Roman	$Q = e^{-0,91} \cdot K^{-0,52} \cdot L^{0,77} \cdot e^{0,08}$	-0.29	0.70	-2.46	-2.12
5	Agrisol International RO	$Q = e^{-9,57} \cdot K^{-0,01} \cdot L^{1,94} \cdot e^{0,02}$	13.34	8.42	-1.78	6.37
6	Nutricom SA Oltenita	$Q = e^{-7,09} \cdot K^{0,18} \cdot L^{1,57} \cdot e^{0,07}$	-0.03	2.26	-3.22	-1.13
9	Premium Porc SRL	$Q = e^{2,35} \cdot K^{1,81} \cdot L^{-1,44} \cdot e^{0,16}$	7.14	-0.86	-3.66	-3.88
10	Latini Com SRL	$Q = e^{-4,72} \cdot K^{-0,2} \cdot L^{1,65} \cdot e^{0,02}$	-0.38	0.30	-0.22	0.06
13	Veres Agro Prod Com SRL	$Q = e^{-1,73} \cdot K^{-0,6} \cdot L^{-1,48} \cdot e^{0,69}$	-2.98	-0.91	-14.19	-14.48
14	Eurospatial SRL	$Q = e^{1,23} \cdot K^{0,12} \cdot L^{-0,06} \cdot e^{0,07}$	0.12	-0.03	-1.14	-1.14
15	Abo Mix SA	$Q = e^{3,36} \cdot K^{-0,32} \cdot L^{0,14} \cdot e^{-0,12}$	0.04	0.03	1.43	1.45
16	Consinterfin SRL	$Q = e^{-4,85} \cdot K^{1,31} \cdot L^{0,93} \cdot e^{0,1}$	-0.66	0.74	-3.52	-2.45
17	Premium PorcNegreni SRL	$Q = e^{-4,41} \cdot K^{0,27} \cdot L^{1,09} \cdot e^{0,2}$	1.82	0.83	-7.46	-6.81
18	Cirrus Comexim SRL	$Q = e^{-4,54} \cdot K^{0,27} \cdot L^{2,33} \cdot e^{-0,17}$	-1.51	0.73	3.12	4.19
19	Europig SA	$Q = e^{-2,97} \cdot K^{0,22} \cdot L^{0,87} \cdot e^{0,04}$	4.05	0.70	-1.28	-0.56
21	CurticiAgroindustrial Plant	$Q = e^{-2,36} \cdot K^{0,51} \cdot L^{0,66} \cdot e^{0,06}$	-0.27	0.74	-2.13	-1.29
24	Porkprod SRL	$Q = e^{0,47} \cdot K^{0,02} \cdot L^{-0,37} \cdot e^{0,2}$	0.88	-0.12	-2.31	-2.39
25	Nutripig SRL	$Q = e^{0,08} \cdot K^{0,07} \cdot L^{0,2} \cdot e^{0,02}$	0.07	0.03	-0.15	-0.12
27	Zoosab SRL	$Q = e^{0,68} \cdot K^{0,33} \cdot L^{-0,19} \cdot e^{0,12}$	0.04	-0.07	-1.74	-1.77
28	SuinprodSiret SRL Bacau	$Q = e^{-4,92} \cdot K^{0,79} \cdot L^{1,33} \cdot e^{-0,01}$	0.16	0.21	0.11	0.35
29	Nutrisuin SRL	$Q = e^{-8,43} \cdot K^{1,14} \cdot L^{3,33} \cdot e^{0}$	1.66	0.27	0.01	0.27

Source: Own calculation based on data obtained from the Ministry of Finance, https://mfinante.gov.ro/persoane-juridice/informatii-fiscale-si-bilanturi

Table 4 shows several situations:

1. The increase of only the *capital* production factor (K) by 1% determines the increase of the turnover for 12 companies (60%). For eight companies, the 1% capital increase leads to a decrease in turnover.

2. The increase of only 1% of the *labor* factor (L) determines the increase of the turnover for 14 companies (70%). For six companies, the increase in the number of employees by 1% leads to a decrease in turnover.

3. The increase by only 1% of the *technical progress* production factor (λt) determines the increase of the turnover only for 4 companies (20%). For 16 companies, the 1% increase in the production factor *technical progress* leads to a decrease in turnover.

1. The increase of all production factors determines a positive evolution for the turnover of three companies: Abo Mix SA, SuinprodSiret SRL Bacău, Nutrisuin SRL

E.g:

- in the case of Smithfield Romania SRL by increasing by 1% the *capital* production factor (K) the estimated Cobb-Douglas function, $Q = e^{4,49} \cdot K^{0,12} \cdot L^{-0,56} \cdot e^{0,11}$, returns an increase in turnover by 2.95 millionEuro;

- in the case of Degaro SRL by increasing by 1% the *capital* production factor (K) the estimated Cobb-Douglas function, $Q = e^{-6,76} \cdot K^{-0,18} \cdot L^{2,29} \cdot e^{0,01}$, returns a decrease in turnover by -7.80 million euros.

CONCLUSIONS

In 2020, Romanian pig farmers benefited from the following subsidies:

1. Measure 14 - Animal welfare, 219 beneficiaries, 48,268,517.76 euros.

2. The state aid scheme to support the activity of pig farmers in the context of the economic crisis generated by the COVID-19 pandemic, 292 beneficiaries, 18,378,700.00 euros.

Although were backed, companies operating in CAEN 0146 – „*Pig breeding"* have net loss in 2020 of -18.26 million euros, 6.06 million euros more than in 2019 and four times higher than in 2017 (-4.44 million euros).

The analysis shows the importance of the use of the Cobb-Douglas production function by farmers in the resource management process.

We have demonstrated with this function that the most important factors of production (labor and capital) generally have a positive effect on the turnover of the main companies studied.

However, technical progress, increasing by 1%, would lead to a decrease in most companies.

The uncertainty created by the African swine fever epidemic and the COVID-19 pandemic highlights the importance of analyzing, forecasting and planning on a farm in order to increase profits during periods of *economic boom* and reduce losses during periods of market contraction.

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TRENDS IN POULTRY IN ROMANIA FOR THE PERIOD 2007-2019

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Abstract:

The study aimed to analyze the evolution of the poultry sector in Romania in the period 2007-2019. The main indicators studied in the poultry sector were: poultry, meat production, eggs production, consumption, producer prices, imports and exports. The research method was based on a quantitative approach, respectively on national and European data series. The results showed that the number of birds in Romania decreased at the level of individual holdings and increased at the level of holdings with legal personality. Overall, the decrease in numbers was 8.13% in 2019 compared to 2007. In the period 2007-2019, Romania's poultry meat production increased by 256.12 thousand tons (+ 61.54%). Romania's egg production decreased in the period 2007-2019 by 14.69%, from 6.5 billion pieces in 2007 to 5.56 billion lei in 2019.

Keywords: poultry, livestock, production, consumption, import, export

JEL classification: Q10, Q13, Q17, O13

INTRODUCTION

Agriculture is an essential factor in ensuring Romania's sovereignty and food security [9]. Poultry farming is one of the strongest agricultural sectors in Romania that has managed to rise to the level of Western countries in terms of technological and productive performance after joining the European Union [11]. The poultry sector, through the evolution registered in the analyzed period, is the most spectacular sector in Romanian animal husbandry [3]. In 2019, Romania ranked 8th in the European Union in poultry production [11]. Most industrial farms have developed vertically, from hatching to feeding, slaughtering, processing and selling meat [5]. Integration allows poultry farms to control production costs and increase profitability. The poultry market in Romania is facing overproduction, massive imports, but also negative media campaigns related to the use of banned hormones and proteins [10]. With regard to the poultry meat sector, there is price pressure due to imports [3].

MATERIAL AND WORKING METHOD

The study is based on data available from the National Institute of Statistics (INSSE), Eurostat and the International Trade Center (ITC) for the period 2007-2019 .The following were used as statistical indicators for analysis and projection: mean, standard deviation, annual growth rate [2] , and second degree trend equations and correlation coefficients (R and r) [6] . The economic indicators were calculated for the period 2007-2019, and for the subperiods 2007-2013 and 2014-2019. The deviation between the average of the indicators analyzed on the two subperiods was statistically evaluated using the t sample (significance depending on GL = 11 (n1 = 7; n2 = 6; GL = n1 + n2-2), and probability =>tcal> t :> 0.05 *;> 0.01 **;> 0.001 ***; if $<0.05^{0}$; $<0.01^{00}$; $<0.001^{000}$) [6]. The assessment scale was used to assess the correlation coefficient: 0.30-0.49: moderate association; 0.50-0.69: substantial association; over 0.7: very strong association [6].

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RESULTS AND DISCUSSIONS

According to INSSE data for the period 2007-2019 (Table 1) there is a decrease in the number of birds by 8.13% from 82.04 million heads in 2007 to 75.36 million heads in 2019. This decrease is the result of a decrease within individual holdings by 19.33% from 59.05 million heads in 2007 to 47.63 million heads in 2019 and the increase by 22.83% (+5.15 million heads) of the staff within the holdings with legal personality.

Table 1. Descriptive statistical analysis of the evolution of poultry number in Romania in the period 2007-2019

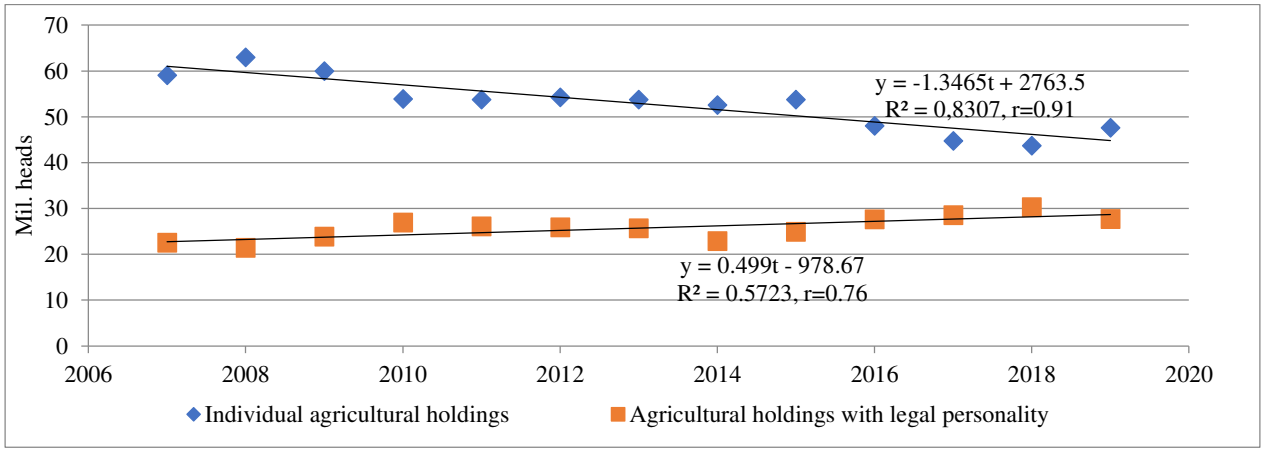
	Period 2007-2013						Period 2014-2019						Deviations	
	2007	2013	Average 1	St. Dev	C V	Rhythm1	2014	2019	Average 2	St. Dev	CV	Rhythm 2	M2-M1	Sign.
Specification	Mil. head.	Mil. head.	Mil. head.	Mil. head.	%	%	Mil. head.	Mil. head.	Mil. head.	Mil. head.	%	%	Mil. head.	
Total	82.0	79.4	81.5	2.0	2.4	-0.5	75.5	75.4	75.4	2.1	2.7	-0.5	-6.1	θθθ
Private sector of which:	81.6	79.4	81.4	2.0	2.4	-0.5	75.4	75.3	75.4	2.1	2.7	-0.5	-6.0	θθθ
Individual farms	59.1	53.8	56.8	3.8	6.7	-1.6	52.6	47.6	48.6	4.5	9.3	-4.5	-8.3	θθθ
Legal holdings with legal personality	22.6	25.7	24.6	2.1	8.4	2.2	22.9	27.7	26.9	3.0	11.0	7.3	2.2	*

Source: Own calculation based on data provided by INSSE, TempoOnline,
*Significance (GL = 11, tcal> t:> 0.05 *;> 0.01 **;> 0.001 ***; <0.05θ; <0.01θθ; <0.001θθθ; <0.05: N)*

Despite this increase, it was not possible to compensate for -11.42 million heads from holdings without legal personality. In the subperiods we find that the decrease of 6.03 million heads in the private sector has a very significant negative statistical significance and the increase of 2.22 million heads in agricultural holdings with legal personality is statistically significant. In the period 2007-2013, in the holdings with legal personality, the rate was + 2.18%, while in the period 2014-2019 this indicator reached + 7.26%.

Analyzing the trend of the poultry number for the period 2007-2019 for individual agricultural holdings by the equation Yexpi = -1.3465t + 2,763.5 (r = 0.91; very strong association) and the holdings with legal personality Yexpj equation = 0.499t-976, 67 (r = 0.76; very strong association), we find that these trends are statistically significant.

Figure 1. The equation of trend of the number of birds in Romania in the period 2007-2019 according to the legal form of organization



Source: Own design based on data provided by the National Institute of Statistics, TempoOnline,

From the extrapolation over 5 years, respectively in 2024, the individual agricultural holdings will have a number of birds of 37 million heads and the holdings with legal personality of 32 million heads, totaling a totalnumber of 68.5 million heads. This number will be 4.2 million lesser than compared to 72.7 million in 2019 (Figure 1).

In the period 2007-2019, Romania's poultry meat production increased by 256.12 thousand tons (+ 61.54%). The difference between the averages of the two periods compared is very statistically significant (Table 2). Investments in the poultry sector led to a growth rate of poultry meat production in the period 2014-2019 of +6.48 (four times higher than in the period 2007-2013, when it was +1.56). In relative terms, poultry meat production increased by 9.72% in 2013 compared to 2007. A spectacular increase (of + 37.67%) was recorded between 2014 and 2019, from 488.36 thousand tons at 672.31 thousand tons. As it can be seen from Table 2 and observed in Figure 2, the increase in poultry production in Romania was based on holdings with legal personality.

Table 2. Descriptive statistical analysis of the evolution of poultry meat production in Romania during 2007-2019 (thousand tons live weight)

Specification	Period 2007-2013						Period 2014-2019						deviations	
	2007	2013	Average 1	StDev	CV	Rhythm1	2014	2019	Average 2	StDev	CV	Rhytm2	M2-M1	Sign.
	Thousands €	Thousands €	Thousands €	Thousands €	%	%	Thousands €	Thousands €	Thousands €	Thousands €	%	%	Thousands €	
Total	416.2	456.6	452.4	30.1	6.6	1.5	488.4	672.3	558.9	49.4	8.8	6.4	106.6	***
Private sector of which:	412	456.6	451.7	30.9	6.8	1.7	488.3	672.3	558.9	49.4	8.8	6.4	107.2	***
Individual farms	131.5	118.1	132.6	16.2	12.2	-1.7	122.5	144.8	108.5	9	8.3	-2.6	-24	θθθ
Legal holdings with legal personality	280.5	338.4	319.1	37.4	11.7	3.1	365.8	527.4	450.4	54.7	12.1	9	131.2	***

Source: Own calculation based on data provided by INSSE, TempoOnline,
*Significance (GL = 11, tcal> t:> 0.05 *;> 0.01 **;> 0.001 ***; <0.05θ; <0.01θθ; <0.001θθθ; <0.05: N)*

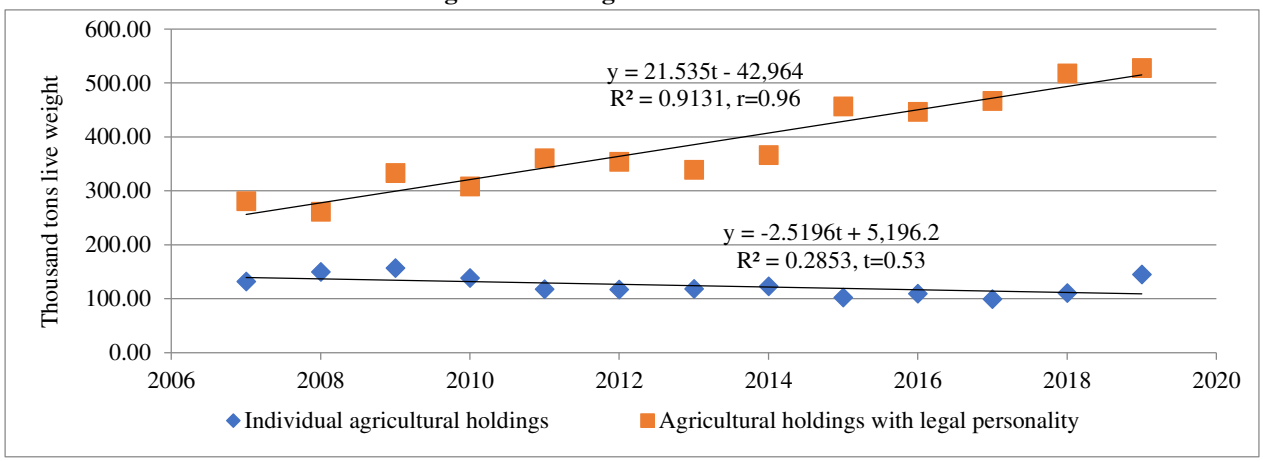
Poultry meat production has continuously increased as a result of demand which has evolved positively from one year to the next [3].

After processing the statistical data obtained from INSSE, we noticed that in terms of structure, in 2007, 67.40% of poultry meat production was obtained in industrial systems, and 31.59% in farms. In 2019, as a result of the industrial farms development, the share of production obtained in agricultural holdings with legal personality became 78.46% (527.47 thousand tons live weight) while individual agricultural holdings decreased to 21.54% (144.82 thousand tons live weight). Absolute figures in both forms of organization resulted in increases in production during the period under review.

Poultry meat production obtained in peasant households decreased in the period 2007-2013 by 10.16% from 131.49 thousand tons in 2007 to 118.13 thousand tons in 2013 and increased in the period 2014-2019 by 18.25 % from 122.47 thousand tons in 2014 to 144.82 thousand tons in 2019. Over the entire analyzed period 2007-2019, the production of poultry meat obtained from individual farms increased by 10.13%. The difference between the averages of the compared periods is -24.04 thousand tons, a very significant negative difference. Regarding the production of poultry meat obtained in agricultural holdings with legal personality we can see from the table that the rates of the two periods are positive, respectively +3.18 in 2007-2013 and +9.06 in 2014-2019. Throughout the

analyzed period, 2007-2019, there is an increase in meat production by 88.05% from 280.5 thousand tons in 2007 to 527.47 thousand tons in 2019.

Figure 2. The trend equation of poultry production in Romania in the period 2007-2019 depending on the legal form of organization



Source: Own design based on data provided by the National Institute of Statistics, TempoOnline

From the calculation of the trend equations of meat production for the period 2007-2019 (figure 2) it is found that the equation for agricultural holdings without legal personality is Yexfpj 21.535t + 42,946 (r = 0.96; very strong association) and holdings with legal personality equation Yexpj = -2.5196t + 5,196.2 (r = 0.53; substantial association), and extrapolation for 2024, results in a meat production of 738.1 thousand tons, compared to 643 thousand tons in 2019 , respectively 87.3% in holdings with legal personality and 12.7% in holdings without legal personality.

It is estimated (according to the Department of Agriculture of the United States of America, 2020) that Romanian poultry meat production will increase by 2.15% in 2020, being stimulated by relatively low feed prices, consumer demand and a lower price than that of pork [13].

Table 3. Descriptive statistical analysis of the evolution of eggs production in Romania during 2007-2019

Specification	Period 2007-2013						Period 2014-2019						Deviations	
	2007	2013	Average 1	StDev 1	CV1	Rhythm1	2014	2019	Average 2	StDev 2	CV2	Rhythm2	M2-M1	smf
	Mil. pcs.	Mil. pcs.	Mil. pcs.	Mil. pcs.	%	%	Mil. pcs.	Mil. pcs.	Mil. pcs.	Mil. pcs.	%	%	Mil. pcs.	
Total	6522	6388	6391	173,8	2,72	-0,35	6636	5564	6216,4	385,3	6,20	-3,67	-174,6	N
Private sector of which:	6505	6386	6387,9	171,9	2,69	-0,31	6634	5562	6213,6	385,5	6,20	-3,68	-174,3	N
Individual farms	5307	4939	5211	220,9	4,24	-1,19	4862	3813	4469,8	428	9,58	-4,91	-741,2	θθθ
Legal holdings with legal personality	1198	1447	1176,9	171,6	14,58	3,20	1772	1749	1743,8	104,1	5,97	-0,51	566,9	***

Source: Own calculation based on data provided by INSSE, TempoOnline,
*Significance (GL = 11, tcal>t:> 0.05 *;> 0.01 **;> 0.001 ***; <0.05⁰; <0.01⁰⁰; <0.001⁰⁰⁰; <0.05: N)*

Romania's egg production decreased between 2007 and 2019 by 14.69%, from 6.5 billion pieces in 2007 to 5.56 billion lei in 2019. The number of eggs obtained from poultry raised on individual farms decreased by 28.15% while in the holdings with legal personality it increased by 46%. The difference between the two periods studied is very significant negative for individual holdings and very statistically significant in the case of holdings with legal personality. Table 3 shows that in the

period 2007-2013 the rhythm was positive (+3.2) while in the period 2014-2019 it became negative (-0.51).

In individual farms, the significant decrease in egg production was recorded in the period 2014-2019 when production decreased by 21.58% from 4.86 billion pieces in 2014 to 3.8 billion pieces in 2019.

Table 4. Descriptive statistical analysis of the evolution of poultry and eggs consumption in Romania in the period 2007-2018

Specification	Period 2007-2013						Period 2014-2018						Deviations	
	2007	2013	Average 1	StDev	CV (%)	Rhythm (%)	2014	2018	Average 2	StDev	CV (%)	Rhythm (%)	M2-M1	Sign.
Poultry meat (kg / year)	20.7	17.5	19.2	1.9	10	-2.8	20.1	26.9	23.8	2.5	10.5	7.56	4.53	***
Eggs (pcs / year)	276	247	260	13.7	5.2	-1.8	246	236	253	12.4	4.9	-1.03	-6.94	N

Source: Own calculation based on data provided by INSSE, TempoOnline,
*Significance (GL = 11, tcal> t:> 0.05 *;> 0.01 **;> 0.001 ***; <0.05⁰; <0.01⁰⁰; <0.001⁰⁰⁰; <0.05: N)*

The annual consumption of poultry meat per capita reached in 2018 a level of 26.9 kg, increasing by 6.8 kg compared to 2014 and by 6.2 kg compared to 2007. The annual consumption of eggs per capita reached in 2018 a level of 236 decreasing by 10 compared to 2014 and by 40 compared to 2007.

Between 2007-2013, consumption decreased due to the economic crisis of 2008-2009 but also due to wage cuts in 2010. In the period 2014-2018, the increase in poultry consumption was driven by the reduction of VAT on food to 9% in 2015 and increasing the income of the population.

The difference between the averages for the consumption of poultry meat is very statistically significant and for the consumption of eggs it is insignificant.

A study published in 2017 shows that the most important factor that influenced the consumption of poultry meat / capita in Romania is the price, which makes this category of meat accessible [4]. At the same time, poultry meat is a lean, healthy, high-protein meat with lower cholesterol than pork [5].

Consumer preference is currently for eggs produced on Romanian farms, because they are very fresh and have the best traceability of all agri-food products [1] .

Table 5. Analysis of the price of poultry meat and eggs in 2019

Week	Poultry meat				Consumer eggs			
	Romania	EU average	Differences		Romania	EU average	Differences	
	2019	2019			2019	2019		
	(lei / kg carcass)	(lei / kg carcass)	(lei / kg carcass)	%	(lei/egg)	(lei/egg)	(lei / kg carcass)	%
1	6.65	8.66	2.01	*130.2*	0.33	0.39	0.06	*118.2*
13	6.83	8.7	1.87	*127.4*	0.3	0.37	0.07	*123.3*
14	6.92	7.83	0.91	*113.2*	0.29	0.37	0.08	*127.6*
15	6.93	8.84	1.91	*127.6*	0.28	0.37	0.09	*132.1*

Source: MADR, https://www.madr.ro/comunicare/5219-punct-de-vedere.html ,

Compared to EU average prices, it can be found that those for poultry meat are 22% lower (Table 5). The farm gate price for eggs is also 24% lower than the European average [16] .

Table 6. Analysis of Romanian poultry meat imports by country of origin in the period 2007-2019

Specification	Period 2007-2013						Period 2014-2019						deviations	
	2007	2013	Average 1	StDev 1	CV 1	Rhythm 1	2014	2019	Average 2	StDev 2	CV 2	Rhythm 2	M2-M1	Sign.
	Mil. €	Mil. €	Mil. €	Mil. €	%	%	Mil. €	Mil. €	Mil. €	Mil. €	%	%	Mil. €	
World	146.3	122.4	132.7	16.5	12.4	-2.9	146.5	177.8	161.2	15.5	9.6	4.0	28.5	***
Hungary	9.4	50.4	27.0	15.8	58.6	32.3	47.3	50.7	48.3	1.9	4.0	1.4	21.3	***
Poland	6.2	10.5	7.4	2.5	34.2	9.0	19.0	40.9	30.7	7.0	22.7	16.6	23.3	***
Germany	9.0	13.6	13.1	5.4	41.4	7.0	17.6	23.8	18.8	3.4	17.9	6.2	5.7	**
Netherlands	55.8	15.8	35.4	19.7	55.8	-19.0	26.1	15.1	17.3	5.0	28.8	-10.3	-18.0	θθ
Bulgaria	3.7	11.6	10.8	7.7	71.0	21.2	11.6	6.5	8.7	2.7	30.9	-10.9	-2.2	N
United Kingdom	4.5	2.2	3.4	1.6	47.2	-11.2	3.6	9.3	7.8	3.0	38.1	20.8	4.4	***
Italy	2.7	2.5	2.4	0.9	39.0	-1.7	1.5	6.5	4.8	2.9	60.8	33.4	2.4	**
Spain	2.6	1.0	1.5	0.6	38.6	-15.1	3.4	4.9	3.9	1.0	26.6	8.1	2.4	***
Cyprus	0.1	3.7	1.2	1.8	148.4	2.9	2.8	2.6	2.4	0.8	34.4	-1.8	1.2	*
Slovakia	0.8	0.4	0.6	0.3	45.9	-10.1	0.4	4.4	1.0	1.3	135.4	65.7	0.4	N

Source: Own calculation based on data provided by the International Trade Center (ITC), https://www.trademap.org/Index.aspx
*Significance (GL = 11, tcal> t:> 0.05 *;> 0.01 **;> 0.001 ***; <0.05θ; <0.01θθ; <0.001θθθ; <0.05: N)*

As it can be seen from Table 6, Romania's poultry meat imports increased in the period under analysis by 21.47% from 146.33 million euros in 2007 to 177.76 million euros in 2019. The difference in averages is 28.52 million euros, being considered statistically very significant (figure 3).

The first three sources of poultry meat in 2019 for Romania are represented by Hungary (50.67 million euros;), Poland (40.93 million euros) and Germany (23.76 million euros) (table 6), 64.9% of the poultry meat imported from Romania comes from these three countries. In the period 2007-2019, imports from Hungary increased dramatically from 9.42 million euros in 2007 to 50.41 million euros in 2013 at a rate of +32.26. After 2014, poultry imports from Hungary remained constant around the average of 48.48 million euros, the rate for the period 2014-2019 being + 1.41%.

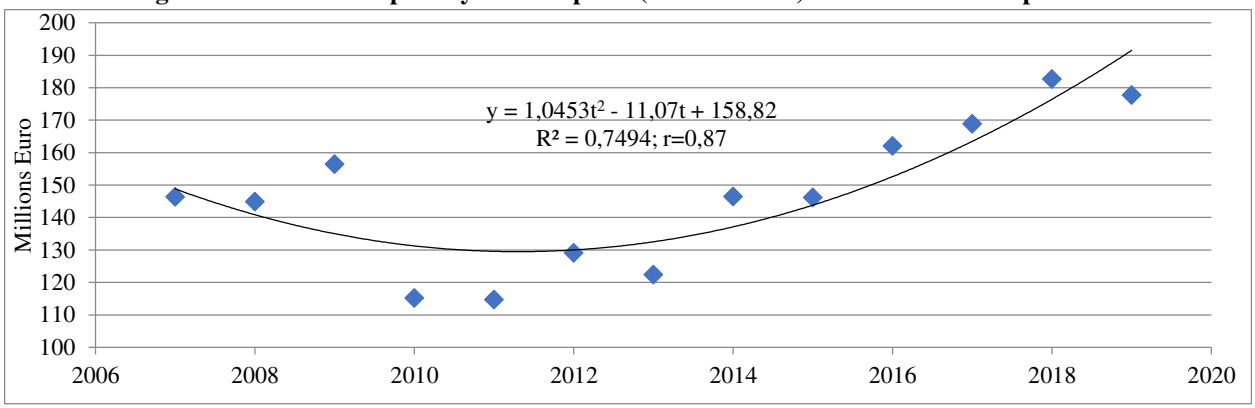
If in the period 2007-2013 the value of poultry meat imports from Poland increased by only 4.24 million euros, in the period 2014-2019 we see a significant increase of 115.3% from 19.01 million euros in 2014 to 40.93 million euros in 2019.

A positive and constant rhythm in both periods is also observed in poultry meat imports from Germany: + 7.01% in the period 2007-2013 and + 6.21% in the period 2014-2019. The difference in averages is 5.71 million euros, being considered statistically distinctly significant.

In the period 2007-2013, imports from the Netherlands decreased dramatically by 71.66%, from 55.80 million euros in 2007 to 15.81 million euros in 2013, the calculated rate being negative, respectively -18.95%. The situation of imports from the Netherlands remained constant during 2014-2019. The difference in averages is -18.03 million euros, being considered statistically significant negative.

Smaller quantities of poultry meat were imported by Romania during the analyzed period from countries such as Great Britain (9.25 million euros; 5.20%), Bulgaria (6.51 million euros; 3.66%), Italy (6.45 million euros; 3.63%), Spain (4.94 million euros; 2.78%), Slovakia (4.38 million euros; 2.47%) and Cyprus (2.59 million) 1.46%).

Figure 3. The trend of poultry meat imports (million euros) of Romania in the period 2007-2019



Source: Own design based on data provided by the International Trade Center (ITC), https://www.trademap.org/Index.aspx

From the analysis of the trend of the import of poultry meat (mil euro) of Romania in the period 2007-2019, by the equation Yiro (mil €) = (1.0453t ^ 2-11.07t + 158.82 (r = 0.87; association very strong), extrapolated for 2024, it turns out that in that year Romania will import poultry meat worth 325.8 million euros.

Romania's poultry meat exports have increased dramatically since joining the European Union (Table 7, Figure 4). The growth rate in the period 2007-2013 was +88.14 exports, increasing from 3.11 million euros in 2007 to 138.10 million euros in 2013. In the period 2014-2019, the rate was only +2.21. The difference in averages is 35.87 million euros, being considered statistically significant.

68% of Romania's poultry meat exports in 2019 were directed to four countries: Great Britain (26.45%), France (17.63%), Bulgaria (12.02%) and Hungary (11.87 %).

The main market for poultry meat is the United Kingdom. In 2019, Romania delivered 36.36 million euros worth of poultry meat to this country. Table 6 shows that in 2007 exports to France amounted to 0.81 million euros (26.04%), and in 2019 poultry meat worth 24.22 million euros (17.65%) was sold.

Bulgaria is the third country that prefers Romanian poultry meat, with sales of 16.52 million euros in 2019, 25.65% higher than in 2014.

We are dealing with very statistically significant differences in averages for the United Kingdom, France and Greece; distinctly statistically significant for Austria; statistically significant for Italy. For Hungary, the Netherlands, the Czech Republic and Slovakia, the calculated differences are statistically insignificant because the coefficients of variation are very high.

Table 7. Evolution of Romania's poultry meat exports to destination countries in the period 2007-2019

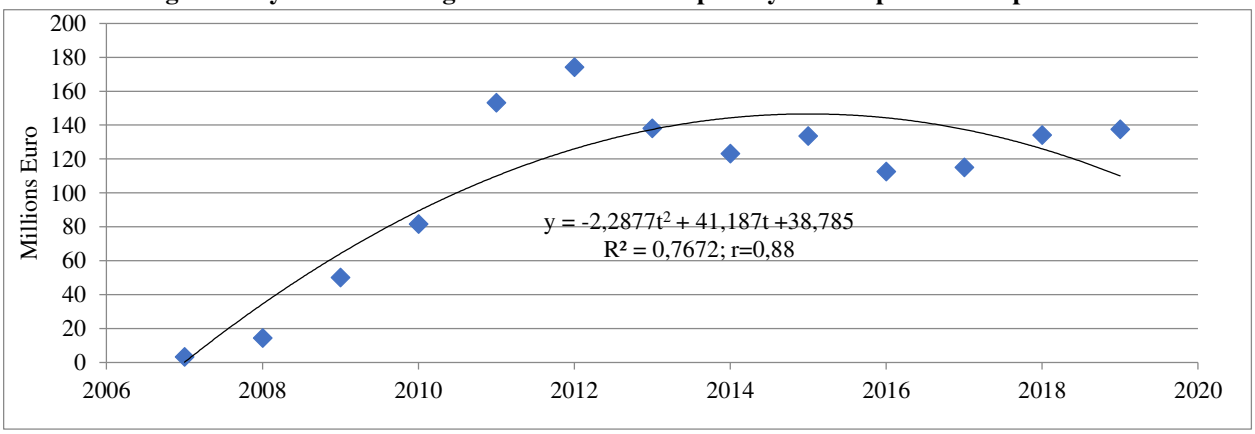
Specification	Period 2007-2013						Period 2014-2019						deviations	
	2007	2013	Average 1	StDev	CV	Rhythm	2014	2019	Average 2	StDev	CV	Rhythm	M2-M1	Sign.
	Mil. €	Mil. €	Mil. €	Mil. €	%	%	Mil. €	Mil. €	Mil. €	Mil. €	%	%	Mil. €	
World	3.1	138.1	87.8	68.7	78.2	88.1	123.2	137.4	123.7	10.1	8.1	2.2	35.9	*
United Kingdom	0.0	17.7	5.6	6.8	121.6	277.9	22.0	36.4	35.6	8.0	22.3	10.6	30.0	***
French	0.8	12.2	3.2	4.1	126.5	57.3	20.9	24.2	22.3	1.9	8.3	3.0	19.1	***
Bulgaria	0.1	13.4	34.2	35.1	102.8	133.0	11.5	16.5	13.3	3.3	25.1	7.5	-20.9	θθ
Hungary	1.0	23.8	12.9	9.6	74.1	68.7	13.0	16.3	9.1	2.6	28.6	4.7	-3.8	N
Greece	0.3	27.7	11.1	11.9	107.4	110.9	8.3	8.7	7.0	1.3	18.9	0.9	-4.1	N
Netherlands	0.2	7.4	3.3	3.0	91.9	89.8	8.5	8.5	8.7	2.0	23.2	-0.1	5.5	***
Slovakia	0.0	0.0	0.7	0.8	108.5	-12.8	0.4	3.6	1.4	1.5	105.4	66.2	0.7	N
Austria	0.0	5.0	2.1	1.9	91.3	30.4	5.7	3.0	2.4	2.0	83.3	-11.9	0.3	N
Czech Republic	0.0	2.7	0.9	1.0	109.4	101.4	1.5	2.9	1.7	0.3	19.5	13.5	0.8	**
Italy	0.0	0.8	0.6	0.7	114.5	97.7	1.7	2.4	1.4	0.7	53.3	7.6	0.8	*

Source: Own calculation based on data provided by the International Trade Center (ITC), https://www.trademap.org/Index.aspx
*Significance (GL = 11, tcal> t:> 0.05 *;> 0.01 **;> 0.001 ***; <0.05⁰; <0.01⁰⁰; <0.001⁰⁰⁰; <0.05: N)*

Romania's trade balance in terms of trade in poultry meat is negative. In the period 2007-2013 there was an accelerated decrease in the deficit. Starting with 2014, there is an increasing trend for both commercial exercises. According to the statistical data, in the whole period studied the results indicated a trade deficit. They demonstrate the essential role of the Romanian farmer for food security and the vulnerable aspects of the relationship between the actors of the agri-food system, as well as between them and consumers, while indicating to the European and national authorities the directions and urgent interventions [9].

From the analysis of the trend of the export of poultry meat (mil. euro) of Romania in the period 2007-2019, through the equation Yero (mil €) = (-2,2877t ^ 2 + 41,187t + 38,785 (r = 0,88; very strong association), extrapolated for 2024, shows that in that year Romania will no longer export poultry meat.

Figure 4. Dynamics and regression of Romanian poultry meat exports in the period 2007-2019



Source: Own design based on data provided by the International Trade Center (ITC), https://www.trademap.org/Index.aspx

The trade deficit in poultry consumption in 2024 will be equal to the import of 325.8 million euros. These considerations place Romanian poultry farming in a field of maximum interest for both producers and consumers, Romanian poultry companies being obliged to continue investing in production and processing technology, logistics and branding [6].

CONCLUSIONS

- The decrease of the Romanian poultry number is caused by the disappearance of the peasant households. In the period 2007-2019, the numbers decreased by 11.5 million heads on individual farms and increased by only 5.1 million heads on authorized farms.
- Poultry meat production increased continuously during the analyzed period due to the industrial sector, from 416.2 in 2007 to 672.3 thousand tons of live weight in 2019 (+256.1 thousand tons of live weight).
- There is a significant consumption of poultry meat in Romania of 26.9 kg / capita / year, a figure comparable to the consumption in the European Union (24.8 kg / capita / year in 2018).
- Romania 's poultry meat imports increased by 21.47% from 146.33 million euros in 2007 to 177.76 million euros in 2019.
- Romania 's poultry meat exports increased after joining the European Union, from 3.11 million euros in 2007 to 138.10 million euros in 2013.

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REALIZATION OF THE LAND BANKING IN THE REPUBLIC OF MOLDOVA AS A STRATEGIC OBJECTIVE IN THE SUSTAINABLE RURAL DEVELOPMENT

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Abstract: *Agricultural land consolidation represents a complex of organizational, technical, economic, ecological and other legal measures requested by the rural community for the purpose of the most rational, efficient use and exploitation of land, as a whole and as a result, raising the living standard in rural communities. The creation of the Commercial Land Bank in the Republic of Moldova requires the consolidation of land and becomes a necessity even in conditions of private ownership over agricultural land, in conditions of wider structural reforms. The reasons for agricultural land consolidation, at present, are much deeper than its privatization. The research presents the basic structure and criteria in the organization of banking activity in the agricultural sector including the financial insurance of land transactions according to the nonparametric rating of data envelopement analysis.*

Key words: *land consolidation, land fragmentation, land bank, data envelopment analysis, european size unit*

Clasification JEL: Q14, R14, R30

INTRODUCTION

The basic objective of the sustainable rural development in the Republic of Moldova is the harmonious combination of its components: social, ecological and economic. Over the last decade, Moldova has achieved important achievements in the field of land reform. These include a dramatic increase in the share of privately owned agricultural land, which has grown from zero to 94 percent of total agricultural land and more than one million people became landowners. These positive trends have contributed to a significant improvement in agriculture, which has been observed since 2010, when it was recorded a halt in the decline of agricultural production followed by an increase both in production volumes and in productivity. Over the years 1995-2005, the land reform process took place in the Republic of Moldova, but it was a process of privatization and not one of restitution of private property, as it was done in some Eastern European countries. The basic principle of agricultural land privatization consisted in the fact that the members of collective farms (cooperative associations of farmers) should become landowners of a share of land free of charge. More than 98 percent of agricultural land subject to privatization today is privately owned. About 1.3 million landowners own on average 1.56 ha each one [5].

Land reform has contributed to the emergence of new enterprises of various sizes and legal forms of organization. But the basic purpose of the land reform was the creation of farm households and this purpose was fully achieved. Unfortunately, the same reforms have led to a serious negative impact on agriculture - excessive land fragmentation, which was based on the principle of equity. Namely this principle was the one that caused the excessive fragmentation of land. The existence of a relatively large number of people (about 25 percent of Moldova's population) and a relatively small area of land to be privatized contributed to the fact that about 1.7 million hectares were divided into over 3 million parcels with the average size less than 0.5 ha. On average, a landowner received 3

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agricultural parcels with various land use destinations: arable land, perennial plantations and orchards. Moreover, another common practice consisting in dividing a land parcel into 6 or more plots.

The aim of this research is to develop an alternative mechanism for agricultural land consolidation by creating a Commercial Land Bank (CLB) in the Republic of Moldova that would concentrate all functions related to land relations and would participate as an active player in the land market in order to create a state land fund, which would facilitate the supply for agricultural land in rural areas with the purpose to intensify the land consolidation processes. Another major function of the CLB would be to grant preferential loans to farmers for the procurement of agricultural land in order to reduce land fragmentation and improve the structure of agricultural farms.

MATERIAL AND METHOD

The methodological approach in consolidating agricultural lands imposes the need for determining the optimal size of the agricultural farm and the legal form of organization ensuring the best economic performance of the agricultural farm. A fundamental indicator of rural performance is the nonparametric rating of the data envelopment analysis (DEA), which broadly reflects the economic efficiency of farmers and can serve as a conceptual approach in the creation of the CLB in the Republic of Moldova. Agricultural land consolidation represents a complex process in which the economic mechanism for restructuring the land market is of major importance. The modification of the regulatory framework of the land market regulation aims at increasing the efficiency of agricultural farms, i.e. their transformation into economic agents with a high degree of commercialization and the disposal of subsistence family farming in which everything produced by the farmer is used for own consumption. [2].

The main directions of agricultural land consolidation are focused on the procurement/sale and lease of land. The land procurement/sale mechanism must ensure a flow of agricultural resources (areas, means of processing, technologies, etc.) from less efficient operators on the land market to agrotechnically optimized solutions. After eliminating in 2017 the development restrictions of the land market, over 300 thousand ha of agricultural lands changed their owners during the investigated period. The distribution of land transactions depending on the legal form of organization of the land market operators is presented in Table 1.

Table 1. The size of the agricultural farms and their legal forms of organization depending on the percentage share of land ownership in the land transactions.

		Respondents, %	The size of the agricultural farm, ha	The share of land ownership, %
The people who procured land	Landowners of parcels next to the house	1,5	1,8	100,0
	Farmers	10,1	3,2	97,6
	Collective enterprises	40,0	923,0	39,4
The people who dindn't procure land	Landowners of parcels next to the house	98,5	2,1	100,0
	Farmers	89,9	2,6	98,9
	Collective enterprises	60,0	837,7	34,1
All options	Landowners of parcels next to the house	100	2,1	100,0
	Farmers	100	2,9	98,7
	Collective enterprises	100	868,5	36,1

An important goal in agricultural land consolidation and consequently overcoming excessive land fragmentation is to define the mechanism for the optimization of land parcels, efficient land use

and conservation of natural resources, which would contribute to sustainable rural development. The nonparametric aggregate indicator of the DEA rating gives the possibility to assess, depending on the resources of the economic agent, the value of the optimal size according to type of activity and regional location. The landowners of parcels next to the house record an average size of 0.37 ha for the agricultrual farm, the farmers identified with property titles record on average 2.61 ha and the collective enterprises are characterized by an area of 851 ha of agricultural land. The econometric instrumentation based on the definition of the Lagrange multiplier on the land market represents the basic landmark in the banking activity in rural areas. [1].

RESULTS AND DISCUSSIONS

The conceptual definition of CLB involves the financial approach of the land market strictly delimitating the notions of arable land parcel and surface of agricultural land. Traditionally, the land bank is defined in terms of agricultural land transactions as „a public authorized acquisition of land subject to be kept for future use and implementation of land policies". The definition of CLB already indicates the fact that the land bank does not only refer to the agricultural environment, but is a broader concept, which includes elements of ecology, rural and even urban development. At the same time, the term land bank it used as a „strategic management of land with subsequent use for strategic public purposes such as infrastructure development and expansion of urban localities". The main criterion for land consolidation consists in the stability of the compact sector in space and time, according to which the land sector will keep its shape and dimensions for as long as possible. The stability of the land sector in space and time will allow the owner to invest in perennial plantations, irrigation systems, other expenses that, in order to be recovered, require long intervals of time. [7].

The size of the surface is a specific criterion for determining the level of land consolidation. Depending on the specialized land-use, the cultivated plants, the characteristics of the area and the potential of the owner, the appropriate surface can vary greatly. The decision on the adequate area of the land sector for various cases will not come „from the top administration". The owners will decide for themselves which is the most appropriate area of land sector and the program will provide consultations and help the owner achieve the established goal. Another finding consists in the fact that the agricultural farms, which, in most cases, own land with an area of 1.0 -1.5 ha, located on several sectors, at great distances from each other, produce insufficient but competitive commercial production. Land use planning involves the establishemnt of irrigation systems, drainage systems, anti-erosion measures, access roads and crop rotation systems. An important role in land use planning is played by the scientific substantiation of the established systems. Based on the criteria for agricultural land consolidation, it will be possible to achieve the following activities:

- establishing the efficiency of the land consolidation methods;
- determining the level of land consolidation;
- evaluating the land consolidation process as a whole;
- making conclusions and presenting proposals regarding the continuation of the land consolidation process.

The definition of CLB stems from its historical use and also the way in which the land bank is defined differs depending on the organization, which is involved in the field of land planning Figure 1. Moreover, even the state does not use the term land bank consistently, because the two state institutions involved in the agricultural land bank use these definitions differently. Thus, the first presents the land bank as the structured procurement and temporary management of land in rural areas by an impartial state agency in order to redistribute and/or lease this land with the aim of improving the structure, and/or reallocating land for other purposes of general public interest. The procurement of agricultural land for the purpose of making land transactions requires the creation of an intermediate buffer, which can later serve as a basic tool in agricultural land consolidation. This buffer can be used not only for agricultural purposes, but also in rural development by improving the elements of infrastructure and other public interests. The term „land banking" refers to the use of this

buffer, and the buffer itself simply represents the land fund. Taking into account the definitions already mentioned and their weaknesses, a conceptual approach to CLB is required in which the most valuable economic indicators - productivity, efficiency and competitiveness in the land market - are assessed on the basis of the DEA rating.

The advantage of this approach in agricultural land consolidation consists in determining the economic balance that ensures a sustainable rural development. First of all, it is not imperative that the public authorized to make land procurement has a certain fixed use for future purposes. At some time, the state can procure land to compensate a farmer for a road that was built on farmer's land. Second, it is not always necessary that the state procure the land intended for public purposes [6].

As a result of analyzing the primary data related to the economic performance of the agricultural farms in the Republic of Moldova, the concept of CLB is proposed in the research, which corresponds to the characteristics of the rural area in the country and does not face the traditional approach in land valuation. Thus, CLB represents „the principle of structural or strategic procurement, storage and sale of land for future use". A traditional approach of farmers working on agricultural lands involves defining an organizational structure (private or state) that coordinates land transactions with Local Public Agency (LPA) and additionally performs ecological expertise (or local sanitation criteria). Land fund management represents a special concern in order not to admit the distortion of the agricultural land procurement/sale market according to the macroeconomic concept of Gérard Debreu [4]. Local public administrations and agricultural decision-makers - Agency for Interventions and Payments in Agriculture (AIPA), Agency for the Development and Modernization of Agriculture and others are admitted to land banking in such a way that monopolization of the land market is not allowed. AIPA operates in a decentralized manner, with regional offices throughout the country and the CLB has the task to make the procurement and manage state property, both movable and immovable. In terms of land management, this service has the following tasks:

- development of the state policy in the land field;
- management of the state-owned land;
- facilitating the use of state lands;
- sale of state-owned land.

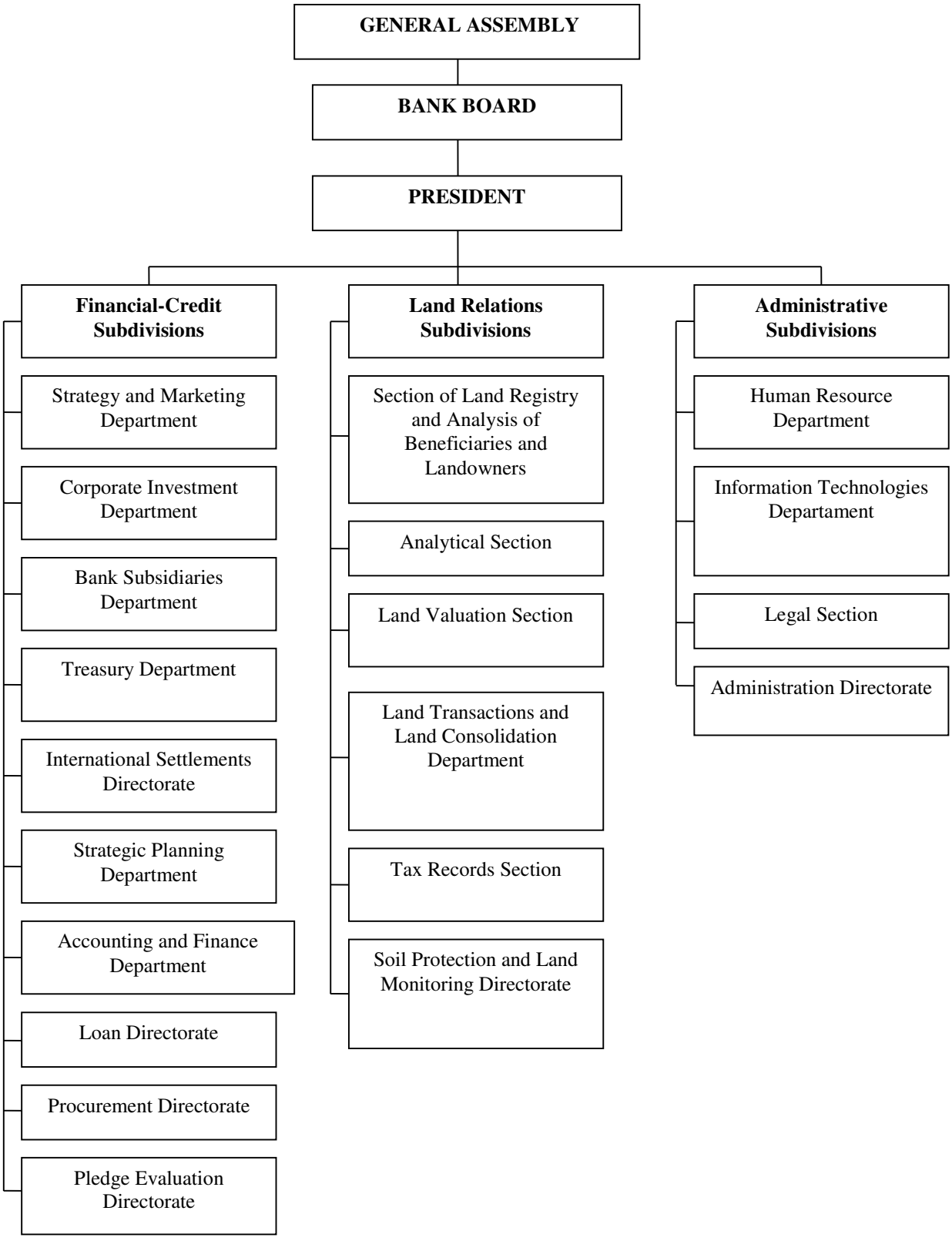

Figure 1. Organizational structure of the Commercial Land Bank meant to reduce the level of agricultural land fragmentation and optimize the size of agricultural farms.

The financial vision „strategic land management" assumes that property owners sell the land in order to subsidize high managerial performance in large corporate and medium private agricultural farms. The advantage of economies of scale for the agricultural farms having a major agricultural land area is oriented towards certain types of agricultural land that have important strategic land use

and goals for the country (seed sector, biodiversity, etc.). In this context, unfortuntely, the farmers who choose the option of subsistence agriculture in which the agricultural production is fully consumed by the agricultural farm does not support unfair market competition in the Republic of Moldova [8]. Therefore, the tasks of the CLB as a land agency are focused on:

- the land procurement in rural areas in order to improve land use and management;
- the management of change of the land fund;
- facilitating the temporary use of land;
- making the sale and distribution of land for multiple purposes.

This agency implements its policy in the agricultural sector through concrete projects in the development of green areas for recreation, nature, aquatic resources or agriculture. To this end, the CLB procures land, redesigns its land-use planning and then transfers it to land management organizations and individual farmers. Thus, the Commercial Land Bank is looking for common concepts and solutions that correspond to the (administrative) ambitions and characteristics of a certain rural area and also brings together the financing flows and has a unique plan of subsidy options. The land agency collaborates with local and governmental decision-makers who have a common goal in carrying out land use planning projects and maintains land market regulatory offices throughout the country. Therefore, the CLB Board, for public purposes, cooperates with the real estate departments within the Ministry of Agriculture and Food Industry (MAIA) to implement more effectively the agrarian policies in the field of land relations [3]. At the same time, the policy of the MAIA departments can be improved in terms of correlation with the land transaction market by better positioning the state and anticipating sudden changes in the real estate market.

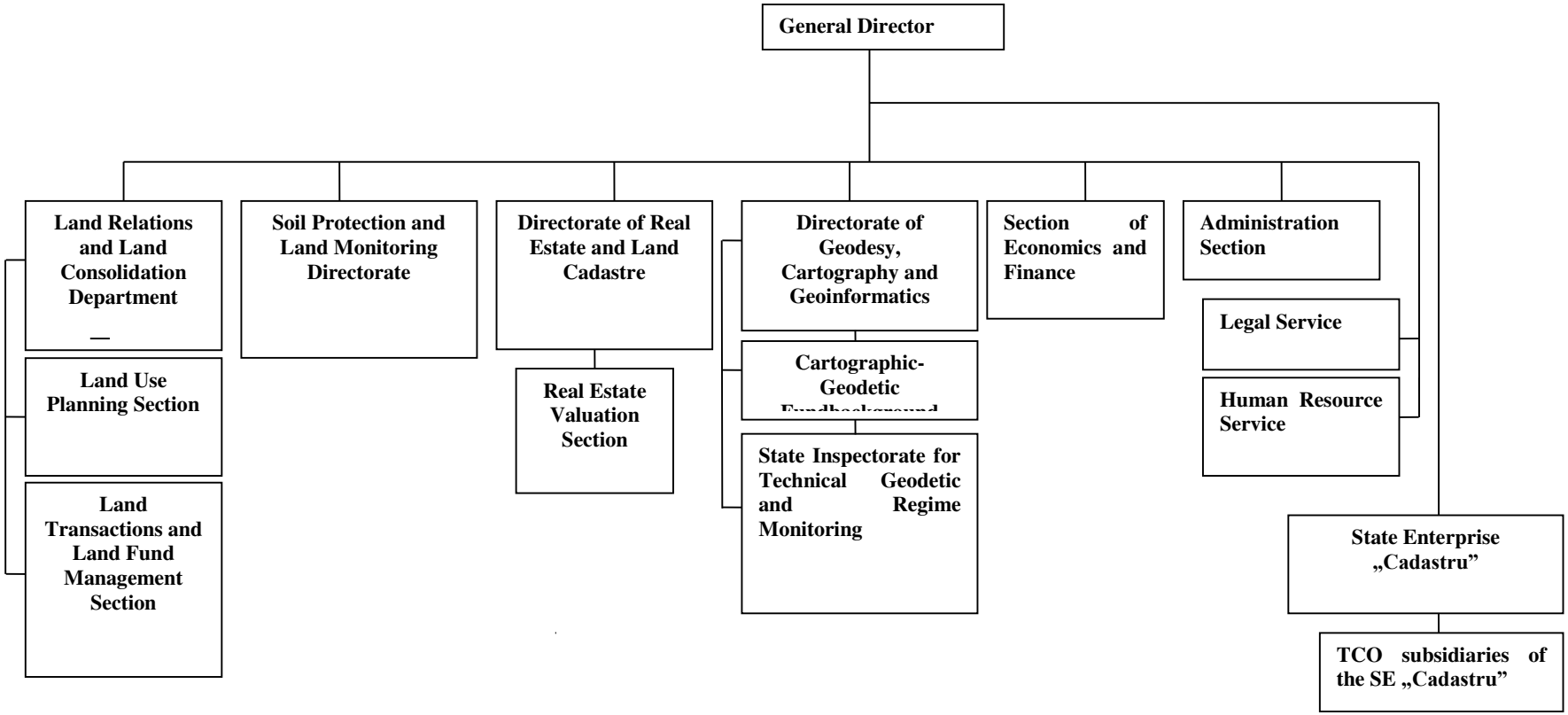

Figure 2. Organizational Structure of the Commercial Land Bank created based on the State Agency.

The five real estate departments that work together within MAIA are:

- project implementation unit in the field of environment;
- state hydrometeorological service;
- agency „Apele Moldovei";
- agency for geology and mineral resources;
- consolidated unit for the implementation and monitoring of projects in the field of agriculture financed by the World Bank.

Municipalities play an active role in land issues. They have their own development corporations, which deal with the procurement, storage and sale of land, taking into account the future development of the locality. In this sense, a municipal development corporation can be considered a municipal land bank. The responsibilities for these land banks belong to the municipality (town hall). Private organizations also have their place in land relations. Among the roles of private organizations in land banking we could mention the financing of projects, which would make it possible to make land procurement. As mentioned above, there are various public organizations actively financing the land. In some cases, the money provided by the state is not enough to achieve the goals. In this case, private organizations can help to achieve public goals, but obviously these organizations also have their own goals.

At international level, in the agricultural sector, the land bank has been in place for a long time, especially the finance and exchange land bank. The first reason this became possible was state support. The government is assisting in land consolidation projects to ensure that the structure in agriculture can be improved. Thus, state regulations reprsent an important factor in the success of land banks in the Republic of Moldova. The tasks of MAIA, necessary to make possible the use of the land bank are coordination and financing.

The second important reason highlighting the necessity to create a CLB is the overcrowded territory. There is currently a high pressure on the land market, including the agricultural land market, which requires a new and different way of maintaining land market projects and actions. The land bank represents a way to bring together different participants to collaborate and find solutions to common problems.

Appropriate legislation is needed for the successful operation of land banks. The law on spatial planning controls the way in which land use in rural areas is carried out and in which all authorities participate. First, the specialized ministry establishes the basic rules of planning, which serve as the starting point for spatial allocation. The districts then outline regional plans for these decisions. As a result, regional plans are already more precise. They determine the places of extension of the localities, as well as the spaces that are free for agriculture, nature and rest. The latter serve as a benchmark for local plans, which are the most detailed. The town halls determine the destination of each area within the locality. Such areas include those intended for housing, industry, recreation, etc. The town hall should review its zoning plan every ten years. Decisions related to land planning are taken at the level of local public authorities. According to the Law on Spatial Planning, the district's land use plan determines the possibilities of the land user. A primary task of area planning is to provide legal security for citizens. As a result, citizens gain certainty about the actions that can influence the market value of their land. Also, due to this, zonal planning provides a predictable framework for investment.

The practical tasks are mostly related to provide all the necessary premises for the creation of the land bank in the Republic of Moldova, as well as to determine its functions, functional subdivisions and finally, to elaborate its organizational structure Figure 2. Namely, the implementation of these tasks requires substantial financial resources and a methodological framework focusing on the authority of rural decision-makers in order to create the CLB. In this context, it is worth mentioning that the basic tasks in implementing land reform are the following:

I. first of all, the possibilities of creating a Commercial Land Bank, although based on the state capital, were examined, which in addition to creating the land fund and conducting transactions on the land market, would be empowered with a wide and diverse range of functions, among the most

important being those related to the preferential crediting of agricultural producers, especially for the procurement of agricultural land, but also the availability of mortgage loan, by pledging the land they have, and in case of non-payment of the loan, their land would be included in the composition of the land fund for subsequent transactions;

II. an obvious advantage of the CLB ensured by AIPA consists in the possibility to use the territorial cadastral organizations as subsidiaries of the land agency for the promotion of its policy and directions of activity in the territory.

It is proposed to reorganize the Agency for Land Relations and Cadastre as follows in the diagram presented in Figure 2. Given that the created Land Bank is a public organization, in order to successfully carry out its activity, it is necessary to allocate some amount from the State Budget, which would allow the Bank to begin the process of land procurement, which is necessary for creating the land fund, subsequently used in the implementation of the state policy in the field of agricultural land consolidation. It is obvious that the CLB be conceptually based on the mechanism for assessing economic performance in agricultural land consolidation and creating levers that stop the distortion of the land market according to the Lagrange model.

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CONCLUSIONS

Though there has been much debate on the subject, it is clear that the agricultural land consolidation process takes place in compliance with the following basic principles:

a. free consent - adherence to the land consolidation process will be made with the consent of the landowner;
b. economic and social necessity - land consolidation will be carried out only in case of an economic need of the agricultural landowners, which will allow them to increase the efficiency of land use, to accumulate additional incomes and to improve the situation of the rural population;
c. respecting the interests of all landowners in the locality - this principle will not only promote land consolidation, but will also correspond to the interests of the community (village) as a whole;
d. economic interest - landowners will adhere to the process of agricultural land consolidation arising from personal economic interest;
e. democratization - this principle will mobilize the participation of the general public in the rebirth of rural communities;
f. multilateralism - land consolidation will include a complex of measures related to land improvements, land use planning, constructions (repairs), etc .;
g. transparency - the actions taken in the consolidation process will be brought to the attention of all owners;
h. staging - the activities related to the agricultural land consolidation will be carried out in stages. The initial stage may be the pilot project, based on which the legal framework will be developed. The second stage will be focused on the massive consolidation, which in turn will be carried out based of initial consolidation projects. Each project will also be carried out in stages;
i. environmental protection - any action related to the agricultural land consolidation will be carried out in compliance with the principle of environmental protection. The actions with ecological impact will be based on scientifically substantiated projects and will be controlled by the state.

The creation of a CLB, conceptually can be carried out in the Republic of Moldova only under the guidance of the nonparametric DEA mechanism for agricultural land consolidation as follows:

- land consolidation is a complicated process, which requires large financial resources, labor force and strict control over the results;

- the rapid consolidation of highly fragmented agricultural lands is possible respecting two basic requirements: ensuring a strong growth of the national economy and implementing a liberal agrarian policy;
- both land and labor productivity is decreasing along with the increase of the land fragmentation degree, expressed under the number of land parcels belonging to an agricultural farm;
- consolidation positively affects farmers' incomes by increasing the degree of trade, i.e. the share of production sold in the overall production of agricultural entities;
- sustainable development involves three important aspects: economic, ecological and social. Therefore, sustainable agriculture must be environmentally friendly, economically viable and socially responsible.

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