AGRICULTURAL WASTE MANAGEMENT

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RESEARCH ARTICLE

Abstract
This study aimed to assess the diversity of food animal and vegetal waste generation generated by the agricultural sector in EU countries. The statistical data used in the study were collected from EUROSTAT. Data were subjected to quantitative analysis using descriptive and parametric statistics. It was found that waste of food animal and vegetal origin has the largest share in the structure of waste from the agricultural sector.

Keywords: agriculture, animal food waste, vegetal waste, waste, biomass
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INTRODUCTION

Nowadays, due to the increase in consumers' demands for food, the amount of waste has constantly increased, a fact that leads to environmental, social, and economic impacts [1].

Agricultural waste is that waste produced as a result of various agricultural processes, it refers to organic waste, represented by vegetal and animal food waste.

The management of these categories of waste must be carried out responsibly to maintain a healthy environment, otherwise, they are pollutants of surface and groundwater and also of air. Moreover, it was shown that agricultural waste can responsibly be used for the removal of other pollutants from the environment [2-4], or as alternative fuels [5].

Vegetal waste, known as biomass, has great potential to produce sustainable energy from renewable fuels, and agriculture is responsible for generating the largest production of biomass [6-9].

The present study has attention to the amount of total agricultural waste, yearly generated by European countries, as well as the share of animal food and vegetable waste.

MATERIAL AND METHOD

Statistical data used to identify and assess the spatial diversification of waste generation by the agricultural sector were collected from EUROSTAT (https://ec.europa.eu/eurostat/data/database).

The research period covered the year 2020. As part of the information, there is no statistical data for Albania. The highest proportion of vegetal waste was 2.34% in 2020.

Statistical data taken into account when conducting the research shows that from 2004 to 2018 the amount of waste was constant towards a slight increase calculated in 28 countries of the European Union. Statistical data were analyzed for 28 countries of the European Union and 27 countries of the European Union after the United Kingdom left the EU.

RESULTS AND DISCUSSIONS

In the first stage of the research, the analysis covered the total waste generation by the agricultural sector. In 2004, a total of 2.547.590.000 t of agricultural waste were generated in the European Union, 28 countries, and 2.248.790.000 t for 27 countries, without the UK. From 2010 we found dates for animal food waste and vegetal waste, as follows 22.940.000 t were animal and food waste, representing 1,06% of the total waste generated in EU 27 countries, and 44.750.000 t was vegetable waste, representing 2,02% of the total waste generated in 27 countries of the EU.

It should be said that agriculture is a sector that generates relatively small amounts of waste compared to the importance of agriculture in a country's national economy.

Analyzing the statistical data, we notice that the amount of waste was constant towards a slight increase calculated in 28 countries of the European Union. However, we can see a decrease in the amount of waste reported to 27 countries of the European Union without the United Kingdom, reaching in 2020 a decrease of

4.35% compared to 2004 as it can be seen in Figure 1.

Regarding food animal waste and vegetable waste, there are no data in EUROSTAT statistics until 2010.

From 2010 to 2020, an increase in the amount of animal food waste and vegetable waste can be observed but compared to the total waste generated at the level of the European Union, the amount increased by 3.68%, a relatively low value.

Figure 1 **Total amount of waste**

As shown in Figure 2, animal food waste had a significant increase in 2020 compared to 2010 by 9.72%, demonstrating that this type of waste is not properly managed. Regarding animal food waste, statistics for 28 European Union countries, including the UK, show a decrease until 2014 and an increase again until 2018.

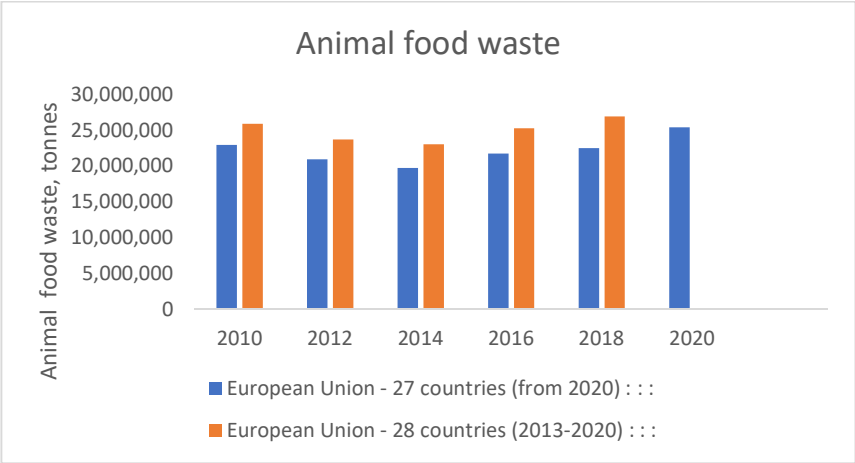

Figure 2 **Animal food waste**

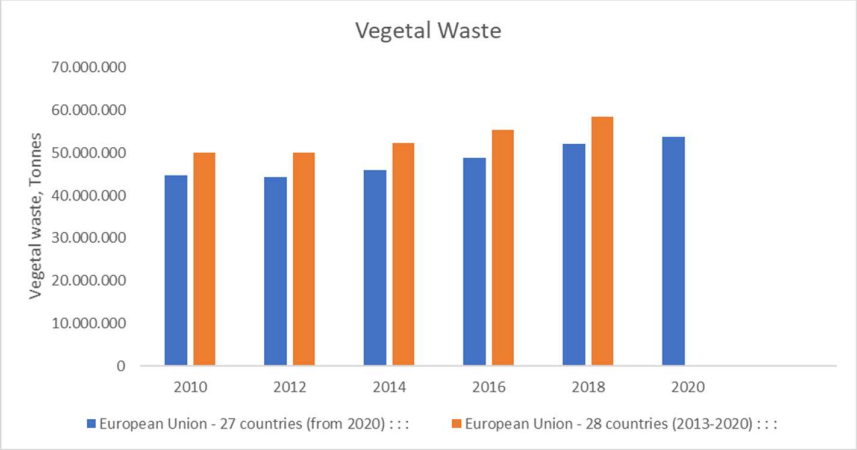

Figure 3 **Vegetal waste**

Vegetal waste amounts to a significant increase in European Union countries reported between 2010 and 2020, this time also highlighting the fact that for the 27 countries of the European Union, the amount of vegetable waste is 16,82 % higher in 2020 than the amount of vegetal waste generated by 27 countries of the European Union, in 2010, as presented in Figure 3.

CONCLUSIONS

The study aimed to identify and evaluate the generation of food animal and vegetal waste in the agricultural sector in EU countries, as well as to highlight this type of waste from the total waste generated at the level of the European Union, with and without the UK. Following the research carried out, it was shown that in 2020, out of the total of 2,150,950,000 t of waste, animal food waste represents 1.18% and vegetable waste represents 2.5%, reduced amounts of waste generated by the agricultural sector, considering the importance of the agriculture in the European and world economy. Therefore, it is a sector that is important for the development of the circular economy.

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