# THE RELATIONSHIP BETWEEN THE ENVIRONMENT-CLIMATE CHANGES-ECONOMY

**IOANA ANDA MILIN*[1], IULIANA IOANA MERCE[1], COSMINA TOADER[1], CIPRIAN RUJESCU[1]**

***Banat's University of Agricultural Sciences and Veterinary*** Medicine ***"King Michael I of Romania" from Timisoara, Faculty of Management and Rural Tourism***

*Corresponding author's email: andamilin@usab-tm.ro

***Abstract:*** *In ecology the notion "environment" directly refers to the environment that sustains life on Earth, to the environment where the man developed and lives, the society on the whole. In the modern civilization, supertechnologised, it's easy to forget that the economy, the engine of our existence,depends, on its integrity, on the systems and natural resources of Earth. The climate changes represent one of the biggest challenges that humanity makes, that can produce devastating effects on the environment. The human activities contribute significantly to the rise of the greenhouse emissions into the atmosphere determining a change in it'scomposition, the global warming and other coastal effects, all of these having implications and costs on the economy. This material presents all the main practical aspects that refer to the quality of the environment of our country, organizes the directions of action related to the climate changes and the problems generated by them, as well as the costs that they generated.*

***Key words:*** *challenges, natural system, climate, quality, action*

## INTRODUCTION

The environment can be defined in multiple ways. Thus, it can be considered:

-"A living, enormous and very complex machine, which constitutes a thin dynamic layer on the earth's surface, and each human activity depends on the perfect state and proper functioning of this mechanism".[3]

-"a *chameleon-notion*,which knows countless valences and is used with different meanings by environmentalists, economists, lawyers, politicians, etc." [1]

-"..... both the natural and the artificial environment (economic, social, and aesthetic) in which man carries out his entire activity, increasingly rich and complex". [6]

The surrounding environment best describes the degree of civilization of the societyin which they live. A number of environmental threats(resource constraints, inequality of access to them, alarming industrialization, population growth in poor regions of the globe, etc.) can contribute to creating a climate of insecurity, leading to various conflicts at regional and global level. According to current global developments, environmental security is an integral part of the national security of every country. [2,7,8]

## MATERIALS AND METHODS

The concepts of environmental security and quality cover a fairly wide range (e.g.ecological consequences of armed conflicts, consequences of environmental disasters, consequences related to inadequate water resources, consequences for chemical waste, etc.). The EU has among the highest environmental standards in the world, which have been developed over a relatively long period of time. Environmental policy helps the EU economy to become greener, protects the continent's natural resources and seeks to protect the health and well-being of people living in the EU. [4,8,11,5]

A main cause of environmental insecurity is climate change, which is seen as a consequence of economic activities (burning of fossil fuels, changing land use, etc.). Climate change is a huge challenge for the world economy. In this regard, the EU formulates and implements climate change policies and strategies, playing an important

role in international climate negotiations (Paris Agreement, EU Emissions Trading System (EU ETS). [12,13]

Based on these considerations, in the paper, we look at the main problems facing our country in the field of environmental protection, climate change and seek to point out the consequences that cause these imbalances on the economy (effects, expenses, taxes).

## RESEARCH RESULTS

In relation to the environment, we believe that in our country the main problems are related to water quality, connection to sewage and water supply systems, waste water management and pollutant emissions.Water quality assessment consists in the evaluation of specific parameters (biological, physico-chemical, pollutants discharged in significant quantities, etc.). 5 quality classes are distinguished (I= Very good- V=bad). Statistical data show the following developments:

**Table1.**

**Surface water quality by quality classes (Km)**

| | | 2010 | 2015 | 2017 |
|---|---|---|---|---|
| **Total** | **Total lengths on supervised rivers** | 41116 | 37111 | 37605 |
| | **Category I** | 708 | : | : |
| | **Category V** | 178 | 192 | 589 |

*Source : Processing after [14,15]*

As can be seen between 2000 and 2017 the total km of supervised rivers has decreased, and a good part of them are in the lower quality category- with negative effects on the quality of the environment.

**Table 2**

**Population connected to sewerage system ( Number of persons)**

| | 2010 | 2015 | 2019 |
|---|---|---|---|
| **Total** | 11931011 | 12634419 | 13728144 |

*Source: Processing after [14,15]*

In 2019, 10,514,924 inhabitants had their homes connected to sewerage systems, representing 54.2% of Romania's resident population, 221,883 more than in 2018. In terms of wastewater treatment, the population connected to sewage systems equipped with sewage treatment plants was 10,264,302 people, representing 52.9% of the country's resident population, 229,014 more than in 2018. The increases were determined by the connection of the population to the newly built sewerage networks, i.e. the commissioning of new wastewater treatment plants.

**Table 3.**

**Population deserted by the public water supply system ( Number of persons)**

| | | 2010 | 2015 | 2019 |
|---|---|---|---|---|
| **Sewerage systems** | **Total** | 9314022 | 9471584 | 10514924 |

*Source: Processing after [14,15]*

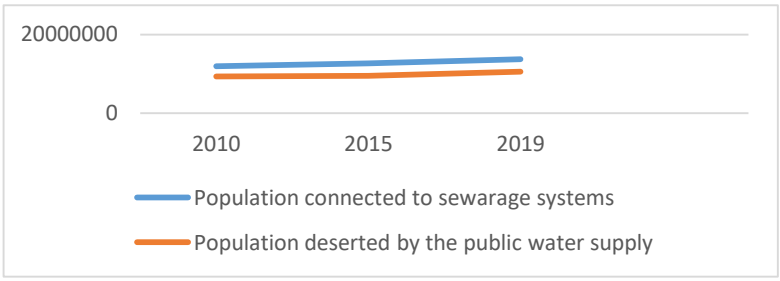



**Figure 1. Number of persons connected to severage system and water supply system**

*Source: Processing after [14,15]*

In 2019 the population connected to the public water supply system was 13,728,144 people, representing 70.9% of the resident population of Romania, 212,518 more than in 2018. The increase was driven by the connection of the population to the newly built water supply networks.Waste water/household water is both a problem and a resource with a big impact on the life of communities.

**Table 4.**

**Waste water volume (Millions cubic meters/year)**

| Activities | 2010 | 2015 | 2019 |
|---|---|---|---|
| **Total, of which:** | 4874,01 | 1942,75 | 1896,28 |
| Agriculture, forestry and fishing | 3,52 | 1,83 | 2,0 |
| Mining industry | 63,43 | 51,56 | 36,97 |
| Food industry | 32,87 | 25,16 | 21,55 |
| Metallurgical industry | 173,23 | 93,91 | 83,23 |
| Transport | 5,46 | 5,84 | 6,23 |
| Textile | 8,2 | 5,14 | 3,57 |
| Cellulose and paper | 9,1 | 3,46 | 3,5 |
| Chemical and petrochemical industry | 115,12 | 70,28 | 66,2 |
| Production and distribution of electricity | 3105,7 | 551,61 | 562,25 |
| Construction | 4,28 | 7,44 | 7,36 |
| Industrial waste water - Total | 3794,53 | 1005,25 | 966,13 |
| Household waste water - Total, of which: | 1079,48 | 937,5 | 930,16 |
| Other activities | 483,77 | 433,09 | 498,32 |
| Domestic activities | 595,71 | 504,4 | 431,84 |

*Source: Processing after* [14,15]

The importance of efficient waste water management is based on:

- ✓ the need to save the human and natural environment that is affected by pollution,
- ✓ the need to recycle essential resources from waste water,
- ✓ economic reasons, since poorly managed waste water has led to high economic costs and may act as a brake on further development investments
- ✓ the increase in the water crisis that is expected as a result of population growth, urbanization and climate change increases the importance of water reuse to maximise the feasible expansion.

Environmental protection encompasses more activities directed towards better maintenance or restoration of a clean environment, by collecting, recycling and treating waste, preventing emissions of pollutants, noises or reducing the presence of pollutants in the environment.

The analysis of environmental expenditure allows the evaluation of the effort made to prevent, reduce and eliminate pollution resulting from the production or consumption of goods and services. Expenditure on environmental protection shall sum up the investments and current expenditure made by the public administration, non-specialised producers and specialists.


**Figure 2. Total waste water volume (Millions cubic meters/year)**

*Source: Processing after [16]*

**Table 5.**

**Expenditure on environmental protection by environmental areas (lei )**

| | Environmental areas | 2010 | 2015 | 2019 |
|---|---|---|---|---|
| NON-SPECIALIZED MANUFACTURERS | Total | 4530102664 | 9262726285 | 6215116738 |
| | Air | 1092003384 | 2566323322 | 2168630589 |
| | Water | 555220162 | 2882498338 | 1387310473 |
| | Waste | 1025708807 | 927504108 | 1214704608 |
| | Soil and groundwater | 342610105 | 462849260 | 564147113 |
| | Noise and vibration | 18107194 | 12477559 | 9253560 |
| | Natural resources and biodiversity | 126765857 | 117076872 | 42135829 |
| | Other domains | 1369687155 | 2293996826 | 828934566 |
| SPECIALIZED MANUFACTURERS | Total | 9581681673 | 6229376078 | 7157534045 |
| | Air | 81468794 | 46195405 | 70690169 |
| | Water | 1080865772 | 161870062 | 355264495 |
| | Waste | 8285300880 | 5698136918 | 6543553723 |
| | Soil and groundwater | 108044421 | 31611907 | 159880780 |
| | Noise and vibration | 7476501 | 133984 | 11083 |
| | Natural resources and biodiversity | 1472948 | 123186 | 3241347 |
| | Other domains | 17052357 | 291304616 | 24892448 |
| PUBLIC ADMINISTRATION | Total | 4293039662 | 4507532954 | 9207400001 |
| | Air | 107111616 | 226128802 | 2408084900 |
| | Water | 1046965851 | 852214562 | 1830800000 |
| | Waste | 659699758 | 3188986686 | 2993300000 |
| | Soil and groundwater | 64185981 | 40393843 | 612387305 |
| | Noise and vibration | 8022449 | 902507 | 507479419 |
| | Natural resources and biodiversity | 1261489140 | 110965828 | 2200000 |
| | Other domains | 1145564867 | 87940726 | 853148377 |

*Source: Processing after [14,15,9]*

**Table 6.**

**Share of domestic investments and expenditure for national environmental protection in Gross Domestic Product (%)**

| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|---|---|
| Investment | 1.0 | 0.7 | 0.6 | 0.6 | 0.4 | 0.3 | 0.3 | 0.4 | 0.3 |
| Current domestic expenses | 2.2 | 2.2 | 1.8 | 1.2 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |

*Source: Processing after [14,15]*

According to Eurostat, Romania makes among the lowest receipts from environmental taxes as a percentage of GDP**.** In addition, the proposal to supply the EU budget with revenues that penalise polluters activities is increasingly being raised in recent times.

**Table 7.**

**Environmental tax account (total activities) - Millions lei**

| **Tax Categories** | **2010** | **2015** | **2018** |
|---|---|---|---|
| Energy taxes | 9416.51 | 15740.05 | 17420.2 |
| Transportation taxes | 1685 | 1791.5 | 1307.3 |
| Pollution taxes | 15.9 | 20.5 | 23.9 |
| Resource Taxes | 48.3 | 16.0 | 20.1 |

*Source: Processing after [14,15]*

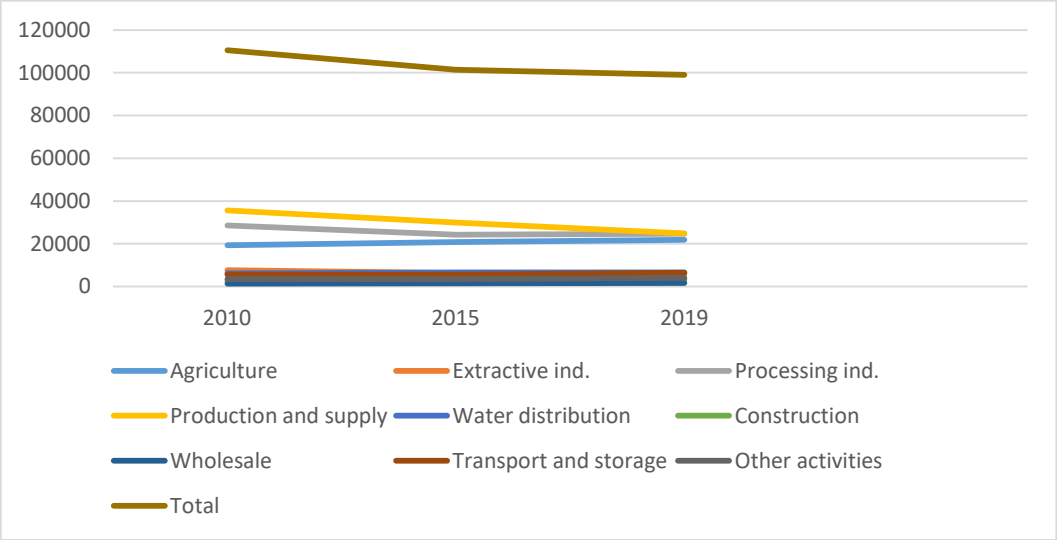
In the analysis of climate change we studied two indicators- the increase in gas emissions and average annual temperatures at national level.

The main cause of climate change is the increase in greenhouse gas emissions. To combat this cause reducing emissions has become a priority for all the countries of the world. Our country must act quickly both to combat the causes (by reducing emissions) and to reduce the effects (through adaptation). The benefits of measures to combat climate change, to adapt to various segments will ensure:

-an advantage for Europe in terms of innovation and development of cutting-edge technologies, thereby maintaining the competitiveness of industry and business,

- investments in the energy sector,

-strengthening energy security at European level.



| | 2010 | 2015 | 2018 |
|---|---|---|---|
| **Total** | 110506 | 101452 | 99085 |
| Agriculture, forestry and fishing | 19333 | 20742 | 21795 |
| Extractive industry | 7707 | 6361 | 5868 |
| Processing industry | 28624 | 24230 | 24627 |
| Production and supply of electricity and heat, gas, hot water and air conditioning | 35644 | 29898 | 24837 |
| Water distribution; sanitation, waste management, decontamination activities | 6126 | 6611 | 6631 |
| Construction | 2605 | 3114 | 3147 |
| Wholesale and retail trade; repair of motor vehicles and motorcycles | 1423 | 1484 | 1675 |
| Transport and storage | 5561 | 5511 | 6476 |
| Other economic activities | 3483 | 3500 | 4030 |

**Figure 3. Greenhouse gas emissions (Thousands of tonnes $CO_2$ equivalent) / total and activities**

*Source: Processing after Source: Processing after [14,15,16]*

The global market for green and low-carbon goods and services has also reached over EUR 4.000 billion and is growing steadily by more than 4% per year, which is an opportunity for European economies.

In order to control climate change, we constantly analyze climate fluctuations and develop projections of the evolution of the climate system both on a global scale and on Romanian scale.

**Table 8.**

**Average annual temperatures in Romania (Grade Celsius)**

| Weather Station | 1901 - 2000 | Year 2018 |
|---|---|---|
| Satu mare | 9.7 | 12.0 |
| Suceava | 7.5 | 9.3 |
| Oradea | 10.3 | 12.6 |
| Iasi | 9.5 | 10.8 |
| Cluj - Napoca | 8.4 | 10.8 |
| Targu Mures | 8.7 | 10.9 |
| Bacau | 9.1 | 10.3 |
| Timisoara | 10.7 | 12.9 |
| Deva | 9.9 | 11.7 |
| Sibiu | 8.7 | 10.8 |
| Varfu Omu | -2.6 | -0.4 |
| Galati | 10.5 | 12.3 |
| Targu Jiu | 10.2 | 11.9 |
| Buzau | 10.7 | 12.4 |
| Calafat | 11.5 | 12.9 |
| Turnu Magurele | 11.4 | 12.6 |
| Bucharest - Filaret | 11,0 | 12.9 |
| Constanta | 11.4 | 13.3 |

*Source: Processing after Source: Processing after [10]*

Data provided by the National Meteorological Agency show that the average temperature of the country in the last 60 in the period 1961-2019 the average annual temperature of Romania increased by 2.4°C.

Romania's climate could suffer significant changes in the coming decades. For the period 2021-2050, an increase in the average annual air temperature of up to three degrees in the summer, a reduction the average amounts of precipitation by about 10-15% in the summer months is expected and intensification of extreme meteorological phenomena (increasing the frequency and intensity of heat waves and increasing the rate of intensity precipitation).

## CONCLUSIONS

The environment is a notion that refers to the totality of natural conditions on Earth (or in a region of it), in which beings and things live and evolve.

Globalisation of environmental problems means a variety of difficulties that can only be significantly solved at international level.

The conclusion of international environmental agreements is usually a slow process, but in many cases it is the only solution that also gives long-term results.

Solutions must be forward-looking, incorporate risk prevention issues such as anticipating climate change (increasing the flood hazard) or progressively reducing dependence on fossil fuels.

## REFERENCES

**[1]. BORZEL TANJA**, 2007, Politicile europene de mediu între succes şi eşec, Institutul European

**[2]. CĂLIN R.,** 2007, Politica de mediu, Editura Triotonic

**[3]. COMMONER B**., 1990, Making Peace With the Planet, Ed.Pantheon **,**New York

**[4]. DUTU M.,** 2008, Dreptul urbanismului, Ed. Universul Juridic

**[5]. LEAUA ANA LIGIA**, 2010, Security and Sustainable Development - Strategic Environmental Information (II), National Institute for Intelligence Studies

**[6]. LEUA ANA LIGIA**, 2012, Provocări de mediu la adresa securității naționale - calitatea și gestionarea resurselor de apă. Annals of the University of Bucharest / Political science series, 14(1)

**[7]. IANCU G**., 1998, Drepturile fundamentale şi protecţia mediului,Editura RAMO

**[8]. MARINESCU DANIELA**, 1993, Dreptul mediului inconjurator, Editia a II-a, Editura Șansa

**[9]. MARINESCU DANIELA**, 2003, Tratat de dreptul mediului, Editura All Beck

**[10].** *** Contract de Prestări Servicii de Consultanță încheiat între Ministerul Mediului și Schimbărilor Climatice și Banca Internațională de Reconstrucție și Dezvoltare-Beneficiar: Ministerul Mediului

**[11].** *** 2019, Raport Institutul Național de Meteorologie

**[12].** *** EU law - EUR-Lex (europa.eu)

**[13]. ***** https://www.eeagrants.ro/programe/mediu/descriere-mediu

**[14].** *** http://www.mmediu.ro/

**[15].** *** http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table

**[16].** *** https://insse.ro/cms/

**[17].** *** http://www.greeanpeace.org/romamia/ro