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FACTOR PRODUCTIVITY IN ROMANIA'S AGRICULTURE – MEDIUM-TERM EVOLUTION

ABSTRACT

This paper analyses agricultural productivity in Europe and in Romania in the last decades, trying to identify the most significant factors and to quantify their contribution to the process of agricultural growth. For the assessment of agricultural productivity, we used the indicator total factor productivity (TFP), to which partial productivity indicators of the main production factors were added, namely labour productivity and land productivity. The paper used agricultural total factor productivity indices (TFP) developed by ERS (Economic Research Service USDA). In conclusion, among the factors that are found to be important for agricultural productivity in Romania are the balanced structure of agricultural output, diversification of agricultural output, the young and skilled labour force input, funds allocated to research, evolution of domestic demand and foreign markets.

Key words: agricultural productivity, TFP, Romania.

JEL Classification: D24.

1. INTRODUCTION

Productivity in agriculture has once again become a topic of interest. The European Union has launched an ambitious program for the efficient use of agricultural resources since 2020. Therefore, the agricultural sector is facing the challenge of producing more with fewer resources. Although it is a well-established fact that technological progress leads to improved use of resources, this is a challenge for the farming sector, which implies working with living organisms that have great variability and limitations in terms of productivity growth.

Productivity in agriculture is strongly influenced by policies, institutions, socio-economic context and environmental conditions. The influences and constraints brought about by climate changes have become increasingly intense, and the indicators and methodological apparatus for assessing this impact are being developed both at EU level and by international organizations (OECD, FAO). There is still uncertainty at the moment in terms of how the public goods provided by the environment will be assessed and grouped so as to have preliminary sets of

indicators for developing the methodology to measure the influence of environmental conditions on factor productivity in agriculture.

Productivity measurement is based on the quantitative ratio of the output produced to the amount of inputs used in the production process. The main indicators used are partial factor productivity (PFP) and total factor productivity (TFP). Partial factor productivity is measured by the ratio of agricultural output to one of the factors such as land, labour force, intermediate consumption or capital. This is the simplest and more often used form of productivity measurement. Total factor productivity is measured by the ratio of agricultural output to total inputs used in the production process. TFP provides more comprehensive information than partial productivity, yet it does not include information on inputs provided by the environment or the non-commodity agricultural outputs (for instance carbon dioxide absorption by plants). A third indicator is currently being developed, namely total resource productivity (TRP), which would try to include an assessment of environmental goods and services in the statistics of economic growth in agriculture.

The present paper analyses the evolution of productivity in agriculture across Europe and in Romania, in recent decades, attempting to measure the contribution of various factors to the process of agricultural growth.

The first part of the paper provides an overview on the factors that have contributed to agricultural productivity growth in the European Union, in its Member States and worldwide. Next the authors focused on the evolution of agricultural productivity in Romania. To this end, the level of productivity indicators in Romania is compared to that of other two EU countries, different in terms of development compared to Romania, but similar in terms of agricultural output structure, namely France and Poland. Our approach aims to identify the quantitative and qualitative factors that mostly contribute to increasing agricultural productivity.

2. STATE OF KNOWLEDGE

There are two stages in the history of the agricultural growth process. In the first stage, the increase of agricultural production was based on the exploitation of growing resources (more land, capital or intermediate inputs were attracted in the production process). By contrast, in recent decades, agricultural growth has been based on increasing productivity and saving resources, this growth relying on qualitative factors such as technical progress, scientific research, qualified labour, top management, investments in technology.

In recent decades, in the European Union, agricultural productivity has increased, yet the growth rate has slowed down in recent years. While in the period 1995–2005 the annual rate exceeded 1% per year, this slowed down to around 0.8% in 2005–2015. In the years 2014 and 2015, TFP experienced fast growth due

to favourable weather conditions (DG-AGRI, 2016). Total factor productivity increased both in the EU-15 Member States and in the EU New Member States (EU-13). Yet there were differences.

The New Member States (EU-13) have experienced stronger increase in productivity. They have also experienced a stronger restructuring process. Yet although productivity in the New Member States is currently increasing at higher rates than in the EU Old Member States, the impact of their production in total agricultural production of the European Union has remained limited. This fast productivity growth in EU-13 is the result of the fast growth of labour productivity, under the background of the diminution in the number of people employed in agriculture.

Labour is replaced by capital due to the application of intensive production technologies on the large farms that have emerged in these countries. In the period 2005-2015, labour force was down by 33%, while capital increased by 10%. Total production has increased by only 5%, which explains the downward trend of capital productivity (DG-AGRI, 2016).

The factors that influence productivity increase at European level are better technologies, better management and ultimately increasing technical efficiency, allocation efficiency or scale efficiency. Some factors are at the discretion of farm managers and depend on their entrepreneurial skills, others are beyond managers' capabilities, such as environmental conditions, technological development, investment in research and development, consultancy system and infrastructure, existence of similar farms on chains, policies and interventions.

Among these we can mention the following (DG-AGRI), 2016):

a) Investment in research & development (R&D) and knowledge dissemination

The most important factor that determines long-term productivity growth is innovation, which in turn is determined by investments in research. The analyses revealed that technological change is the most important factor contributing to TFP development.

The indicator R&D expenditure in agriculture can be considered a proxy for technological development in agriculture. Fuglie and Heisey (2007) estimate that the profit rate of investments in agricultural research is around 20% to 60%, depending on the methodology and data used.

Farmers' managerial skills are of great importance in the implementation and application of the new technologies. In the absence of measurable indicators, certain proxy indicators such as age, education, specialization and use of labour force can provide useful information.

b) Development of supply chains and rural infrastructure

A favourable economic environment can result in significant productivity gains. The investments in rural infrastructure, access to information (e.g. internet), presence of well-developed food supply chains can act as drivers of farm business. Thus, well-connected chains to the processing sector can have beneficial effects on the agricultural sector.

c) Structural changes

Agriculture in the European Union is under continuous restructuring process, which implies *decreasing the number of farms and increasing their size.* Changes are also taking place in terms of *farm specialization,* i.e. decrease in the number of mixed crop and animal farms in favour of large specialized farms. The former improves the technical and allocative efficiency while the latter improves scale efficiency.

The evolution of production and agricultural growth factors have been intensively studied by American economists over long periods of time. Thus, S.L. Wang, P. Heisey *et al.* (2015) note that since 1948 to present, the input mix used in American agriculture has changed a lot and intermediate consumption (fertilizers, pesticides) has increased in particular. The prices of agricultural machinery, energy, chemicals and services have significantly decreased compared to the price of labour. Price drops in intermediate consumption have encouraged the replacement of labour by chemical inputs (e.g. herbicides), energy, paid services, etc.

Agricultural output has changed its structure, crop production growing faster than animal production. Relative prices of agricultural products have changed. For instance, certain prices like those of fruit (and nuts in particular) and of vegetables (melons) have increased faster than prices of animal products. This change has been produced due to dietary changes and uneven changes in production technologies.

At the same time, total factor productivity is slowing down worldwide, mainly due to the decrease of public investments in research&development. *It is expected that the decrease of investments in research&development will not affect total factor productivity over the next 10 years, yet total productivity will be affected in the long term.* At the same time, even though R&D investments increase again, the effects on TFP will not appear in the near future, due to gaps between the investments made in research, the obtained results and the dissemination of these results.

Globally, agricultural growth can be broken down into two components: *growth based on the expansion of resources used and growth due to total factor productivity.* Worldwide, agricultural growth slowed down in the period 1970–1980, but it accelerated again in the years 1990 and 2000 (USDA, ERS, 2019).

In the recent period, agricultural output represented by crop and animal production has increased by 2.45% per year, and total factor productivity in agriculture has increased by 1.9% per year. Briefly, the increase of productivity has replaced the increased use of resources, as primary source of agricultural growth. At the same time, the sources of agricultural growth experienced significant changes in the last 50 years, in the sense that in the period 1961–1990 increased application of inputs prevailed, while in the later periods 1991–2000 and 2001–2016, the growth was based on the increase of total factor productivity, and secondarily on qualitative factors (Figure 1).

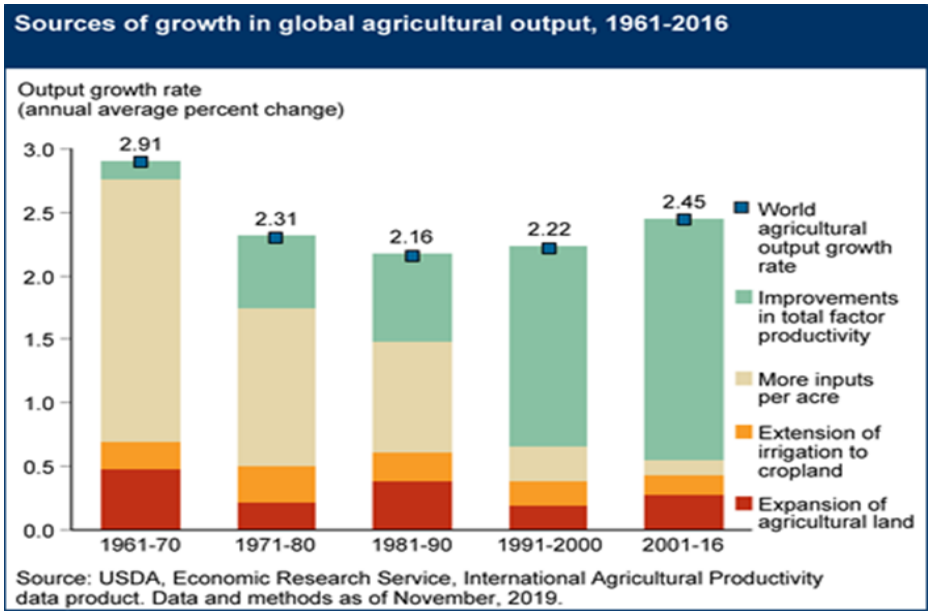


Figure 1. Source of growth in global agricultural output in the last fifty years

There is a strong and consistent link between agricultural productivity and investments in research. The effects of investments in research include benefits not only at farm level but also for the processing industry and consumers; most often these are manifested in the form of abundant supply and low prices. At the same time, there is a gap between investments in agricultural research and the eventual results. K.O. Fuglie (2007) points out that according to recent studies, research influences agricultural productivity after 2 years at the earliest, but the impact may be late to appear for up to 30 years.

3. MATERIAL AND METHOD

In this paper, the indicator total factor productivity (TFP) was used to measure agricultural productivity, which adds to partial productivity indicators of the main production factors, namely labour productivity expressed as value added per number of workers and land productivity expressed by physical output value per hectare.

Total factor productivity (TFP) is the main indicator used for *measuring productivity changes,* being considered much more comprehensive than the partial factor productivity such as labour productivity or land productivity. TFP increase can be defined as the ratio of the change in the output volume over a given period to the change in the volume of inputs used to produce that output. TFP reflects the combined effect of several factors such as new technologies, economies of scale,

managerial skills, changes in production organization. Fisher indices are used to calculate TFP indices, and the variations in agricultural output and corresponding input are expressed in *volume indices*.

The paper used the agricultural total factor productivity indices (TFP) developed by ERS (Economic Research Service USDA, 2016). The ERS methodology constructs output and input aggregates starting from quantitative expressions based on the use of Tornqvist index and on the basis of detailed information on output and inputs. The output includes products from the main agricultural commodity groups, namely meat (beef and pork), dairy products, poultry meat and eggs, cereals used in human food, fodder cereals, oilseeds, vegetables, melons, fruit, other crops, other farm products from agricultural production. The input index is calculated by aggregating intermediate agricultural inputs, using a cost-based weighting system. Inputs are divided into six categories, namely: labour, agricultural land, capital represented by farm machinery and livestock herds, two types of intermediate consumption (chemical fertilizers and animal feed). The data sources are provided by FAO, Eurostat, International Fertilizer Association, national statistical offices, other specialized international agencies.

Given the structure of national agricultural accounts in Eurostat, which provides the indicators for the calculation of total factor productivity, no delimitations are possible with regard to the contribution of different inputs or at sector / product level. Comparison of productivity at the level of sectors and agricultural products is extremely difficult, if not impossible. Returning to other sources of information, such as FADN (Farm Accountancy Data Network database), could facilitate such an approach. Out of this reason, no difference can be made between economic efficiency change and technological change.

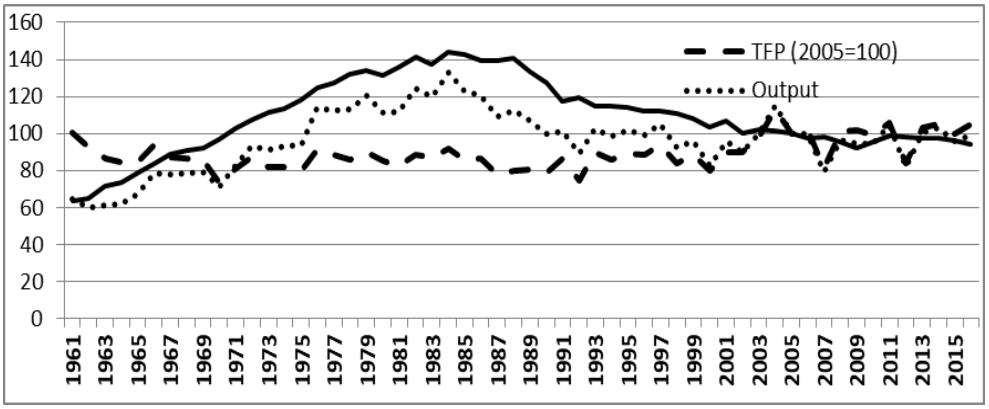
4. RESULTS AND DISCUSSIONS

4.1. TRENDS AND CHANGES IN THE COMPOSITION OF AGRICULTURAL INPUTS AND OUTPUT IN ROMANIA, FRANCE AND POLAND

As we have already mentioned in the introduction, in this paper we set out to compare some indicators on agricultural productivity in Romania with those from two different countries in terms of development level, but with a similar agricultural output structure, namely France and Poland. In our approach we tried to identify the quantitative and qualitative factors that most significantly contribute to the increase of agricultural productivity. As it has been mentioned before, total factor productivity (TFP) is measured by relating the dynamics of agricultural output to the dynamics of inputs used. In conclusion, TFP represents a relative index that should be put in context with the considered location and period. In the

comparisons across countries, it does not provide information on the absolute level of productivity, but on the *amplitude and speed of change*.

We can notice in Figure 2 that in Romania TFP experienced a stagnation period in 1969-1989, as although agricultural production significantly increased, the amount of inputs used increased even more consistently.



Source: Economic Research Service (USDA), International agricultural total factor productivity (TFP) indices 1961–2016

Figure 2. Evolution of Total Factor Productivity,
of agricultural output and inputs in Romania (2005=100%)

A similar situation was noticed in Poland, where the increase in the volume of inputs outpaced the growth rate of agricultural production. The analysis of agricultural productivity evolution by decades (Table 1) highlights significantly different dynamics, starting from the beginning of the investigated period, namely the year 1961. In France, TFP has steadily increased. Poland also experienced an extended period of TFP growth, except for the decade 1971–1980.

In Romania, we can notice a slowdown and even a decline of TFP in the decades 1971–1980 and 1981–1990, followed by a reversed trend starting with the decade 2001–2010. As compared to the period 2001–2010, total factor productivity increased by 19% in France, by 13% in Poland and by only 2% in Romania in the period 2011–2016.

Table 1

TFP by decades % (2005=100)

	1961–1970	1971–1980	1981–1990	1991–2000	2001–2010	2011–2016
France	62	67 (+5)	79 (+13)	90 (+11)	101(+11)	121 (+19)
Poland	94	82 (-12)	86(+4)	97(+11)	103(+6)	116 (+13)
Romania	88	85 (-3)	84(-1)	86(+2)	98(+12)	100 (+2)

Source: Author's calculations based on data from Economic Research Service (USDA) database

In the evolution of agricultural output by decades (Table 2), we can notice that the two former communist countries, Poland and Romania respectively, had the highest values of this dynamics in the decades 1981–1990 and 1971–1980 respectively. A decline followed since 1991–2000, stronger in Romania. The agricultural production has been stable since 1981–1990, and there are no spectacular changes in dynamics, which brings more predictability to the agricultural sector in France.

Table 2

Dynamics of agricultural output by decades (2005=100) %

	1961–1970	1971–1980	1981–1990	1991–2000	2001–2010	2011–2016
France	76.7	87.6	98.7	100.4	99.6	100.3
Poland	103.1	120.3	120.6	107.2	103.0	110.3
Romania	69.9	102.6	116.0	96.9	96.5	97.4

Source: Economic Research Service (USDA)

Table 3

Dynamics of inputs by decades (2005=100) %

	1961–1970	1971–1980	1981–1990	1991–2000	2001–2010	2011–2016
France	124	131	125	112	99	83
Poland	110	146	141	111	101	95
Romania	80	120	138	113	99	97

Source: Economic Research Service (USDA)

In all the three countries it can be noticed that in the decades before 2001, the amount of inputs applied significantly increased, and it can be presumed that agricultural productivity growth was based on the increase in the quantity of inputs used (Table 3). After 2001, the increase of agricultural productivity was based on qualitative factors, mainly restructuring of the agricultural sector, technical progress and investments.

4.2. CONTRIBUTION OF STRUCTURAL FACTORS TO AGRICULTURAL PRODUCTIVITY GROWTH

The balanced structure of agricultural production, that is the relatively equal share of the two important sectors, crops and livestock, is important because it can generate a high productivity in value terms at branch level, due to high value-added animal products. At the same time, this balanced structure can result in economic stability, in the conditions in which the share of the crop production sector, which features higher volatility, is within quite reasonable limits and it effectively contributes to food security and increase of food diversity, while it indirectly contributes to the improvement of the agricultural trade balance.

At the same time, the development of the livestock sector ensures the direct use of products obtained in the crop production sector, namely grains, feeds of

various types, other by-products, for animal feeding, contributing to obtaining high value-added products and to the smart use of bioresources provided by agriculture. The development of circular economy models on farms also takes into consideration this type of approach.

In the recent decades, the structure of agricultural production, i.e. the share of the two main production sectors (crops and livestock) has progressively deteriorated in Romania, from a relatively balanced structure in 1990, i.e. 53% crop production and 47% animal production to a share of crops of 70.9%, and 29.1% livestock in the year 2018. At the same time, it can be noticed that in the other analysed countries, namely France and Poland, in the year 2016, the crop production sector accounted for 43.4% and the livestock sector 53.4% of total agricultural production, while in France the crop production sector accounted for 54.7% and the livestock sector 39.3%.

In Tables 4–6 we can see the structure of agricultural production in the three counties, in terms of share of the two sectors, crops and livestock in total agriculture.

Table 4

Evolution of agricultural output structure in Romania

	UM	1998	2008	2016
Output value, out of which:	Mil. euros[x)]	11,022.9	12,154.5	12,645.6
Crop production	%	57.3	65.3	68.4
Animal production	%	42.2	30.3	27.4

[x)] 2005 constant prices
Source: Eurostat, aact_eaa03

Table 5

Evolution of agricultural output structure in Poland

	UM	1998	2008	2016
Output value, out of which:	Mil.euros[x)]	13,623.12	15,757.74	18,669.32
Crop production	%	48.5	47.2	43.4
Animal production	%	50.1	49.8	53.4

[x)] 2005 constant prices
Source: Eurostat, aact_eaa03

Table 6

Evolution of agricultural output structure in France

	UM	1973	1998	2008	2016
Output value, out of which:	Mil.euros[x)]	43,701.72	63,459.67	63,011.34	61,339.44
Crop production	%	52.0	56.3	56.4	54.7
Animal production	%	45.6	39.6	38.1	39.3

[x)] 2005 constant prices
Source: Eurostat, aact_eaa03

At the same time, the production structure within each sector is also important, as certain products, such as vegetables, fruit, strawberries, floriculture

and winegrowing produce commodities with high value added and are more profitable than products like cereals, oilseeds or fodder crops.

It can be noticed in Table 7 that in Romania, as compared to France, the share of certain groups of products in the agricultural output is higher, namely in the case of cereals, fodder crops, potatoes, fruit, while France is significantly ahead of us in wine, beef and milk, all of which are high value-added products. As compared to Poland, this country has higher shares of animal products (beef, pork, chicken and milk) than Romania.

Table 7

Structure of output value by main commodity groups in France, Poland and Romania, in 2016

Total Agricultural Output=100%

	France (%)	Poland (%)	Romania (%)	RO-FR (%)
Cereals	13.4	12.3	18.1	4.7
Industrial crops	6.1	7.6	6.8	0.7
Fodder crops	8.4	5.5	11.9	3.6
Vegetables	8.5	6.6	14.6	6.1
Potatoes	1.8	3.0	4.9	3.1
Fruit	3.3	5.7	6.4	3.1
Wine	11.4	0.0	1.4	-9.9
Cattle	13.4	7.8	2.0	-11.4
Pigs	4.7	12.8	8.4	3.7
Sheep and goats	1.1	0.0	0.8	-0.3
Chickens	4.3	13.4	4.9	0.7
Milk	13.6	14.9	5.8	-7.8
Eggs	1.0	3.3	4.3	3.3
Other	9.1	7.2	9.7	

Source: Eurostat, aact_eaa03

The level of intermediate consumption per hectare (Table 8) is twice as high in France compared to Poland and 2.3 times compared to Romania. The level of intermediate consumption reveals the production technologies applied, the quality of inputs used and is correlated with the technological level and the application of research results.

Table 8

Level and structure of intermediate consumption in the year 2016, euros/ha

	France	Poland	RO
Total intermediate consumption	1829.9	920.6	796.0
Seeds	98.9	14.2	90.5
Energy	149.1	237.3	153.7
Fertilizers			9.4
Crop protection products	152.6	73.4	14.2
Feeds	585.3	320.6	230.8

Source: Eurostat, aact_eaa03

4.3. LABOUR FORCE AND EFFECTS ON LABOUR PRODUCTIVITY

It is well-known that Romania has a huge number of farms (3.4 million), out of which 94.6% are very small-sized farms and 99.3% would be in the category of family farms (Eurostat, 2019).

At the same time, it is known that people working on the small farms do not fully use their available work force, due to the limitation of other production factors (small agricultural area, few animals, etc.).

Table 9 also provides general information on the farm structure and workforce characteristics in the other two investigated countries.

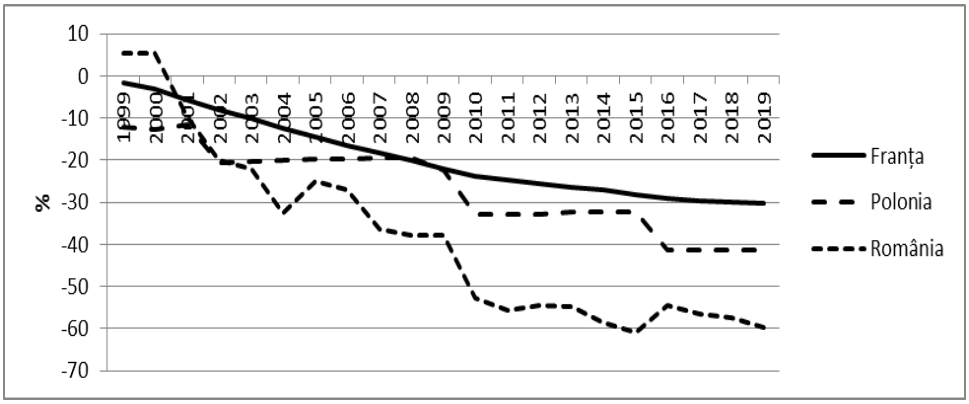
Table 9

Structure of farms and labour resources, 2018

	France	Poland	Romania
Utilized agricultural area (thousand ha)	27814	14406	12503
Number of farms	456520	1410700	3422030
Very small farms with a standard output under 8000 euros	18.9%	64.8%	94.6%
Family farms (> 50% of labour input comes from family members)	72.3%	99.3%	99.3%
Young farmers (under 40 years)	15.6%	20.3%	7.4%
Farmers with full agricultural training	34.9%	27.4%	0,4%
Real income index per annual work unit (2005=100)	127.93%*	167.72%*	149.07%*
Entrepreneurial income index (2005=100)	140.46*	174.11*	196.53*

Source: Agriculture, forestry and fishery statistics, 2019 edition, Eurostat, year 2014

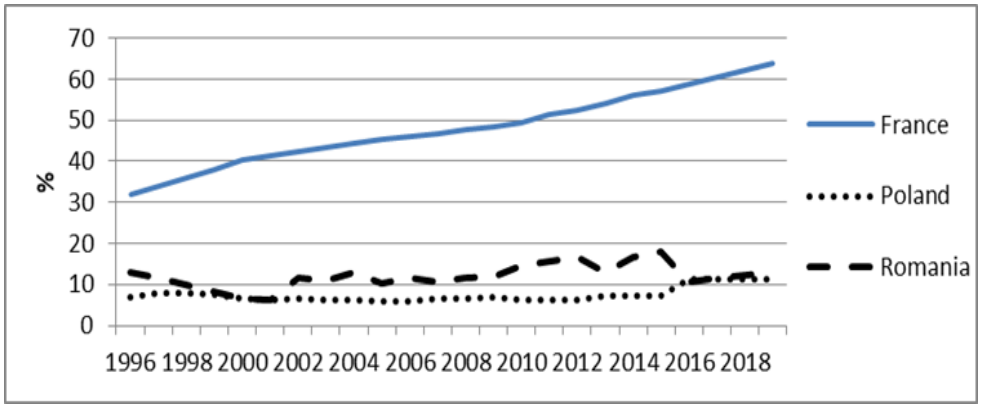
At the same time, the ageing labour force (only 7.4% of farmers are under 40) with poor qualification (only 0.4% have full agricultural training) are characteristic for Romania's situation.



Source: Eurostat, aact_ali01

Figure 3. Decline of the agricultural labour force expressed in Annual Work Units (1998=100)

In the period 1998-2019, the population employed in agriculture steadily and consistently declined, mainly in the former communist counties; this decline was produced under the background of young population's emigration to western countries, with more attractive labour markets in terms of incomes and opportunities. Graph 3 shows that in the above-mentioned period the labour force expressed in Annual Wok Units decreased by 30% in France, by 40% in Poland and by 60% in Romania, in about 20 years. Therefore, it is considered that the main factor that led to the consistent increase of labour productivity in the New Member States is the decrease in the number of persons working in agriculture in these countries.



Source: Eurostat, aact_ali01

Figure 4. Share of employed labour force in total agricultural labour force (%)

At the same time, in the countries from Western Europe, and we have here the example of France, the majority of labour force is represented by salaried workers (64%, in 2019), while in the New Member States the majority of labour force consists of non-salaried labour force or unpaid family workers. The percentage of salaried workers in agricultural labour force is 12%–13% in Poland and Romania respectively.

4.4. INVESTMENTS AND RESEARCH EXPENDITURE

Investments and research expenditure represent the driving force of agricultural productivity growth in the long term. We can see in Table 10 the extremely low rate of investments from own funds in Romania. Thus, while in the period 2011-2016, in France, 36% of the gross value added in agriculture was dedicated to investments, in Romania this percentage was only 11.5%. This low investment rate calls into question the future development of the sector and the long-term profitability of Romanian farms.

Table 10

Share of Gross Fixed Capital Formation in Gross Value Added in Agriculture (%)

	1973–1980	1981–1990	1991–2000	2001–2010	2011–2016
France	56.8	40.1	34.2	33.8	36.0
Romania	-	-	9.0	11.7	11.5

Source: Author's calculations based on Eurostat, aact_eaa03 data

At the same time, the total agricultural research expenditure significantly declined in Romania, i.e., by 36% in 2015 as compared to 2007. It can be noticed that in the same period, in Poland, the research expenditure increased by 50% (Table 11).

Table 11

Total research expenditure in agriculture – million euros

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Poland	130.542	156.345	131.805	199.915	202.155	159.008	175.652	246.588	196.339
Romania	72.178	64.114	39.118	61.667	:	33.443	:	49.158	46.170

Source: Eurostat, rd_e_gerdsc

4.5. CHANGES IN FOOD CONSUMPTION

The changing food demand is another important factor that leads to changes in the structure of agricultural production and ultimately in productivity. Against the background of economic growth in recent years and increase in household incomes, food consumption in Romania has seen some quantitative and qualitative improvements. However, the food consumption pattern is *still* dominated by a high share of food expenditure in total consumer expenditure, which makes the food security of the population vulnerable. According to the Household Budget Survey, the share of food expenditure decreased in the last years, from 43.4% in 2014 to 37.0 % in 2018, yet this level is still very high. We can notice that this level is one of the highest in the EU, for the developed countries this indicator ranging from 10 to 15% in general (for instance in France it was 14.3% in 2001).

Table 12

Structure of total consumer expenditure in the period 2014–2018 (%)

	2014	2015	2016	2017	2018
Total consumer expenditure out of which:	100	100	100	100	100
Food	43.4	41.6	39.7	38.0	37.0
Non-food	30.2	31.6	33.1	36.1	37.4
Payment of services	26.4	26.9	27.2	25.9	25.6

Source: Coordonate ale nivelului de trai în România. Veniturile şi consumul populaţiei, 2015, 2017, 2018, INS

Table 13

Structure of consumer expenditure by residence areas in the year 2018 (%)

	Total	Urban	Rural
Total consumer expenditure per household (RON) out of which (%):	2272.2	2541.3	1926.1
Food	37.0	34.2	41.6
Non-food	37.4	36.9	38.4
Payment of services	25.6	28.9	20.0

Source: Coordonate ale nivelului de trai în România. Veniturile şi consumul populaţiei, 2018, INS

The urban-rural gap in terms of food consumption expenditure is due to the more severe poverty in the rural area and it points out that in the rural area there are often food-vulnerable groups (such as children), for whom food aid is needed.

Over the years, food consumption in Romania has revealed the characteristics of an emerging economy and a low to medium-income population, with an increased demand potential, mainly in quantitative terms. Unlike other developed countries in the European Union, where there is a saturation of demand for certain foodstuffs (meat, for example), food demand in Romania is on a growing trend for many important products, such as meat, vegetables, fruit and fish.

Options for improving food quality and diversity have only become apparent in recent years. Thus, the recent years have brought a series of improvements in the food and nutritional situation that we shall point out below.

Table 14

Annual per capita food consumption (kg)

(1)	2007 (2)	2010 (3)	2013 (4)	2016 (5)	2017 (6)	2018 (7)	2018 as compared to 2007 (8)=(7)-(2)
Cereals and cereal products, cereal equivalent	213.4	211.3	218.1	208.4	208.2	205.4	-8
Potatoes	99.1	103.9	103	95.5	96.6	95.5	-3.6
Grain legumes	3.4	3	3.3	2.1	2.4	4.1	0.7
Vegetables and vegetable products, fresh vegetables equivalent	149.9	155.7	152	155.8	162.1	173.5	23.6
Fruit and fruit products, fresh fruit equivalent	69.9	67	73.7	96	96.1	110.8	40.9
Sugar and sugar products in sugar equivalent (including honey)	25.7	23.4	21.1	25.3	25.7	25.4	-0.3
Meat and meat products in fresh meat equivalent	64.7	59.9	54.4	65.5	68.4	73.8	9.1
Milk and dairy products in milk equivalent with 3.5% fat (excluding butter)	268.6	244.2	244.5	253.6	251.4	258.3	-10.3
Fish and fish products in fresh fish equivalent	3.9	4.9	4.3	5.9	6.3	6.7	2.8
Wine and wine products (litres)	24.1	22.2	21.7	18	21.8	23.8	-0.3

Source: Tempo online, Disponibilitatile de consum ale populatiei, NIS

The data on the evolution of food consumption in Table 14 refer to the average annual consumption of food products, calculated as *available for consumption (production+import-export-industrial processing-losses-variation of stocks)* related to total population on July 1 of the reference period. These reveal the specific evolutions of a country in a process of economic growth, with an unsaturated food demand that is very elastic in products considered to be highly nutritional (Alexandri, Păuna, Luca, 2015).

Thus, in the period of increasing population income, the demand for superior food products such as meat (animal protein), fruit and vegetables increased significantly. In the year 2018, compared to 2007, meat consumption per capita increased by 9.1 kg, the consumption of vegetables by 23.6 kg/capita and fruit consumption increased by almost 41 kg/capita.

At the same time, the consumption of carbohydrate foods decreased, like in the case of cereals (by 8 kg/capita) and potatoes (by 3.6 kg/capita). An atypical situation occurs in the consumption of milk and dairy products, probably in the context of the decline of dairy cow herds and of self-consumption implicitly. In the period 2007-2018, milk consumption per capita in the rural area decreased by about 1 litre/month, hence by 12 litres per year.

These evolutions led to the increase of demand for animal products, meat and dairy products in particular, and also for fruit, vegetables and fish.

The increase of consumers' preference for products of animal origin also led to an increased demand for such products and influenced the level of prices. By meat types, consumption increased by 6.2 kg/capita in poultry meat, by 5.9 kg/capita in pork and decreased by 3.1 kg/capita in beef in the year 2018 as compared to 2007.

In this context, it is worth noting that poultry meat had the lowest price increase in 2019 as compared to 2004, i.e., by only 16%, while in the case of beef, price increased more than 3 times (of course meat quality is different). Yet we can conclude that consumers' preference for poultry meat is also influenced by the better prices of this type of meat. Significant increases were also noticed in the case of pork, about 2.5 times and milk, almost 2 times, by the end of investigated period.

5. CONCLUSIONS

Briefly, among the factors that are considered important for agricultural productivity, the following are worth noting:

1. Balanced structure of agricultural production, i.e. balance between the two sectors, crops and animals. This can lead to high productivity in value terms due to the high value-added animal products. At the same time, this balanced structure can result in economic stability, given that the share of the crop production sector, which is par excellence more volatile, is at a reasonable level

2. The diversity of agricultural production and the increase in the share of high value-added products (fruit, wine, organic crop and animal products, etc.)
3. Young or relatively young skilled labour
4. Investments in agricultural inputs and technology
5. Funds allocated to research activities
6. Quantitative and qualitative evolution of domestic and foreign demand
7. Evolution of foreign markets and relative prices.

On the other hand, another factor, which slows down agricultural growth this time, is represented by the degradation of natural resources, mainly due to global warming. The effects of climate changes on agriculture may be positive in certain areas, yet on very short term, but are likely to become increasingly negative in the medium and long term.

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