

PROSPECTS FOR EUROPEAN UNION'S MEAT PRODUCTION IN THE CONTEXT OF CURRENT CONSUMPTION CHALLENGES

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Abstract

Meat is an important element in human nutrition, and its consumption is expected to increase in the coming years in parallel with population growth. However, the livestock sector faces problems related to climate change, animal protection and welfare, and various epizootics, which have decimated livestock. In this context, the article analyses pig, cattle and sheep herds, as well as the production of pig, beef and sheep meat resulting from slaughterhouses in the EU, focusing on the main animal breeders and meat producers, for the period 2018-2022. The results of the study show that the number of pigs, cattle and sheep in the EU decreased during the period under review, as well as the total production of slaughtered meat. The most important pig breeders were Spain, Germany and France, for cattle - France, Germany and Ireland, and for sheep - Spain, Romania and Greece. Among the meat-producing countries stood out: for pork - Spain, Germany and France; for beef - France, Germany and Italy and for sheep meat - Spain, France and Ireland. At the same time, the article presents the perspectives of meat consumption, in the context of the pressures to which the livestock sector is subject and the changes that are manifested in the food preferences of European consumers.

Key words: beef meat, livestock, meat consumption, meat production, pig meat, sheep meat

INTRODUCTION

Consumed by humans since ancient times, meat is an important food due to the intake of vitamins (B12, B3, B6), minerals (iron, phosphorus, zinc, selenium), creatine and carnosine - a powerful antioxidant [2].

Global population growth is reflected in higher demands for food, mainly meat and dairy products [20].

Meat is currently a product consumed across the globe, which has made the meat industry well-developed, being valued at \$960 billion in 2022. A continuous increase in its value is foreseen until 2027, based on the increase in meat consumption [18].

A study available on the Statista platform on global meat consumption, between 2020-2022, shows that the average for the mentioned period was 28.1 kg per capita [19]. The North American continent was in first

place, with 78.6 kg per capita, and the last place was occupied by the African continent, with 9.6 kg per capita. The amount of 52.1 kg of meat per capita placed Europe in third place, with a value almost double in comparison with the world average (Figure 1).

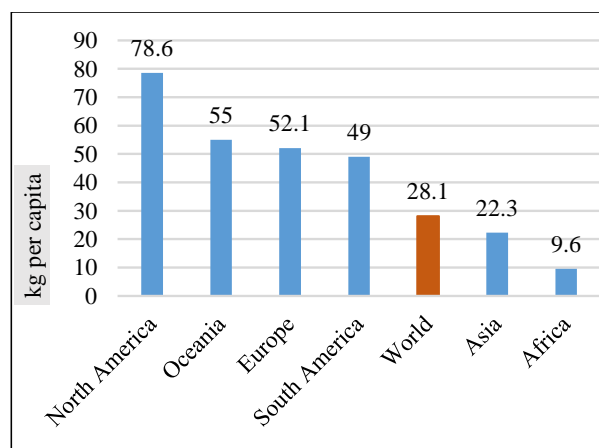


Fig. 1 Average of worldwide meat consumption per capita from 2020 to 2022.

Source: own representation after [19].

The type of meat preferred by Europeans has been and is expected to remain pork [13], with Europe leading the consumption of meat for this category [1].

At the same time, in 2022 the EU was the 4th consumer of beef worldwide [1, 18], and among the member countries, Germany had the highest consumption of meat in kg per capita, especially pork [18].

Starting from the information regarding the increase in meat consumption, the article aims to highlight the evolution of factors influencing meat consumption, such as EU pig, cattle and sheep herds, and meat production obtained in slaughterhouses from these categories of animals.

MATERIALS AND METHODS

The bibliographic method was used to obtain the data presented in this article, and the study period was 2015-2022.

The indicators analyzed included the livestock of the following species: pigs, cattle and sheep from the EU, and the production of meat obtained from animals slaughtered in slaughterhouses. It should be noted that the article analyzes data on animal species that were studied within Project number 1060/15.06.2022, "Proposals for strategic measures in Romanian agriculture in the context of geopolitical instability", Acronym AgRoMaS, within IPC 2022; co-financer PRO-AGRO Federation.

The statistical data in the article were processed and graphically represented based on information obtained from specialized websites such as Eurostat, OECD and Statista. At the same time, a number of specialized materials on the chosen topic were studied, available on the websites of reference institutions in the EU, the European Commission and DG Agri.

RESULTS AND DISCUSSION

According to Eurostat, in the EU, in the period 2015-2022, the number of animals of the analyzed species decreased, as follows: in

the category of pigs by 6.87%, cattle by 5.67% and sheep by 6.26%.

Spain, Germany and France were the most important pig farmers in the EU in 2015-2022. Their combined herds accounted for half of all pigs raised in the EU (50.31%). The highest percentage was held by Spain, 25.35% (Figure 2).

It should be noted that Figure 2 shows the pig herds in the EU states that raised more than 1,000,000 swine in 2022, 15 in number, which accounted for 95.99% of the pig herds in the EU. The other 12 EU Member States accounted for 4.01%.

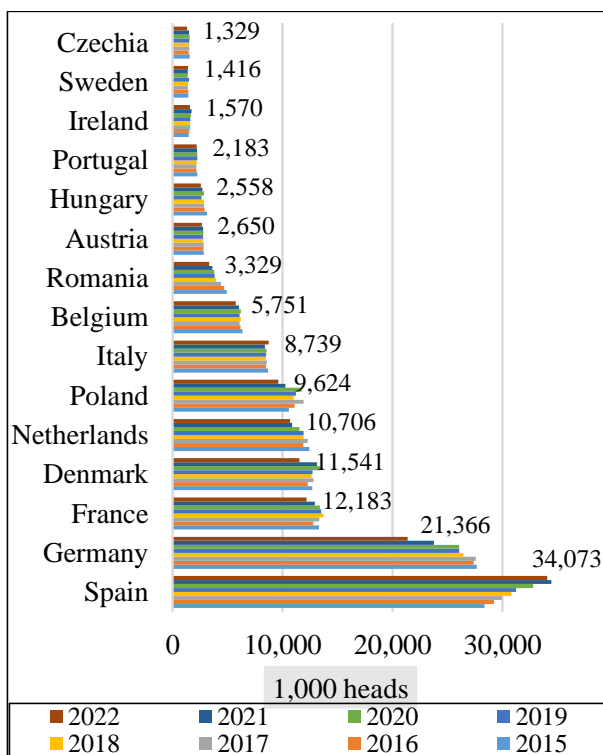


Fig. 2. Pig herds in the main pig farming states in the EU, 1,000 heads.

* 2022 values

Source: own representation after [9].

The trend in the period under review was a decrease in the number of pigs for most EU States. One explanation for this phenomenon is the diseases that have affected swine lately, such as "African swine fever". The largest decreases were registered by Slovakia - 39.84%, Romania - 32.44% and Malta - 32.27%. There were also 3 exceptions, which recorded the following increases: Spain -

20.11%, Ireland – 6.50%, Italy – 0.27% and Bulgaria – 0.27%.

The top 3 countries that raised the largest number of cattle between 2015 and 2022 were France, Germany and Ireland. The herds of the first 2 ranked accounted for more than a third of the total cattle in the EU (37.41%), and for the largest breeder, France - 22.41% (Figure 3).

Figure 3 shows the top 14 countries in the EU, with more than 1,000,000 cattle in 2022, which accounted for 92.30% of the cattle in the EU. The remaining 13 states owned cattle that accounted for 7.70% of the total.

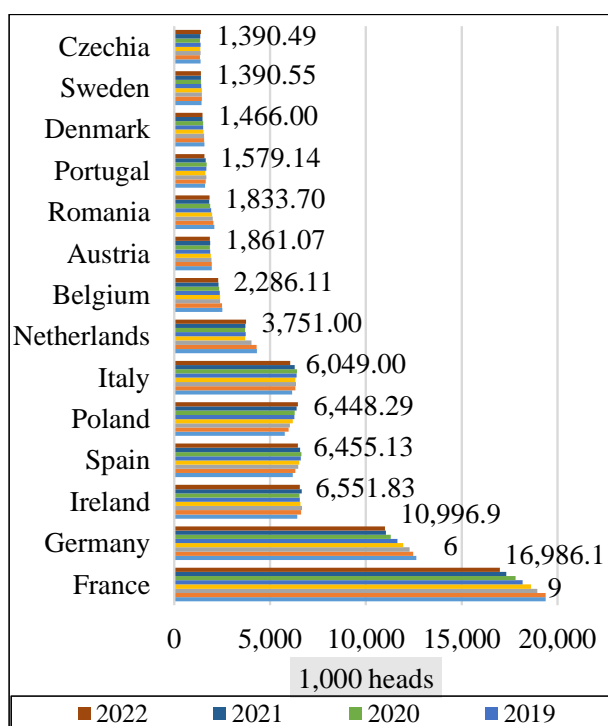


Fig. 3. Cattle herds in the main cattle breeding states in the EU, 1,000 heads.

* 2022 values

Source: own representation after [9].

As in the case of pigs, the general trend was that of decreasing the number of cattle, the highest values being recorded for the Netherlands – 13.07%, France – 12.38% and Romania – 12.36%. Cattle numbers increased in Cyprus by 38.36%, Poland – 11.90%, Hungary – 8.89%, Spain - 4.40%, Bulgaria – 3.35%, Ireland – 2.02% and Czechia – 1.77%. In the EU a large proportion of sheep are grown in economically vulnerable areas, for example in mountainous regions [3, 5] and

EU grants farmers income support payments [5].

The dynamics of sheep flocks in the EU Member States that grew over 1,000,000 specimens in 2022 is shown in Figure 4.

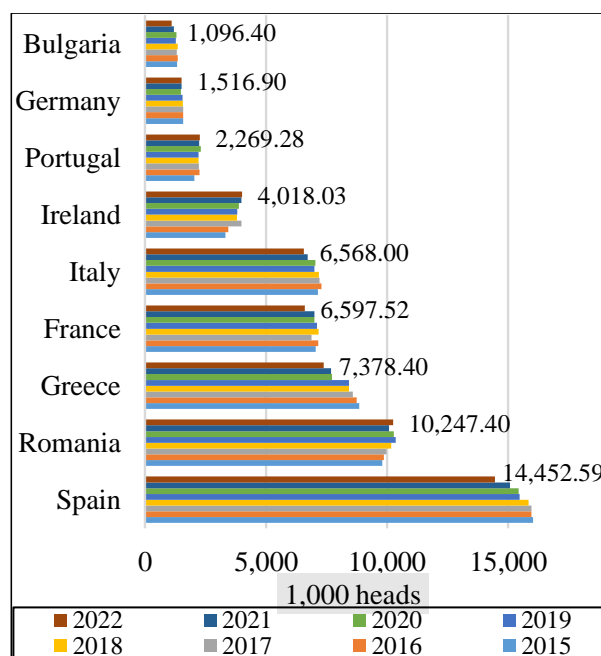


Fig. 4. Sheep flocks in the main sheep breeding states in the EU, 1,000 heads.

* 2022 values

Source: own representation after [9].

The flocks in the top 3 countries with the most sheep (Spain, Romania, Greece) represented 54.36% of the EU total, although in Spain and Greece the number of animals decreased by 9.82% and 16.65%, respectively.

Despite the fact that the total number of sheep in the EU recorded a decrease, in 10 countries the sheep flocks increased, the largest increases being recorded for Malta (30.60%), Ireland (20.85%) and Poland (20.43%).

For Sweden, the largest decrease in the number of sheep was recorded, of 42.69%, followed by the Netherlands – 29.94%.

In the EU meat production is closely related to the dynamics of livestock, the objectives and support of the Common Agricultural Policy and the prices of crops used in animal production [16]. Consumer preferences will be also very important [14].

Regarding the production of meat obtained from animals slaughtered in slaughterhouses, in the analyzed period, the available data also

revealed decreases for pork by 0.67% and 0.92% for bovine meat [9].

The EU is the world's second producer of pig meat after China and the largest exporter of pig meat and pig meat products [6].

The total pork production obtained in slaughterhouses in the EU fluctuated, recording increases from 2015 to 2021, when 23,393.67 thousand tons were obtained, and in 2022 it decreased to 22,065.92 thousand tons.

This downward trend in production was also manifested in 13 of the EU countries. Thus, Malta, Germany and Romania recorded the largest decreases, with 20.18%, 19.34% and 19.15% respectively.

In contrast, meat production in slaughterhouses in the other 15 countries increased, most notably in Bulgaria by 35.15% and in Spain by 31.43%.

Figure 5 shows the pig meat productions made by the first 8 EU countries that obtained in the period 2015-2022 more than 1,000,000 tons of meat in slaughterhouses. It should be noted that the production of these states accounted for 86.40% of the total in 2022.

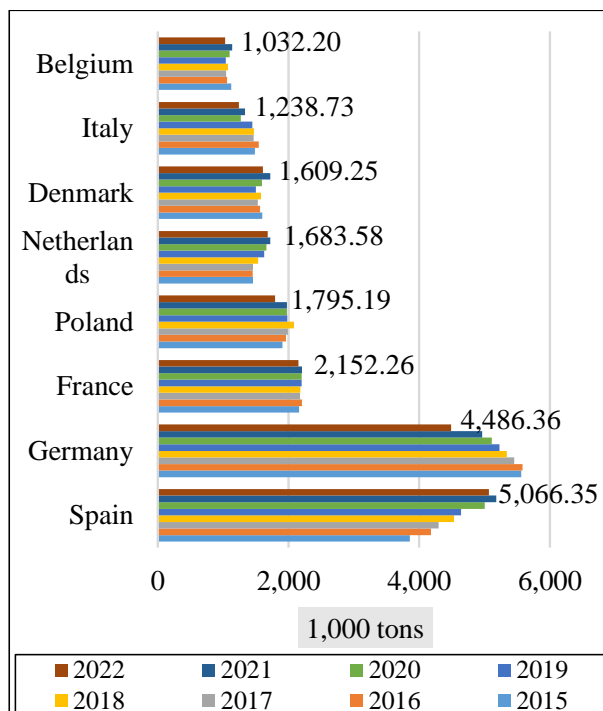


Fig. 5. Pork production obtained in the main producing countries in the EU, 1,000 tons.

* 2022 values

Source: own representation after [9].

As can be seen, the main producers were Spain and Germany. In 3rd place was France, whose production decreased by 0.49% in 2022.

The EU is also a major beef producer. It supports farmers through income support payments and uses a number of market measures to stabilize the beef market [4].

The total production of beef obtained in slaughterhouses in the EU increased from 2015 to 2018, and decreased from 2019.

More than half of the EU states have shown the trend of declining beef production and only 10 states have obtained higher yields. The largest production increases were recorded by Bulgaria (32.70%), Portugal (17.08%) and Spain (16.84%), and the largest decreases – by Romania, 19.92%, Latvia, 16.30% and Greece – 15.34%.

Figure 6 shows the beef productions made by EU states that obtained in the period 2015-2022 more than 1,000,000 tons of meat in slaughterhouses. These states had a production of 6,217.3 thousand tons, which meant 93.63% of the total EU beef production in 2022.

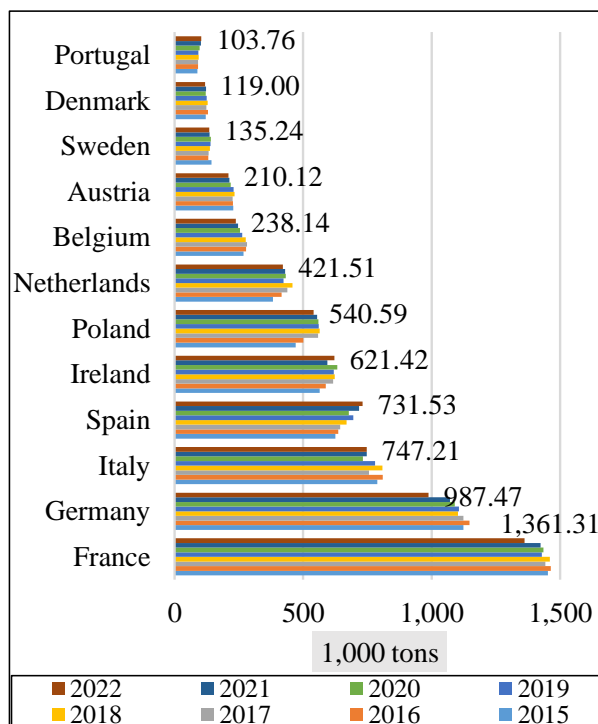


Fig. 6. Beef production obtained in the main producing countries in the EU, 1,000 tons.

* 2022 values

Source: own representation after [9].

From the analysis of the data presented in Figure 6, it results that France, Germany and Italy ranked in the first 3 places in the ranking of beef producers, despite the fact that the quantities of meat obtained in slaughterhouses in these countries decreased by 6.30%, 12.15% and 5.21%, respectively.

The information available on the Eurostat website regarding the production of sheep meat obtained in slaughterhouses, indicated that the main sheep breeders are not also the most important meat producers. This is the case of Romania, which was ranked second in terms of the number of sheep raised, and in the ranking of meat producers it occupied only the 10th place, with a production of 5.14 thousand tons in 2022, decreasing compared to 2015 by 44.19%, the largest decrease recorded for the analyzed period. It is known that Romanians eat sheep meat seasonally, and mainly around the Easter holidays [3, 11], and the government tries through various programs to sensitize consumers and change preferences regarding meat types [11].

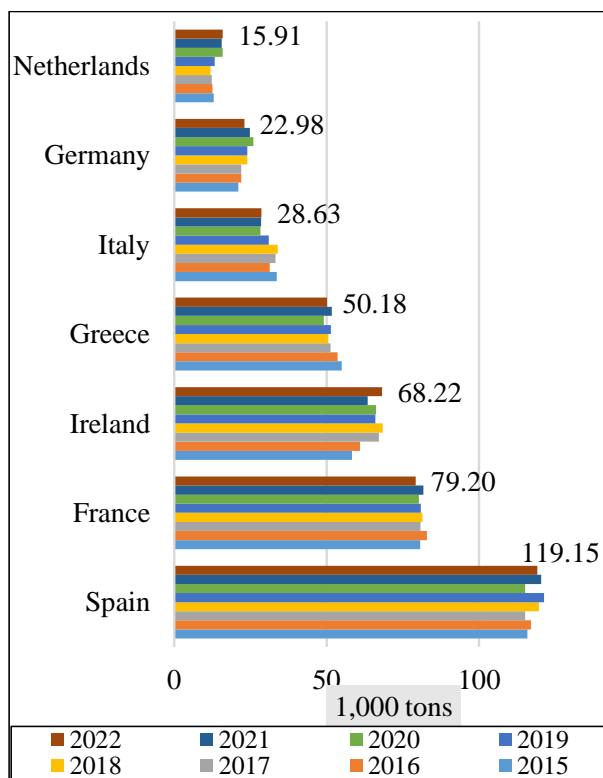


Fig. 7. Production of sheep meat obtained in the main producing countries in the EU, 1,000 tons.

* 2022 values

Source: own representation after [9].

Figure 7 shows the production of sheep meat obtained in states where more than 10 thousand tons of meat were produced in slaughterhouses in 2022. The first place was occupied by Spain, with 119.15 thousand tons in 2022, followed by France (79.20 thousand tons) and Ireland (68.22 thousand tons).

The production obtained by the 7 main producing states in Figure 7 in 2022 was 384.27 thousand tons of meat, while the other states obtained together 37.90 thousand tons.

Between 2015 and 2022, half of the EU countries recorded increases in sheep meat production, the highest values being recorded for Poland – 116.07%, Estonia, 77.78% and Hungary – 73.81%. At the same time, production declines were noted, outside Romania a large percentage being held by Denmark – 32.22% and Czechia – 27.78%.

It should be noted that another type of meat widely consumed in the EU is poultry meat. Meat production, which amounted to 43.92 million tons in 2021, was made up of 52.3% pork, 31% poultry, 15.5% beef and veal, and 1.2% sheep and goat. In terms of poultry meat, Poland and France were the top producers in the EU [15]. The EU was the fourth largest producer of poultry meat worldwide in 2022 [18].

In the coming period, a change in the content of the shopping cart in the EU is foreseen: beef consumption will continue its downward trend, pork will continue to be replaced by poultry, while sheep meat consumption will increase due to the diversification of the meat diet and the changes in the EU demography (migration and religious traditions) [8].

Another trend that will manifest itself is the change in food preferences, namely the switch to another type of diet, a trend already felt by the largest meat consumer in the EU, Germany [14]. In Germany, Poland and France, in the age category 18 - 29 years over 5% of people are vegetarians [18].

Various factors such as: animal welfare concerns, climate change, health problems, or epizootic causes consumers to switch to a diet based mainly or only on plants, thus adopting the vegetarian, vegan or flexitarian diet.

As an alternative, the EU recommends the consumption of "in vitro" meat, vegetable meat or insect consumption [7, 17].

In this situation, some companies in the meat industry have started to produce substitutes for plant-based meat. Consumption of these products is expected to increase in the European Union and reach a total of 178.8 million kilograms by 2028 [18].

At the same time, "Greenpeace" believes that pigs and cattle contribute to increasing climate problems and has asked the European Commission to recognize the environmental impact of meat and dairy consumption [10]. Simultaneously, "The Guardian" study showed that about 60% of greenhouse carbon emissions come from meat production [12]. "Greenpeace" has proposed to include in the "Farm to fork" strategy targets such as reducing meat consumption by 71% by 2030 and by 81% by 2050 [10].

Contrary to the information presented above, the Statista platform [19] estimates for 2032 an increase in meat consumption, both for the world average – 28.8 kg per capita and at the level of the continents, as follows: 2.9 kg per capita for South America, 2 kg per capita for Asia, 0.6 kg per capita for Europe, 0.5 kg per capita for North America and 0.3 kg per capita for Africa. A decrease will be recorded in Oceania, where consumption will reach 53.3 kg per capita.

CONCLUSIONS

From the analysis of livestock dynamics and production of pig, beef and sheep meat in the EU for the period 2015-2022, the following conclusions were drawn:

- the livestock in the 3 categories analyzed decreased, the most affected being the pig sector, which recorded the highest percentage - 6.87%;
- Spain, Germany and France were the most important pig breeders, owning 50.31% of the EU specimens;
- Spain, the EU state with the largest number of pigs (25.35%) recorded a 20.11% increase in their number;

- The first 2 cattle breeders were France and Germany, and their herds represented 37.41% of the total EU;
- France registered a decrease of 12.38% in the number of cattle during the studied period;
- The first 3 sheep breeders, Spain, Romania and Greece, owned 54.36% of the total EU herds;
- the production of pig and bovine meat resulting from slaughterhouses in the EU recorded a slight decrease, the highest percentage being obtained by bovine meat - 0.92%;
- The EU is the world's second largest pig meat producer and largest exporter of pig meat and pork products;
- The major EU pork producers were: Spain, Germany and France, and for beef France, Germany and Italy;
- Regarding sheep meat production, Spain, France and Ireland occupied the first 3 places;
- in the perspective of increasing sheep meat consumption, an increase in production is also foreseen.

In the coming period, the livestock sector will be subject to new challenges due to new trends in food consumption, EU directives on climate change and competition with new types of meat or meat substitutes, and at the same time the demands due to population growth.

That is why compliance with the conditions regarding animal welfare, adaptation to the technologies promoted by Agriculture 4.0 in parallel with the preservation of traditional occupations and the implementation of the "Zero-Waste Concept", will represent essential elements in carrying out activities specific to the livestock sector.

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instability”, Acronym AgRoMaS, within IPC 2022; co-financier PRO-AGRO Federation.

REFERENCES

- [1] AgroInfo 2019, Carnea preferată de europeni: 40 kg pe cap de locuitor pe an!/Meat preferred by Europeans: 40 kg per capita per year!, <https://www.agroinfo.ro/economic/carnea-preferata-de-europeni-40-kg-pe-cap-de-locuitor-pe-an>, Accessed on 11.09.2023.
- [2] Agointeligența, 2015, Consumul de carne și motivele pentru care nu trebuie să renunți la acest obicei alimentar/ Meat consumption and the reasons why you should not give up this eating habit, available at: <https://food-retail.agointel.ro/consumul-de-carne-si-motivele-pentru-care-nu-trebuie-sa-renunti-la-acest-obicei-alimentar/>, Accessed on 11.09.2023.
- [3] Chiurciu, I.A., Zaharia, I., Fintineru, G., Dinu T.A., Soare, E., 2023, Sheep and goat breeding in Romania - Between tradition and consumption. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 23(2), 135-144.
- [4] Directorate-General for Agriculture and Rural Development 2023, Beef, https://agriculture.ec.europa.eu/farming/animal-products/beef_en, Accessed on 03.10.2023.
- [5] Directorate-General for Agriculture and Rural Development 2023, Lamb, mutton and goat meat, https://agriculture.ec.europa.eu/farming/animal-products/lamb-mutton-and-goatmeat_en, Accessed on 03.10.2023.
- [6] Directorate-General for Agriculture and Rural Development 2023, Pork, https://agriculture.ec.europa.eu/farming/animal-products/pork_en, Accessed on 03.10.2023.
- [7] Directorate-General for Health and Food Safety, Food, Farming, Fisheries – Food Safety 2023, Approval of fourth insect as a Novel Food, https://food.ec.europa.eu/safety/novel-food/authorisations/approval-insect-novel-food_en, Accessed on 05.10.2023.
- [8] European Commission, DG Agriculture and Rural Development 2021, EU agricultural outlook for markets, income and environment, 2021-2031. DOI 10.2762/753688, https://agriculture.ec.europa.eu/system/files/2023-01/agricultural-outlook-2021-report_en_0.pdf, Accessed on 04.10.2023.
- [9] Eurostat, 2023, Database, <https://ec.europa.eu/eurostat/data/database>, Accessed on 09.09.2023.
- [10] Greenpeace European Unit, 2020, EU climate diet: 71% less meat by 2030, <https://www.greenpeace.org/eu-unit/issues/nature-food/2664/eu-climate-diet-71-less-meat-by-2030/#:~:text=Brussels%20%E2%80%93%20Meat%20consumption%20in%20the,to%20new%20analysis%20by%20Greenpeace.>, Accessed on 11.09.2023.
- [11] Maerescu, C.M., Țuțui, D., Chereji, A.I. 2018, Evolutions and perspectives concerning the production and consumption of sheep meat in Romania. From a declining industry to a rising star. Annals of the University of Oradea, Fascicle: Ecotoxicology, Animal Husbandry and Food Science and Technology, Vol. XVII/A 2018, 87-94, https://protmed.uoradea.ro/facultate/publicatii/ecotox_zooteh_ind_alim/2018A/Animal/Maerescu_2018.pdf. Accessed on 11.09.2023.
- [12] Milman, O. 2021, Meat accounts for nearly 60% of all greenhouse gases from food production, study finds, in press: The Guardian 2021, <https://www.theguardian.com/environment/2021/sep/13/meat-greenhouses-gases-food-production-study>, Accessed on 23.09.2023.
- [13] OECD / Food and Agriculture Organization of the United Nations 2023, “Meat”, in OECD-FAO Agricultural Outlook 2023-2032, DOI: <https://doi.org/10.1787/f01f6101-en>, <https://www.oecd-ilibrary.org/sites/f01f6101-en/index.html?itemId=/content/component/f01f6101-en>, Accessed on 09.09.2023.
- [14] Pitulice, V., 2023, Europeanii reduc consumul de carne de porc. Nemții, la dietă/ Europeans are reducing their consumption of pork. Germans, on a diet, in press: Puterea/ The Power, <https://www.puterea.ro/europenii-reduc-consumul-de-carne-de-porc-nemtii-la-dieta/>, Accessed on 09.09.2023.
- [15] Popescu, A., Dinu, T.A., Stoian, E., Serban, V., 2022, Livestock decline and animal output growth in the European Union in the period 2012-2021. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 22(3), 503-514.
- [16] Sandu, M., Mantea, Ș., 2017, Study on the meat sector in the European Union. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 17(1), 375-380.
- [17] Stan, A., 2023, Se interzice carnea? După interzicerea automobilelor cu benzină din 2035, Europa trebuie să reducă consumul de carne animală cu 71% până în 2030. Un oraș olandez face primul pas – interzice reclamele la carne animală din 2024/ Is meat prohibited? After the 2035 ban on essence cars, Europe must reduce animal meat consumption by 71% by 2030. A Dutch city takes the first step – it bans commercials for animal meat from 2024, in press: MEDIAFAX 2023, <https://www.mediafax.ro/politic/dupa-interzicerea-automobilelor-benzina-2035-europa-reduca-consumul-carne-animala-71-pana-2030-oras-olandez-face-primul-pas-interzice-reclamele-carne-animala-2024-21617410>, Accessed on 23.09.2023.
- [18] Statista, 2023, Meat industry in Europe - statistics & facts, <https://www.statista.com/topics/4197/meat-industry-in-europe/#topicOverview>, Accessed on 07.09.2023.

[19]Statista, 2023, Per capita consumption of meat worldwide from 2020 to 2022, with a forecast for 2032, by region, <https://www.statista.com/statistics/1037429/per-capita-consumption-of-meat-worldwide-by-region/>, Accessed on 07.09.2023.

[20]Tirpe, A.R., Veres, A., Crecan (Letea), N.I., Maerescu, C. M., Chereji, A. I. 2023, The evolution of cattle herds in Romania in the period 2017-2021. Case study North West Region period 2017-2021. Annals of the University of Oradea, Fascicle: Ecotoxicology, Animal Science and Food Science and Technology, Vol. XXII/A 2023, 212-217, https://protmed.uoradea.ro/nou/images/Publicatii/Ecotox/2023A/33._Tirpe.pdf. Accessed on 07.09.2023.