SUPPORTING A HEALTHY ENVIRONMENT THROUGH LIVESTOCK

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Abstract
The importance of animal husbandry reaches all aspects (social, economic and environmental) of sustainable development in rural areas. People produce for sale, but also for consumption. At the same time, considering the location of this economic activity and the practice of farm technology, it is necessary to observe certain norms in order to ensure good environmental conditions. Of course, the future points to the mistakes of the past. Today, modern animal technology is coordinated through IT programs, which anticipate not only the production but also the risks. Specialized literature indicates the environmental risks arising from cattle breeding at planetary level: accumulation of methane as a specificity of digestion, but also through accumulated manure. In this sense, however, the bibliographic studies and the statistical analyses are in favour of maintaining the herds of cattle, on condition there is genetic improvement in the nutritional aspect, as well as judicious waste management. These considerations are appreciated by Romanian farmers in the economic activity of cattle breeding, promoting measures to reduce greenhouse gases in this field.

Keywords: *Greenhouse emissions, healthy environment, livestock, waste management*
DOI: 10.24818/CAFEE/2019/8/04

Introduction

Throughout time, the need for food of the population of Romania has been satisfied by the diversified yield of the natural habitat which has contributed, at the same time, to the country's overall economic development.
Irrespective of the technological system used, agricultural production is based on the biological growth and development processes of living beings (plants and animals), taking place under the influence of natural factors (light, water, soil, genetic factors). Considering the fact that, overall in Romania, agricultural land is predominant, rural life is dominated by agriculture, as an environmental factor, from the economic, social and ecological points of view. Consequently, there is a need to conserve, protect and improve the quality of the agricultural environment, for example through the cautious and rational use of the natural resources. Thus, the population's health can also be protected. This objective is also mentioned in the EU strategic guidelines for rural development, based on which Romania has created the legal framework allowing for agri-environment payments to be made. The key elements in diversifying the economic activities were considered to be, among others,

improving the balance between the economic development and the sustainable use of natural resources, along with maintaining and increasing the attractiveness of rural areas.
Agriculture is managed by agricultural holdings, which are grouped according to the following criteria: political ideology and economic doctrines; size, profile (production structure); relationship between the holding on the one hand and land ownership, the human resource or the integration level on the other hand; the destination of the production, as well as according to legal and economic criteria. As for animal breeding holdings, they can specialise in breeding either herbivorous or granivorous animals, but they can also be mixed, breeding various animal species, or working the land and breeding animals at the same time. The latter classification is leading to ecological agricultural holdings.
According to Eurostat, in Romania, in 2012 there were 20 ecological husbandry holdings, and by 2017 their number had risen to 1300 (each producing one ton of ecological animal products per year). The same database indicates that in Denmark, the country with the highest number of ecological animal farms, there were 132239 such farms in 2012, while in 2017 there were 953693 ecological farms (with a production of 16254 tons of ecological animal products per year). In 2017, our Bulgarian neighbours had 2772 ecological farms (with a production of 212 tons of ecological animal products per year), which is twice as much as in Romania, although the area of Bulgaria is half of that of our country. One should also mention the ecological animal production of France, which released 55694 tons on the market, the highest amount within the EU-28 in 2017.
An ecological farm generates "clean" products, which impacts on the consumers' health. Still, there are concerns fueled by the latest studies which are against animal breeding (the microorganisms in the ruminants' rumen ferment and start the digestive process, leading to the production of methane) and, implicitly, against milk consumption (milk cows have high CH_4 emissions). According to the United Nation's Food and Agriculture Organisation, the animals bred using "organic" methods emit even more methane than animals on industrial farms. Approximately 44% of the emissions produced by animals are under the form of methane.
The ruminant breeding sector might be saved also with the help of science which, cumulating the experience of biologists, chemists and experts in the science of ruminants and animal nutrition, are committed to reducing the methane emissions by at least 30% with the help of a food supplement proposed and tested by Clean Cow Project since 2007.
The introduction should outline the opportunity of the research against time, space and knowledge milestones, followed by a clear statement of the problem and of the research question that will be investigated. You should also add details regarding the scope of the research, type and source of data, research methods and techniques, and how the results will contribute toward solving the considered problem.

Material and method

Animal husbandry as a production system in the European Union, for example, represents the livelihood of the populations in less favored areas and, by supporting biodiversity, it supports landscape renewal and maintaining cultural and heritage values.
According to FAO, animal breeding accounts for 40% of the global value of agricultural production, as well as for ensuring the living means and food safety of about 1.3 million people. As far as maintaining the size of the livestock is concerned, FAO states that this is a multifunctional activity and that besides their role in generating food and income, animals are "a valuable asset, acting as a welfare deposit, a credit collateral and a safety net, essential in periods of crisis".

But according to the study undertaken by Goodland and Anhang R. J. in 2009, 51% of global emissions of greenhouse are caused by animal breeding. At the same time, the authors of the article Livestock and Climate Change emphasize that "the extra emissions from land use for livestock and feed comes to around 2,672 million tons of CO2e, while livestock generates 37% of human-induced methane".
Knapp et al. (2014) consider that methane emissions are a function of the population of ruminant animals, the production level, and the associated manure-handling systems. The rumen ecosystem is an anaerobic environment, in which the degradation of plant material occurs in a very short time frame, and the CH_4 emissions are produced by regurgitation. In other words, enteric fermentation is the digestive process characteristic of ruminant animals by which the feed is fermented in the digestive tract, producing compounds which are assimilated by the animal, simultaneously with the emission of methane, as a by-product. Lower emissions are also produced by manure (8.9% of the total CH_4 emissions of farm activities).
According to Herrero et all (2015), in order to reduce the inconvenience of the environment of animal husbandry, it is sustained the modification in the human diet, respectively to reduce the consumption of meat where it is excessive.
Within the new realities of climate change, in order to allow the transformation and reorientation of agricultural systems in the sense of food security, the challenge is launched towards the transition to intelligent agriculture, supported by appropriate technologies and practices. Of course, the objectives of this ambitious endeavor must be sustained both at national, regional and global levels.
For progress in reducing gas emissions from agriculture, the research uses innovative estimation methods and quantifies the uncertainty of the common emission factor database (CGIAR, Research Program on Climate Change).
Within the European Union and in Romania in particular, the studies related to the animal breeding sector and most specifically referring to the herbivorous sub-sector, are carried out using analysis and synthesis methods. Logical deduction is also used, in order to complete the statistical investigation.
This paper is based on the specialized publications on the above-mentioned topic, but the ideas put forward belong to the authors. The various aspects are tackled in a scientific manner.

Results and discussions

In time, the Romanian zootechnical sector was characterized by variations in its production (Fig. 1).

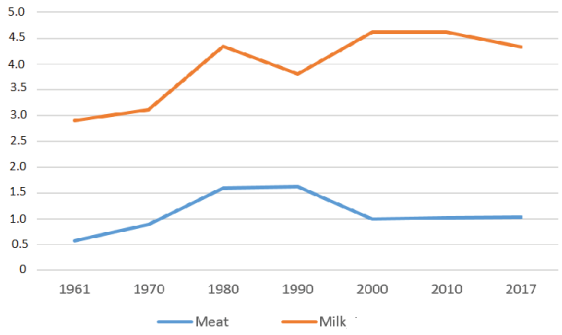

Figure 1. Meat and milk production of the Romanian zootechnical sector (million tons)

Source: knoema.com

The milk production of Romanian farms went down by 3.5% in 2017, and the meat production also decreased by 2.7%. In spite of this, the milk production obtained in Romania in 2017 accounted for 2.6% of the milk production in the EU-28, while the country's meat production (beef, pig and chicken) represented 5% of the EU-28 meat production.

These results are due to the species and numbers of animals in the agricultural holdings. Figure 2 indicates that according to EU-28 statistics, the numbers fluctuated upwards (in the case of pigs and bovine animals in 2017) or downwards (sheep and goats in 2017), the situation being influenced by the appearance of certain animal diseases, but also by the political environment.

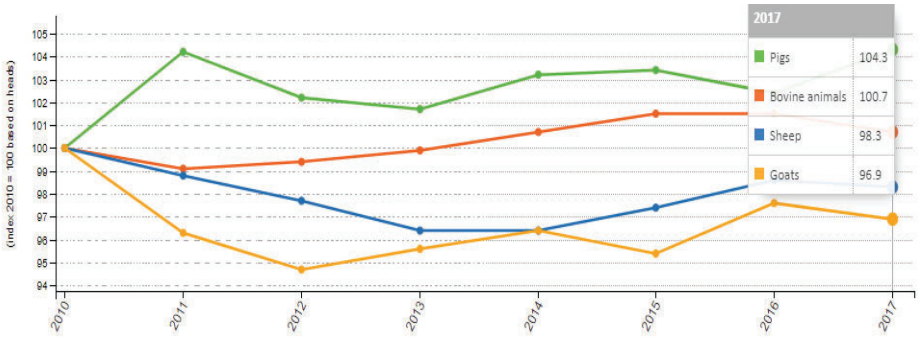

Figure 2. Livestock population, EU-28, 2010-2017

Source: Eurostat's publication Agriculture, forestry and fishery statistics – 2018 edition

The developments noticed in this field are due to the reduction of the workforce (in terms of numbers) and the introduction of technology, in parallel with the improvement of the breeds and their differentiation in terms of production. Such aspects promote industrial animal breeding.

In order to clarify the position occupied by Romania and its trend in terms of animal breeding, the evolution of the livestock "accused of amplifying the greenhouse effect" is presented in Figures 3 and 4.

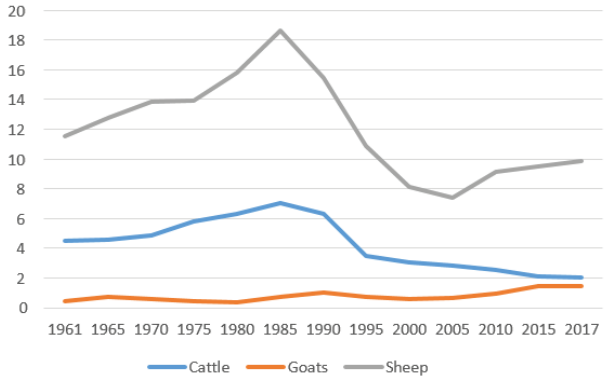

Figure 3. Ruminant livestock in Romanian (million heads)
Source: Bran (2019); FAOSTAT

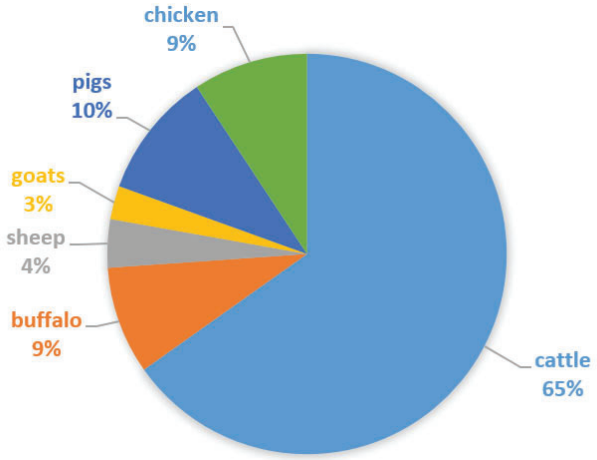

Figure 4. Structure of greenhouse emissions by animal species
Source: knoema.com

In 2005, the structure of the emissions by zootechnical farm activity was also recorded (Fig.5). It revealed that taken together, food preparation and enteric fermentation characteristic of the ruminants' digestion produce 76% of the GHG total of the respective farm. The animal feed used on farms is coming from the vegetation of meadows and pasture lands (more than half of the area of the world land is used for animal breeding, which benefits from the goods and services of the environment), as well as from the residues of vegetal farms and of the food industry which cannot be processed as food products. Farmers should take into consideration the reduction of livestock in favour of improved, healthier breeds, in order to foster a higher production.

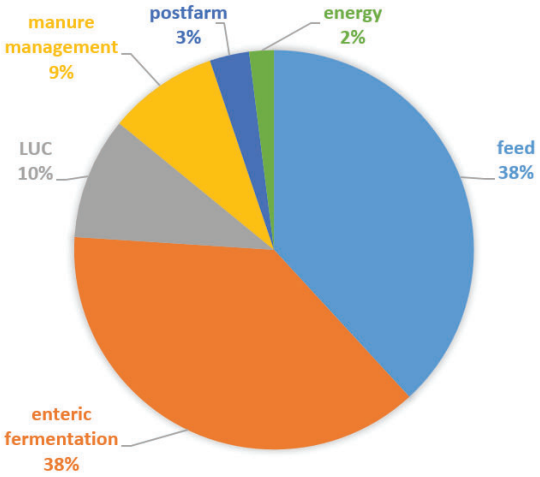

Figure 5. Greenhouse emissions caused by activities on the animal breeding farm
Source: knoema.com

Methane prevails among the gases with a greenhouse effect (42.3% in 2005: according to the same source). An experiment has shown that a bovine animal emits 9.87 t of manure per year (the annual average on a sample of 53 localities in Calarasi County – an APRA 2002-2004 project). However, the quantity of manure is influenced by a variety of factors (breed, age, ration, technological system, etc.) and consequently the manure mean per capita is much higher. Managing such waste is compulsory and, being a complex organic matter, it must enter the economic circuit though its value.

Methane emissions together with the other gases (CO_2, NO_2, etc.) have determined the climate changes which were noticed due to their effects on ecosystems, the economy and human health. Therefore, keeping the planet below the dangerous level of global warming can only be achieved by reducing the emissions. In this sense, the long term strategic vision of the European Commission (28.11.2018) stipulates a prosperous, modern, competitive and neutral economy from the climate point of view by 2050.

As a consequence, by the end of 2019, Romania and the other EU Member States are obliged to adopt integrated national plans regarding the climate and the energy for the 2021-2030 period.

The techniques that scientists already know and help for reducing the emissions of greenhouse gases produced by animals are promoted in the economic environment so that farmers are aware of the importance of their work and for the benefit of the health of the environment. In this sense, it is acted by administering more digestible feeds, by better managing the manure and avoiding deforestation in order to increase the surfaces destined for the production of animal feed. Thus, the management of this sector promotes sustainability. But the essential element of this is to create proper political environment and incentives. As an offer, subsidies and taxes can be used to help reducing emissions and changes in land use.

Conclusions

This economic branch has the capacity to transform the local natural resources (land, water, crops) into substantial income for the producers. At the same time, there is a positive impact on the consumers, as long non-polluting production systems and structures are used in agriculture, combining the market needs with those of the natural environment. Within this framework, agriculture should be seen as a priority national economic branch, since people need food on a daily basis, and food self-satisfaction policies and a positive trade balance are being promoted worldwide. Animal breeding and consumption of animal products have social, cultural and economic benefits, but also environmental costs.

The intensity of the emission which are produced is closely related to how efficiently the farmers use the natural resources and the production systems.

Besides the agricultural system used, the situation of the CH_4 emissions resulting from waste fermentation (manure) can be kept under control on condition the waste is stored and used in bio-gas installations which can then supply the farmer's household with energy.

As climate change and average temperatures continue to rise, animals will suffer from heat stress, more pests and diseases, as well as poor quality and food availability. The measures which should be taken are related not only to the issues related to the agricultural production, but also to the rural areas as a whole.

The approaches regarding the reduction of CH_4 emissions should take into consideration the economic impact on the farm profitability and the relationship between enteric CH_4 and the other GHG gases.

These conclusion are to be considered by the farm managers who, besides animal breeding, are also concerned with the ecological economic development of the rural area. Improving the agricultural technologies and practices may contribute to reducing the greenhouse effect.

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