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**Challenges in Environmental Goods  
and Services Sector in Romania**

Bianca Eugenia LEOVEANU-SOARE<sup>1</sup>

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**Abstract**

*The current challenges posed by globalization have led to changes in technology and new priorities for economic policies. Pollution and current patterns of resource use are unsustainable. The players involved have paid more attention to the environmental sector because it has a major role in the transition of economies to sustainable development. Economic growth is influenced by environmental conditions. The paper aims to study the evolution of the environmental goods and services sector in Romania, in 2014-2017. The paper analyses data related to the value of output in the environmental sector, employment and the value of exports. The number of people involved in this domain decreased by 16%, from 190,883.81 FTE (full-time equivalent) to 159,542.79 FTE in the period analysed. Regarding the output value from the total activities, it had an oscillating trend, and the environmental domains from CReMA (Classification of Resource Management Activities) registered the highest values compared to those from CEPA (Classification of Environmental Protection Activities). In the case of exports, there is a slight increase in environmental services from RON 13,630.51 million in 2014 to RON 14,555.15 million in 2017. Thus, Romania should focus more on the environmental goods and services sector as it can contribute to the growth of the national economy and can be an important pillar in the development of green economy.*

**Keywords:** environment, environmental goods and services, employment, export.

**JEL Classification:** Q01, Q56, F18, F6, O44

**1. Introduction**

The environmental goods and services sector (EGSS) represents those production activities of a national economy that generate environmentally friendly products. These products are manufactured for the purpose of environmental protection and resource management. The current challenges posed by globalization have led to changes in technology and new priorities for economic

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<sup>1</sup> Bucharest University of Economic Studies, Bucharest, Romania, bianca.soare@eam.ase.ro.

policies. The environmental goods and service sector is one of interest for the decision makers as it represents a sector with growth potential.

Interest in the sector of environmental goods and services was initiated in the early nineties by the Organization for Economic Cooperation and Development (OECD) and the European Commission and in 1999 “The Environmental Goods and Services Industry: Manual for Data Collection and Analysis” was released. The Regulation (EU) no. 691/2011 on European environmental economic accounts establishes a common framework for the collection, compilation and transmission of data on environmental accounts. The legal basis for the development of accounts in the environmental goods and services (EGSS) sector in the European Union is the Regulation of the European Parliament and of the Council (EU) no. 538/2014 of April 16<sup>th</sup>, 2014 amending the Regulation (EU) no. 691/2011 on European environmental economic accounts (EC 2014). According to the OECD/Eurostat (1999) definition, the environmental industry consists of activities that produce goods and services for measuring, preventing, limiting, minimizing or correcting environmental damage to water, soil aeration, and waste issues, noise and ecosystems.

The main benefit from this sector is the fact that it has a major role in the transition of economies to sustainable development. Also, advantages in this sector can be in the employment and national welfare. The concern for environmental issues has increased and it has economic implications, on the one hand there are opportunities in this sector and on the other hand the costs in the field are increasing. Therefore, it is important to understand how this sector influences the economy through environmental protection and newly created jobs. Thus, the objective of the study was the evolution of the environmental goods and services sector in Romania in 2014-2017.

## **2. Problem Statement**

Current global trends in the state of environmental factors have led to greater concerns about reducing risks due to imbalances between humans and nature, as anthropogenic activities have led to environmental pressures. Human life, as well as the economy, depends on ecosystem of environmental goods and services (EGS) that influence the well-being of individuals and communities (Summers et al., 2018).

The consolidation of the process of development and economic growth in the medium and long term in Romania can be done simultaneously with the transition to an economic model that has a negative impact as low as possible on the environment and the balances of natural ecosystems.

There is a growing recognition that new technologies and other innovations can provide a tangible means to achieve sustainability. The EGS sector provides technologies, goods and services to reduce environmental impact and increase resource productivity in a wide range of economically critical industries (NSW Government, 2019). Also, environmental industries bring economic and employment benefits (Zhou & Moinuddin, 2015).

Romania's capacity to provide efficient public infrastructure and services in the field of environmental protection, both at national and local level, is an important factor in stimulating and supporting sustainable economic development (Frone, 2012).

EU guidelines indicate the need to focus on environmental activities and products (Eurostat, 2016). Green economy indicators are useful tools for informing policy-makers and transitioning to an ecologically stable society, but also an economically solid and equitable one (UNEP, 2012).

The environmental goods and services sector is a sub-set of the whole economy (Eurostat, 2016). Environmental protection includes all activities and actions which have as their main purpose the prevention, reduction and elimination of pollution and of any other degradation of the environment. Those activities and actions include all measures taken in order to restore the environment after it has been degraded. The environmental goods and services (EGSS) sector, also called the environmental economy or eco-industries, refers to producers of goods and services aimed at protecting the environment and managing natural resources. The EGSS provides technologies, goods and services to reduce environmental impact and increase resource productivity of a wide range of industries in the national economy. It is also seen as a key ingredient of industrial competitiveness, trade advantage and social stability in a world where the pressure to protect environmental resources is increasing (Sinclair-Desgagné, 2008). It includes both environmental protection activities (e.g., those aimed at reducing the negative impact on the environment) and resource management (conservation and reduction of natural resource depletion) (Eurostat, 2018).

The EGSS framework developed by Eurostat (2009) provides descriptions and specifications of activities to be considered as environmental activities (UNEP, 2012) and it is a vital tool for facilitating the greening of the economy due to the innovations in this sector. Environmental economic accounts have been designed to better reflect both the contribution of the environment to the economy and the impact of the economy on the environment (Rosiek, 2017). It is also a means of monitoring economic pressures on the environment and exploring how they could be mitigated (Eurostat, 2019).

The environmental goods and services sector consists of companies and institutions that are involved in activities related to the measurement, prevention, limitation, minimization or correction of environmental damage to water, air and soil, as well as problems related to waste, noise and ecosystems (OECD, 1999; Eurostat, 2009). Environmental goods and services are those produced for the purpose of environmental protection, i.e. the prevention, reduction and elimination of pollution and any other degradation of the environment, as well as the management of resources, i.e. the conservation and maintenance of the stock of natural resources and therefore the protection against depletion (EU Regulation no. 538/2014).

The increased awareness of the need to combat environmental pollution and conserve natural resources has led to an increase in the supply and demand

for environmental goods and services (Broniewicz, 2016). There is a clear international requirement to measure progress towards a green economy and, in this regard, to understand the contribution of the environmental goods and services sector to economic growth (Livesey, 2010).

The provision of goods and services to reduce pollution or manage environmental resources has largely become the main activity of specialized private firms (Sinclair-Desgagné, 2008). The global market for environmental goods and services is expected to rise to US\$ 1.9 trillion by 2020 (Blazejczak et al., 2009).

The transition to an ecological economy is also due to the growth of the markets for environmental goods and services. And the sector can reveal other potential opportunities and challenges in this sector (ITC, 2014). Georgeson & Maslin (2019), suggest that countries should consider developing energy, environmental and educational policies relevant to the green economy, in order to remain competitive in these areas.

Economic variables in the environmental sector are reported according to their relevant environmental domain. Thus, environmental protection activities are divided into environmental domains using the Eurostat classification (2016):

- The Classification of Environmental Protection Activities (CEPA 2000):
  1. Protection of ambient air and climate, 2. Wastewater management, 3. Waste management, 4. Protection and remediation of soil, groundwater and surface water, 5. Noise and vibration abatement, 6. Protection of biodiversity and landscapes, 7. Protection against radiation, 8. Research and development (R&D), 9. Other environmental protection activities
- The Classification of resource management activities (CReMA):
  10. Management of water, 11. Management of forest resources, 12. Management of wild flora and fauna, 13. Management of energy resources, of which: 13A. Production of energy from renewable sources, 13B. Heat/Energy saving and management, 13C. Minimisation of the use of fossil resources as raw materials, 14. Management of minerals, 15. Research and development activities for resource management, 16. Other resource management activities

The Statistical Classification of Economic Activities in the European Community, Rev. 2 (2008) (NACE Rev. 2) is the standard to report data by industries. Compiling and reporting EGSS data broken down by NACE is a fundamental condition for comparability of the EGSS accounts with other statistical systems such as national accounts (Eurostat, 2016). The activities of national economy are: A - Agriculture, forestry and fishing, B - Extractive industry manufacturing industry, C - Manufacturing industry, D - Production and supply of electric and thermal energy, gases, hot water and air conditioning, E - Water supply, sewerage, waste management and remediation activities, F - Construction, H - Transport and storage, public administration and defence; social insurance from the public system.

The interest of economic agents for ecological concerns has increased. The role of the environmental protection sector as a sector producing goods and services results from factors that influence the environmental economy such as: the positive evolution of environmental expenditure, increased investments, the employed labour force (Camasoiu, 1992).

The assessment of the economic and employment impact of the EGSS can be considered an effective way of measuring progress in greening the economy (Zhou et Moinuddin, 2015).

### **3. Research Questions / Aims of the Research**

Given the global awareness of the importance of environmental sustainability, the demand for environmental goods and services has grown rapidly. The purpose of the paper was to present an overview of the market for environmental goods and services in Romania. The study aims to draw attention to the impact of raising awareness, regulation and enforcement of environmental laws. Thus, the paper helps estimating the share of ecological economic activities and benefits to the economy through added value, employment and exports. The analysis of these variables will help in understanding some aspects of the environmental goods and services sector, such as the growth potential, the potential for the labour market through jobs, export development, the efficiency of the sector.

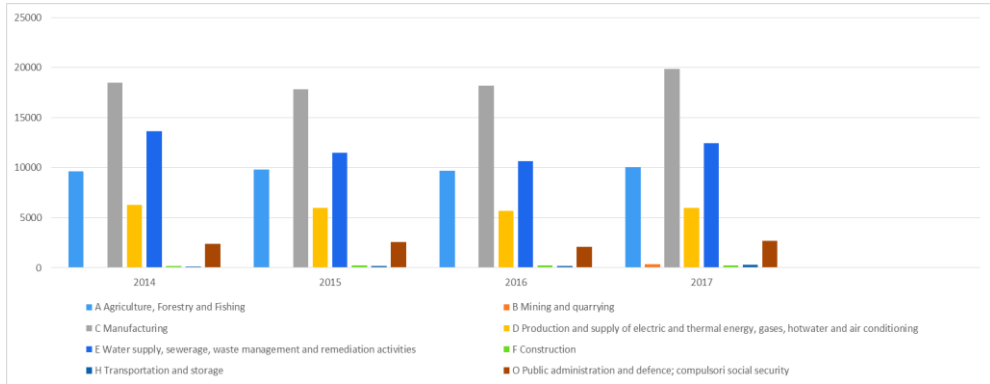
### **4. Research Methods**

The environmental goods and services sector (EGSS) is considering the development of statistical indicators in the field of environmental protection, but also of resource management. Thus, the economic variables studied for the presentation of the performances in the field were the output value, the turnover, the number of employees and exports. Their analysis will provide information on the main areas of specialization for environmental producers. Data were taken from existing official statistics such as the National Institute of Statistics. The data are presented from 2014 to the last available year. To determine how important the goods and services sector is, a Pearson correlation was made between the variables output value and exports. To establish the connection between the two variables, it was performed an analysis using the SPSS software version 20.

### **5. Findings**

The value of production is the value in basic prices of environmental goods and services available for use outside the production unit or for its own final consumption and environmental goods that remain in stock at the end of the period in which they are produced (NIS, 2010).

Figure 1 presents the value of production by activities of the national economy.

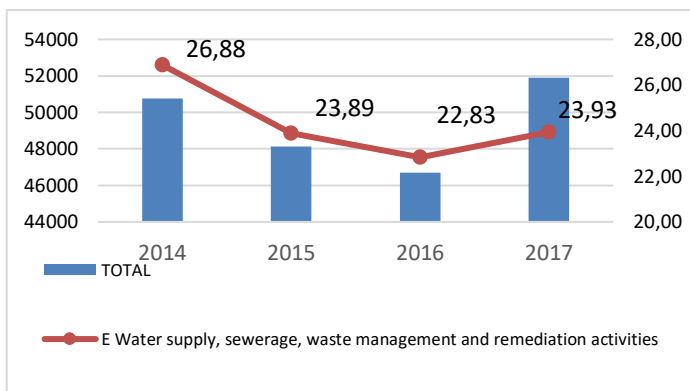


**Figure 1. Output value by activities of the national economy (million RON)**

Source: NIS, accessed on 15.07.2020

It is found that in each year of the analysed period, the highest values were recorded in the case of the activity C - manufacturing. These are followed by E - water supply, sewerage, waste management and remediation activities. These industries are important for the national economy and contribute to the well-being of the nation. The fact that the output from the activity E is high, demonstrates Romania's interest in the environmental sector and that the country is making efforts in this regard.

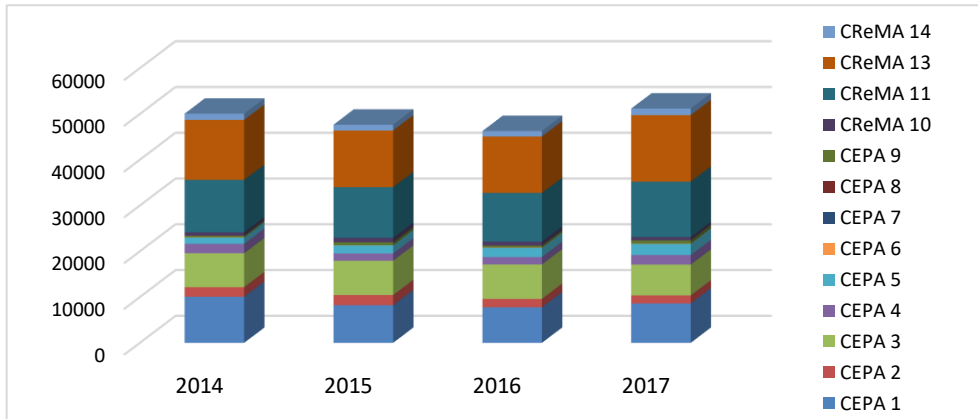
The environmental sector is one of global interest. In order to determine the importance of this sector in the activities of the national economy, it was determined the share of environmental services in the total activities (figure 2). Thus, it is found that from the total value of the EGSS in the total activities of the national economy, those from activity E represent approximately a quarter.



**Figure 2. Share of output value of the activity E in the total value of the activities**

Source: NIS, accessed on 15.07.2020

The value of production of the environmental goods and services sector by environmental domains is presented in fig. 3.

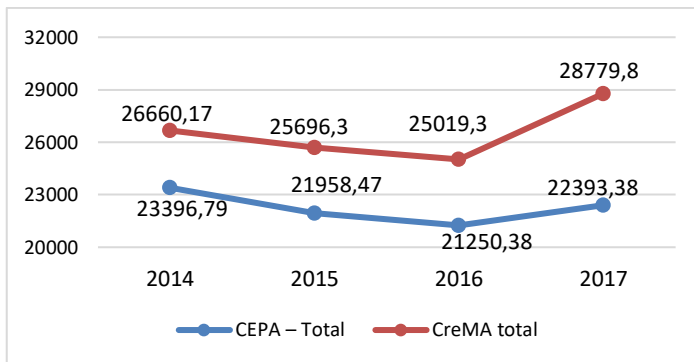


**Figure 3. Output value of the environmental goods and services sector by environmental domains (million RON)**

Source: NIS, accessed on 15.07.2020

Thus, the highest proportions are found in the case of CEPA 1, CEPA 3, and the largest resources are held by CReMA 11 and CReMA 13. In the analysed period, their value was constant in almost all areas of the environment.

Regarding the total value of production from all activities, this can be found in figure 4. The largest share is held by the management activities - CReMA. They have an upward trend, increasing by approximately RON 2 million. In the case of environmental protection services CEPA, a slight decrease is noticed in the analysed period.



**Figure 4. Output value of the activity E by environmental domains - million RON**

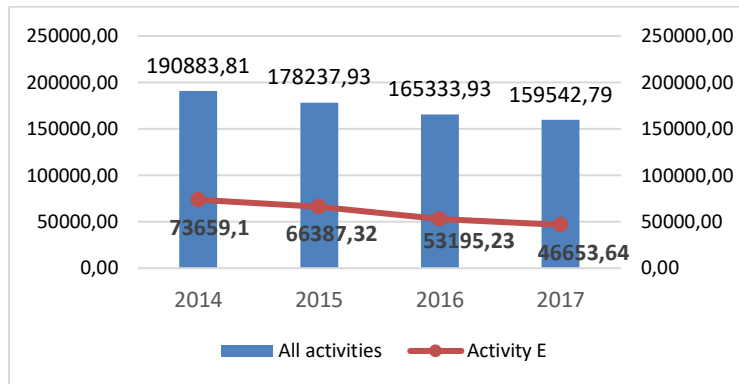
Source: NIS, accessed on 15.07.2020

Employment is measured in full-time equivalents (FTE) and is the number of full-time equivalent jobs, defined as total hours worked divided by average annual hours worked in full-time jobs (Broniewicz, 2016). The EGS sector employs an increasing proportion of the global workforce (NSW Government, 2019). The growing share of the EGSS in employment (and GDP) reflects the transition to an

economy that aims to reduce the pressure on the environment and natural resources and contributes to reducing unemployment.

In the European Union (EU), the output-GDP ratio of the EGS sector increased by almost two percentage points between 2000 and 2014 (Eurostat, 2018) and created over one million new full-time equivalent jobs (NSW Government, 2019).

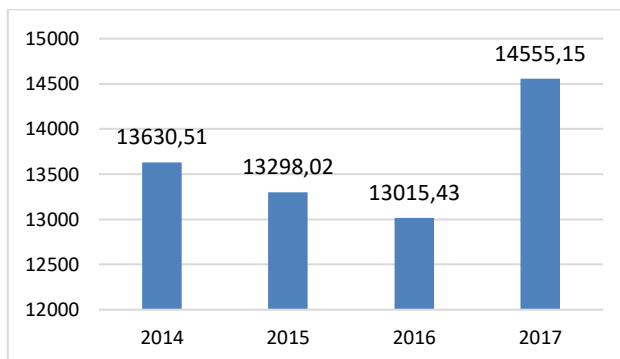
EGGS employment in Romania decreased from 190,883.81 FTE in 2014 to 159,542.69 FTE in 2017, meaning a decrease by 16% (figure 5). Regarding the employment in activity E, the trend is also a downward one, the decrease being significant, from 73,659.1 FTE in 2014 to 46,653.64 FTE, i.e. 36% in 2017.



**Figure 5. Population employed in all activities of the national economy and in activity E (FTE)**

Source: NIS, accessed on 15.07.2020

Regarding the total exports of environmental goods and services from all activities of the economy, they are represented in figure 6. Thus, in 2017 there is an increase in these exports, after in previous years it registered lower values. The percentage increase is 6% in 2017 compared to 2014.



**Figure 6. Total exports of environmental goods and services (million RON)**

Source: NIS accessed on 15.07.2020



As other authors have found, in Romania the goods and services of environmental production are the main exported products (Broniewicz, 2016).

The challenges in the environmental goods and services sector are closely related as well to the well-being of a country. Thus, a correlation was made to determine the link between output value and exports. It was started from the hypothesis that this correlation is a positive one. To test the hypothesis, the Pearson correlation was performed. The correlation is positive and strong, the Pearson correlation coefficient is 0.922 (Table 1.). The high level of this coefficient reveals the close connection between the two variables. The relationship between the two is directly proportional. Therefore, the higher the output value of goods and services, the higher the exports and vice versa.

**Table 1. Pearson Correlation between output value and exports**

|                |                     | <b>Output</b> | <b>Exports</b> |
|----------------|---------------------|---------------|----------------|
| <b>Output</b>  | Pearson Correlation | 1             | .922*          |
|                | Sig (1-tailed)      |               | .039           |
|                | N                   | 4             | 4              |
| <b>Exports</b> | Pearson Correlation | .922*         | 1              |
|                | Sig (1-tailed)      |               | .039           |
|                | N                   | 4             | 4              |

\*Correlation is significant at the 0.05 level (1-tailed)

## 6. Conclusions

From this study, it can be concluded that in Romania, in the period 2014-2017 the value of production increased and employment decreased. However, the increase in output value of EGS also generated an increase in exports. A better understanding of this rapidly and dynamic changing sector could open up new opportunities for both employment and exports and could make greater contributions to the national economy. The EGS sector is one which can be innovated both in research and in industry through new products, “cleaner” technologies, investments in infrastructure and incentives for research and development, but also through newly created jobs. Also, it can represent a growing competitive advantage for developing countries. In the EGS sector, the challenge is represented by the fact that the development of this sector depends on the efficient exploitation of the natural and human capital so as to ensure to Romania a sustainable economic growth, a balance between environment and nature. Romania is aware of the potential of the environmental goods and services sector and is making efforts to improve it because this sector can be an important pillar in the development of green economy.

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