



# VULNERABILITIES TRANPOSED BY CLIMATE CHANGE EFFECTS IN ECOLOGICAL RISKS AND THREATS TO THE NATIONAL SECURITY

*Mirela ATANASIU, PhD\**

*Climate changes effects determine major transformations of interactions between socio-economic and natural environment, phenomena that directly affect the overall security (international, national, regional) systems. In the security equation, vulnerabilities in different sectors expose systems to threats and associated risks and their existence represents gaps and malfunctions in assuring systems' overall resilience.*

*In this paper, we start from the research hypothesis that vulnerabilities are a constitutive element of the climate security equation seen as a logical construction of a causal nature, respectively: the effects of climate changes are the source of ecological threats and associated risks facilitated or multiplied by exploited vulnerabilities whose presence/absence gives the measure of the impact over the respective security system. In this regard, our topic is focused on a narrower subject, namely the identification of vulnerabilities that have the potential to be exploited in generating ecological threats and associated risks against Romanian national security. In order to achieve our goal, concepts like “environmental security”, “climate security”, “ecology”, “climate change”, “vulnerability”, “ecological risks and threats”, and “resilience” will be approached in the capacity of their interdisciplinary entanglement between security and ecology.*

**Keywords:** *vulnerability; impact; environmental insecurity; national resilience; climate change.*

---

*\* Mirela ATANASIU, PhD, is Senior Researcher within the Center for Defence and Security Strategic Studies, within the “Carol I” National Defence University, Bucharest, Romania, and Associate Researcher at the Doctoral School of Safety and Security Sciences, Obuda University, Budapest, Hungary. Email: [atanasiu.mirela@yahoo.com](mailto:atanasiu.mirela@yahoo.com)*



## Introduction

Climate change represents “a long-term shift in the average weather conditions of a region, such as its typical temperature, rainfall, and windiness” (Government of Canada 2023). The phenomenon has been long lasting present on Earth as “in the last 800,000 years, there have been eight cycles of ice ages and warmer periods, with the end of the last ice age about 11,700 years ago marking the beginning of the modern climate era — and of human civilization” (NASA 2023). However, what has changed in the present that triggered the international agenda focus on the climate change aspect?

The answer is quickly to be found in the binomial relation between their increasing damaging effects in the world on the socio-economic and ecological environments and their intensification on an accelerating rate, particularly triggered by wide-scale polluting post-industrial human activities impacting all the security sectors (political, military, economic, societal, environmental) as identified in the Copenhagen School assumption (Buzan, Waever și de Wilde 2011, 171), particularly in more exposed states with low level of resilience and many vulnerabilities. Therefore, the worrying impact of climate changes in terms of security has garnered increased importance.

When it comes to the relation between national security and climate change effects, in a traditional perception wherein security refers to overall military aspect, this can be seen in terms of “threats associated largely with conflict or border integrity arising from climate change and means of providing security focus on adaptation to manifestations of threat” (Busby 2008, 468-504). From this perspective, *environmental security* “has been described as a bundle of issues which involves the role that the environment and natural resources can play in peace and security, including environmental causes and drivers of conflict, environmental impacts of conflict, environmental recovery, and post-conflict peacebuilding” (UN Environment 2018, 3). However, the relation between climate change and security means more than that, as climate change effects are increasingly affecting all aspects of human-centred ecosystem: political, social, economic, etc. Also, climate change has become a significant risk multiplier, as it may contribute to aggravating already existent crisis factors (such as deepening of economic inequalities, social fragmentation, and strong political oppression) and vulnerabilities in ecosystems (lack of proper critical infrastructures, poor governance, finances’ mismanagement, etc.), therefore it constitutes a new security challenge that needs to be addressed with adequate resources.

Regarding the research methodology in this paper, in order to achieve its objective to identify the vulnerabilities liable to be exploited by the effects of climate change in the sense of generating climate insecurity, respectively ecological risks and threats to national security, the following will be addressed: the concept



of vulnerabilities as an element in the security equation; main sources and effects of climate change; main risks and threats of the effects of climate change in Romania as identified in national documents. This approach comes from the identification of vulnerabilities as a constitutive element of the security equation, following the established model addressed in a previous study carried out by the researchers of the Centre for Defence and Security Strategic Studies, consisting of the logical construction of a causal nature, respectively *source - threat - target vulnerability - impact* (Cîrciumaru și Petrescu 2022, 9). Afterwards, on this knowledge background some vulnerabilities will be identified in different sectors of security exploited by the effects of climate change that result in situations of national insecurity, some of them being recognized as such during the Climate Change Summit 2023, held at the Bucharest National Opera, on October 19-20, 2023, an event attended by a number of important specialists in climate change topic.

### **1. Conceptualizing Vulnerabilities in the Climate Security Equation**

Security developed into a multidimensional concept in the Copenhagen School perception represents not only the military aspect related to the use of hard power but also engages other sectors such as the political, economic, societal, but also the environmental sector.

The connection between the environment and security is so complex that it requires a new way of thinking. Today, national security is intertwined with vulnerabilities associated with climate change, particularly with the unsustainable management of available resources that mostly have consequences in the ecological sector.

In regards of the ecological dimension of risks and threats, serious phenomena associated with the natural environment or its degradation can endanger national security, examples being natural or industrial catastrophes with the potential of significantly disrupt the economic-social climate. Thus, while the “Ecology is the study of the relationships between living organisms, including humans, and their physical environment that seeks to understand the vital connections between plants and animals and the world around them” (The Ecological Society of America 2023), with the awareness of climate change effects, a new field of research has been developed, namely “climate-change ecology” seen as “the study of the effects of anthropogenic climate change on any aspect of ecology” (Nature 2023). Furthermore, for the scope of this research, we consider ecological risks and threats to be related to natural environment challenges that are able to harm biodiversity and human existence.

Environmental security is strongly related to ecology, but it means far more than that, as it represents “the protection of the natural environment and the vital interests of citizens, society, and the state from internal and external impacts, adverse



processes and development trends that threaten human health, biodiversity and the sustainable functioning of ecosystems and the survival of mankind” (The Security Council of the Russian Federation 1996, 55), thus it has a more societal approach. Still, the most important challenge included in the environmental dimension of security is climate change.

Since the 1980s, the idea that climate change might pose a threat to security has become prominent, and concomitantly, environmental issues more broadly have featured significantly in debates about redefining security (McDonald 2015, 1). Lately, the environmental security have gained in importance in terms of security studies as it has become obvious that climate change and its effects, including ecological degradation, biodiversity decline, deforestation, desertification, extreme weather conditions, water and food shortages, air pollution and natural disasters are fuelling conflicts or crises and already threaten security, stability and peace in local, regional and international level.

Recently, the concept of *climate security* has been used more and more in the analysis of the impact of climate change on security. The Centre for Climate and Security (Washington) proposes a coherent conceptual framework based on four interrelated factors: *climate change* (increased greenhouse gas emissions; global temperature rise; sea level rise); *natural disasters* (events related climate: floods, tropical storms, landslides, heat waves, drought, forest floods), *human systems* (risk factors: vulnerabilities, such as lack of adaptive capacity and resilience; exposed elements and socio-economic and institutional sensitivity) and, last but not least, *the determinants of insecurity* which, in turn, affect climate change (adverse impacts: mortality and morbidity, environmental degradation, infrastructure and living environment, health problems, inequality, availability and quality of resources, social tensions, migration and internal dislocations of the population, unstable institutions, etc.) (The Center for Climate and Security 2021, 20). These factors are reflected in all levels of security: international, national or regional, however, in our paper we focus on national aspects related to climate security, particularly those of ecological nature.

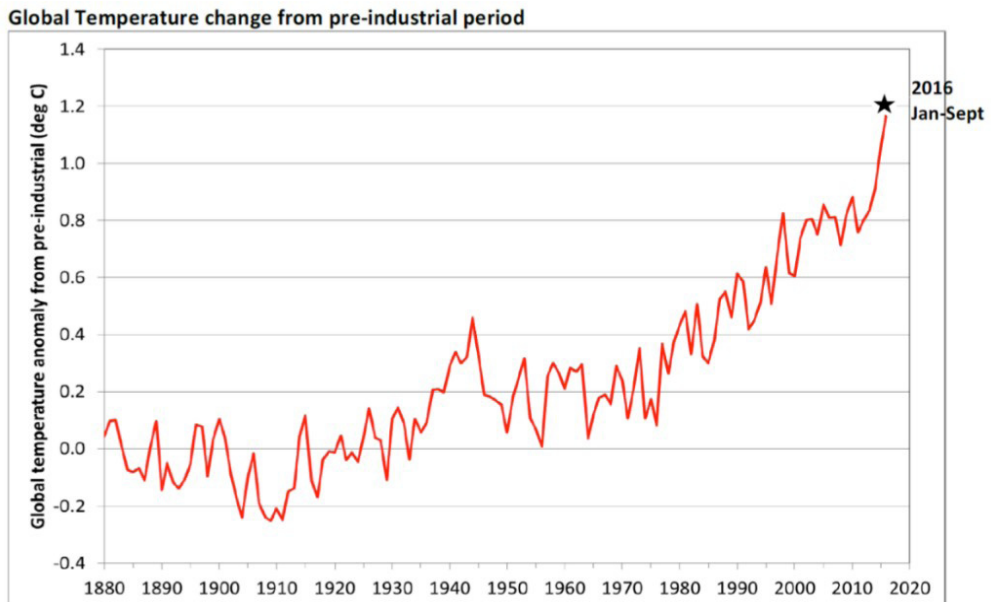
Vulnerability is part of the security concept equation strongly connected with threats and their associated risks, having an important role in the level of impact that a crisis or conflict can have over a certain sector of human life. In terms of climate security, “vulnerability is a factor of climate risk” (Climate Adapt 2023). Thus, environmental vulnerability refers to the structure and function of ecosystems composed of humans, their socio-economic life and natural environment in its biodiversity. In these terms, the relation between vulnerability and climate change is seen as “the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes” (Intergovernmental Panel on Climate Change 2007, 6), thus “vulnerability is a function of the character, magnitude, and rate of climate change and variation to

which a system is exposed, the sensitivity and adaptive capacity of that system” (Intergovernmental Panel on Climate Change 2007, 6). Therefore, in the climate security equation, vulnerability is exploited by a threat that once materialized determines the risk (the potential for loss) and is reflected in the level of impact over a certain ecosystem or security sector.

## 2. Main Sources and Effects of Climate Changes

The greenhouse effect is a positive factor for Earth’s capacity to maintain life on its surface because it captures Sun’s energy at its surface. The greenhouse effect is damaging when extra greenhouse gases in the atmosphere trap too much sunlight, which causes more global warming than necessary to maintain the bio-balance<sup>1</sup> on Earth.

Climate change was a perpetual phenomenon in Earth’s history. Actually, there are specialists that discovered that “three periodic motions in Earth’s orbit, known as Milankovitch cycles, contribute a predictable amount of variations to Earth’s climate over time frames of tens of thousands to hundreds and thousands of years” (NASA 2020). But with the industrial era, human activities such as burning fossil fuels, including coal and oil have increased greenhouse gas concentrations in our atmosphere that triggered the growth of global temperature at an unprecedented pace (Figure no.1).



**Figure no. 1:** Global temperature change from pre-industrial period (World Meteorological Organization 2020)

<sup>1</sup> The balance between nature and humans.



Nowadays, climate change is mainly caused by greenhouse gas emissions resulting from human activities based on the burning of fossil fuels (energy system, industry, agriculture and forestry, etc.), but also by deforestation and animal husbandry. Also, along with unsustainable energy and improper land use, societies' lifestyles in terms of consumption and production patterns in global economies "highly contribute to increasing the level of gas emissions with greenhouse effect (carbon dioxide, methane, nitrogen oxide, and fluorinated gases) generating widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere" (Intergovernmental Panel on Climate Change 2023, 42).

Climate changes effects are manifested in global warming reflected mainly in the increase in the average temperature of the air, soil and waters, but also in the rise in the level of the seas and oceans as a result of the melting of the glaciers and manifestation of intense extreme phenomena and, often, unforeseen (heavy precipitation - floods; light precipitation - drought; storms; cyclones, etc.).

### **3. Part of Ecological Threats and Risks Associated to Climate Change Effects in Romania**

Climate changes give birth to a series of threats and associated risks to national security, part of them of ecological nature. The Ecological Threat Register produced by the Institute for Economics & Peace analyses in its reports such threats and risks, from population growth, water stress, food insecurity, droughts, floods, cyclones, to rising temperatures and sea levels. The results showed that "141 countries are exposed to at least one ecological threat by 2050" (Institute for Economics & Peace 2020, 2). Moreover, the founder and Executive Chairman of Institute for Economics and Peace stressed out that "ecological threats and climate changes pose serious challenges to global peacefulness, as over the next 30 years lack of access to food and water will only increase without urgent global cooperation and in the absence of action civil unrest, riots and conflict will most likely increase. COVID-19 is already exposing gaps in the global food chain" (ReliefWeb 2020).

By studying strategic documents and reports one may acknowledge that as concerns Romania main threats and associated risks triggered by the effects of climate changes are: **a) changes in biodiversity** (Ministry of Environment and Climate Change 2014); **b) food insecurity and the depletion of fresh water sources**, and **c) multiplication of health risk factors**, all of these three elements affecting the quality of life and triggering internal migration acceleration.

In the following, these elements are discussed.

**a)** Research studies show that "the main anthropogenic factors that have, in recent decades, induced the change of ecological composition and structure and of the yield and support capacity of the Romanian biodiversity were identified in the





objectives of socio-economic development strategies and in the means chosen to implement them during 1950-1989” (Ministry of Environment and Climate Change 2014, 15), thus extensive agriculture generated imbalances and discontinuities that have only partly been corrected by the implementation of the environment policies.

Climate change threatens Romanian biodiversity by: modifications produced to the species behaviour, as a result of the stress induced on their adaptation capacity; modification of the habitats distribution and composition; increase of the number of exotic species and of their potential to become invasive; modification of the distribution of the ecosystems specific to wet areas, with the possible limitation up to their extinction; changes in the freshwater and marine aquatic ecosystems generated by water warming and sea level rise; extinction of certain flora and fauna species (Climate Change Post 2023). For example, in Romania six species of invertebrates, eight plants and ten new vertebrates were registered as invasive in June 2023. Invasive alien species are of increasing interest due to the negative effects on biodiversity, the health of the human population, and the economy (CCMESI 2023). Also, the impact of invasive species is felt in forestry, agriculture and animal husbandry, fish farming, transport, trade, protected natural areas, urban and rural human settlements.

**b)** In terms of the main consequences triggered by climate change, according to *Think Hazard* instrument developed by the World Bank and the Global Facility for Disaster Reduction and Recovery (GDFRR), in Romania there were identified the following risks and threats in terms of natural hazards: river flood (high)<sup>2</sup>, urban flood, landslide, wildfire, earthquake, water scarcity and extreme heat. All of these elements are able to damage the agrifood<sup>3</sup> sector and water sources increasing food insecurity and water scarcity.

Food security is defined as the access for all people at all times to enough food for an active, healthy life, definition grounded on three aspects namely, adequacy of food availability (effective supply), the adequacy of food access in terms of individuals’ ability to acquire sufficient food (effective demand) and the reliability of both. Thus, food insecurity can be a failure of availability, access, reliability or some combination of these factors. (Food and Agriculture Organisation of the United Nations 1996). Statistics show that in Romania, food insecurity is mostly built on the lack of access to financial resources to acquire sufficient food (FAO Statistics Division 2023), as the population’s average incomes<sup>4</sup> are very low as well as the GDP per inhabitant expressed in purchasing power parity terms, and not necessarily

---

<sup>2</sup> This means that potentially damaging and life-threatening river floods are expected to occur at least once in the next 10 years (World Bank; GDFRR 2023).

<sup>3</sup> Agrifood refers to food produced as a result of agriculture.

<sup>4</sup> According to Romanian National Institute of Statistics, in Quarter IV 2022, on average, household income was 6634 lei and expenditure was 5842 lei, from which food products and non-alcoholic beverages were 34,8% (The National Institute of Statistics 2023, 3-4)



of food unavailability<sup>5</sup>. Also, other studies indicate that national water scarcity is classified as “medium”, score showing that there is “up to a 20% chance droughts in the coming 10 years” (World Bank; GDFRR 2020). Still, a medium and long term issue is represented by the decline in the most important crops used for population nutrition<sup>6</sup> and fresh water decay as results of climate change effects.

e) The World Health Organization (WHO) considers climate change to be the greatest threat to health in the 21<sup>st</sup> century. Climate change affects people’s safety, health and well-being through direct impact by amplifying the intensity and frequency of extreme weather events (such as heat waves, floods and wildfires) and indirect impact through worsening of air quality, changes in the spread of infectious diseases, changes in food and water quality and effects on mental health (World Health Organization 2023). In Romania, since the mid-1980s, extremely high values for summer thermal stress that indicates an increased risk to human health during summers (Climate Change Post 2023). Another aspect is the risk of infectious diseases spreading beyond tropical regions to temperate zones, for example “dengue fever, Chagas, leishmaniasis, Chikungunya, schistoso-miasis” (Ivanescu 2023). Climate change effects’ health risks are mostly affecting vulnerable categories of people like children, pregnant women, elderly people and people with chronic conditions and people from disadvantaged areas with poor access to financial means, medical aid and other social services.

#### **4. Vulnerabilities Transposed by Climate Changes in Ecological Risks and Threats Impacting against the National Security**

Environmental security is part of the national security. Also, the different political, economic, societal, environmental, military sectors’ vulnerabilities are transposed in risks and threats against national security. In this part of the paper there will be identified only some vulnerabilities transposed by climate changes effects in ecological risks and threats against Romania’s security sectors.

Some vulnerabilities identified at the national level in policy documents and resilience plans that have the potential to trigger or worsen ecological threats and risks detrimental to different security sectors that proved to be of great impact over Romania are listed in Table no. 1.

---

<sup>5</sup> Global Hunger Index 2023: Romania shows that 2 Romania is one of 20 countries with a low GHI score of less than 5”, meaning that the level of hunger is low (GHI 2023).

<sup>6</sup> Average grain yields tend to decrease by 14.4% between 2021-2050, and more abruptly, by 36.5% between 2071-2100 (Climate Adapt 2014).



**Table no. 1** – Vulnerabilities detrimental to security that generate or facilitate ecological threats and risks development (author’s concept)<sup>7</sup>

<b>Vulnerability</b>	<b>Affected security sectors</b>	<b>Ecological threats and risks<sup>1</sup></b>
Improper budgeting and public funds management and low exploitation of European funds directed toward environmental security (green energy production, irrigation systems, dams, afforestation, water desalination systems, etc.)	- Political - Economic - Societal - Environmental	- failure to mitigate climate change - more biodiversity loss and ecosystem collapse - failure in achieving European goals in global warming policies; - diminished grain crops; - smaller reserves of fresh water; - pollution growth.
Delay in the implementation of endowment programs for the modernization of response capabilities to ecological crises		- failure of climate-change adaptation; - Natural resource crises.
Reduced resilience of the medical system to diseases that have appeared on the territory of Romania as a result of climate change.	- Economic - Societal - Environmental - Military	- more imported disease from the tropical regions; - increase of illness and deaths, particularly in the vulnerable categories of population; - health crises.
Gaps in economic development in the perspective of the transition to a “green” economy capable of coping with climate change in terms of infrastructures, technologies, connections, transport, etc.	- Political - Economic - Societal - Environmental - Military	- failure of climate-change adaptation; - increased differentiation between green and polluting technologies; - increased green gas emissions.
Intensification of urbanization.	- Economic - Societal - Environmental - Military	- natural habitats destruction; - diminution of arable land; - deforestation; - increase in occurrence of natural disasters and extreme weather events; - accelerated decay of biodiversity and fresh water quality.
Improper waste management.	- Economic - Societal - Environmental	- accelerated pollution growth; - more large-scale environmental damage incidents.
Low level of security culture of the population in the field of ecology and climate change.	- Economic - Societal - Environmental	- poor collecting, processing and reuse of waste materials; - lack/or low awareness over the carbon print importance for the ecosystem and biodiversity; - natural resources crisis.

Obviously, in addition to the above, other vulnerabilities can be added, such as: the increase in salinity of the Black Sea tributaries, which can cause changes in

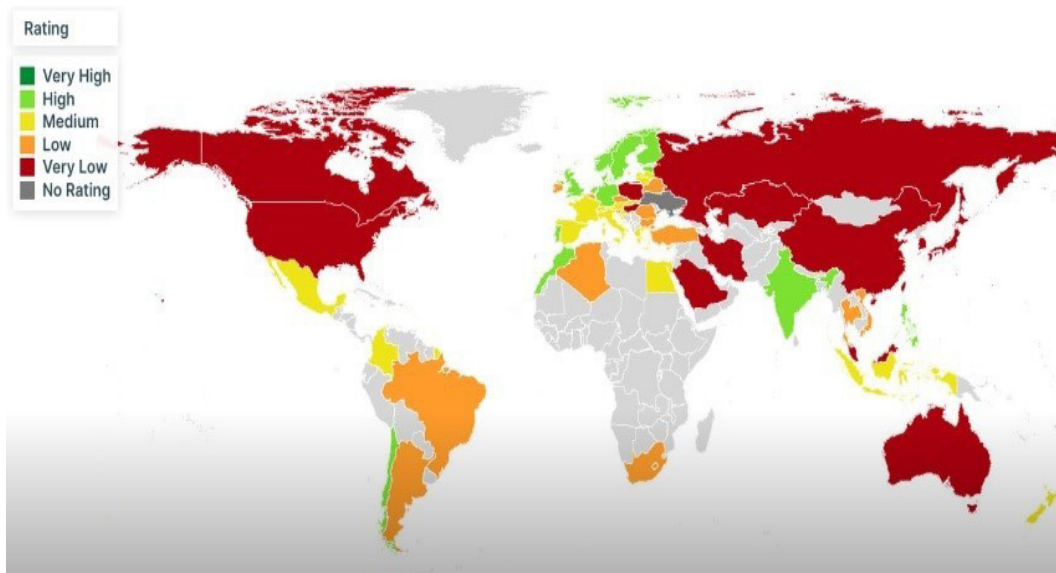
<sup>7</sup> Many of these risks are also identified as global risks ranked by severity over the short and long term, as are presented in Global Risks Report 2023 (World Economic Forum 2023, 6).

the freshwater flora, which will be replaced by a typical vegetation of a saltwater ecosystem; higher water temperatures can cause algae to grow, especially in shallow lakes, endangering the drinking water supply; irrational exploitation of natural resources, economic development inequalities between regions, etc.

### 5. Initiatives to Mitigate Climate Change by Diminishing National Vulnerabilities

Nowadays climate change, along with demographic developments, pandemics and economic crisis, is considered to pose direct threats to national and international security. Also, the most effective way to diminish the threats posed by climate-fragility risks is, on one hand, to mitigate climate changes' sources and effects and, on the other hand, to diminish the vulnerabilities to climate change of ecosystem made up of people and socio-economic and natural environments. And this is where the resilience seen as a solution for climate change that can bring economic benefits while improving our lives and protecting the environment comes in.

Climate change impact is mitigated differently from state to state, from region to region, or even from one microclimate to another, depending on the level of threat perception, affected sectors and resources. The process doing all that is called resilience. In Figure no. 2, it is shown how many efforts countries worldwide are making in order to mitigate climate change.



**Figure no. 2:** World countries climate protection performance (Climate Change Performance Index 2023)



The analysis is performed through The Climate Change Performance Index (CCPI)<sup>8</sup>, “an instrument ... that uses a standardized framework to compare the climate performance of 59 countries and the EU, which together account for 92% of global greenhouse gas emissions” (Climate Change Performance Index 2023).

Romania is among the countries with low performance in climate change resilience. Still, in the National Defence Strategy of Romania 2020-2024, we found that the ideas regarding climate change are focus on the fact that “it will be more and more present and more extensive, having the potential to reach a critical level for Romania’s security”; also, „it is accelerated by the intensification of urbanization”; „it has associated risks (degradation or disappearance of cultural heritage); „it has unpredictable evolution”; „its effective combat supports the process of sustainable development” and „there is a need to move to a green and circular economy in order to diminish its effects” (SNAp 2020). Thus, in the Strategy the climate change topic is seen as a severe security issue that has the capacity to unpredictably become increasingly important in the future, owed to the Romanian society transformation and its combined threats and risks, but its mitigation is regarded as an opportunity for sustainable development through green solutions and circular economy.

At the national level, “in a broader context of EU climate objectives, namely to significantly cut greenhouse gas emissions by 2030 and achieve climate neutrality by 2050, the funds allocated to Romania for fulfilling these objectives are an important opportunity for structural reforms and sustainable economic growth” (National Bank of Romania 2021, 6). Therefore, the vulnerability of poor European funds absorption directed toward environmental security resilience building must be properly approached, nevertheless, under the situation when gaps in economic development in the perspective of the transition to a “green” economy capable of coping with climate change in terms of infrastructures, technologies, connections, transport, etc., are still present compared to other EU Member States.

The national environmental security system is composed by regulation and control institutions aimed to develop strategies to adapt to climate changes the main affected areas (biodiversity, agriculture, water resources, forests, vital infrastructures, energy-efficient constructions, eco-tourism, green energy, industry, transport, health, etc.). For this purpose, the EU Recovery and Resilience Facility (RRF) is a temporary instrument - centrepiece of Next Generation EU - a plan to emerge stronger and more resilient EU member from the current crisis. The delay in the implementation of endowment programs for the modernization of response capabilities to ecological crises comes from the “particular need to improve infrastructure and increase investments in water, waste, wastewater and air pollution infrastructure” (European Commission 2021). Romania’s National Recovery and

---

<sup>8</sup> The climate protection performance is assessed in four categories: GHG Emissions, Renewable Energy, Energy Use and Climate Policy.



Resilience Plan (NRRP) embodies reforms and investments part of them directed to facilitate the country's green transition and has to be implemented by 2026. The health crisis provoked by the COVID-19 pandemic overwhelmed the national medical system. Reduced resilience of the medical system to diseases that have appeared on Romanian territory as a result of climate change is a vulnerability that can also be reduced through NRRP investments.

Urbanization often results in increased temperatures partly because of the formation of urban heat islands, or localized areas of heat storage near urban centres, as well because of deforestation to build urban areas. A viable solution to reduce this vulnerability is setting forest curtains and urban and peri-urban forests. Moreover, this vulnerability is corroborated with improper waste management. In support of this idea, Romania adopted its National Waste Management Plan (NWMP) and waste prevention programme, both of which are valid until 2025. Still, owed to a third vulnerability, namely the low level of security culture of the population in the field of climate change in terms of implementing mitigation measure, which transposes in an overall recycling rate of 13.7% for 2020, which represents a large gap to the recycling target for 2025 (55 %) (European Environment Agency 2022, 9). The idea is that polls show that 88% of Romanians are aware that they are affected by climate change (European Investment Bank 2021), but the public is poorly involved in actually implementing policies on the ground. Actually, a zero waste policy has poor prospects because of the lack of civil society involvement, to which precarious infrastructure for the waste management, the complexity of the implementing process and lack of experience are added. Still, there is hope in this direction as, in 2021, Amera Tower building in Cluj Napoca became the first zero waste pre-certified building in Romania.

### **Conclusions**

Ecological security represents a tremendous challenge because it enhances the preservation and protection of a natural environment suitable for humanity existence and perpetuation.

One of the main challenges of ecological security comes from the effects of climate changes triggered by human activity unbalancing the green gas emissions that transpose in increasingly high temperatures that cause changes in the geographical distribution of climate zones. In their turn, these changes are altering the distribution and number of plant and animal species, which are already under pressure from habitat loss and pollution.

Because of climate change, we are witnessing a decrease of the yield and viability of agriculture and animal husbandry or of the capacity of ecosystems to provide important services and goods (such as the supply of clean water or cool,



clean air). Furthermore, droughts often have knock-on effects, for example on transport infrastructure, agriculture, forestry, water and biodiversity. Temperature increases also influence the behaviour and life cycles of animal and plant species, in the sense that the number of pests and invasive species increases, as well as the incidence of certain human diseases by multiplying health risk factors.

Comparing the picture of the effects of climate change with their associated threats and risks, we find that they are ramified and interconnected. For example, global warming has had the impact of changing the pattern of precipitation which has become either extremely light or extremely abundant, and the volume of precipitation generates extreme phenomena (drought and floods) which, in turn, can affect the volume and quality of agricultural products and reduces biodiversity. At the same time, it also presents associated risks for the health of people and animals in the affected areas by reducing the vital resources of food and water for the population, inducing food insecurity and implicitly affecting life quality, a fact that can in turn generate migration from the areas in question.

In the climate security equation, the identification of vulnerabilities (along with threats and associated risks) is an important step for mitigating the disruptive impact of climate change. Also, the diminish or eradication of the identified national vulnerabilities (finances' mismanagement, infrastructure and green technology gaps, extended urbanization, improper waste management, etc.) can lead to a lower impact on the security sectors and a greater level of resilience with proper planning and implementation initiatives undergone with the support of the EU finances, know-how and policies.

## BIBLIOGRAPHY:

- Anthony Dworkin. 2020. *Why America is facing off against the International Criminal Court*. September 8. Accessed on 30 January, 2023. [https://ecfr.eu/article/commentary\\_why\\_america\\_is\\_facing\\_off\\_against\\_the\\_international\\_criminal\\_cou/](https://ecfr.eu/article/commentary_why_america_is_facing_off_against_the_international_criminal_cou/)
- Atanasiu, Mirela. 2022. "Războiul ruso-ucrainean. Consecințe în plan internațional." *Colocviu Strategic*, April-May: 5-9.
- Baker Institute. 2016. *The Rise of Populist Nationalism in Europe & U.S.* Accessed on 12 October, 2022. <https://www.bakerinstitute.org/event/rise-populist-nationalism-europe-us>
- Börzel, Tanja A., and Michael Zürn. 2021. "Contestations of the Liberal International Order: From Liberal Multilateralism to Postnational Liberalism." *Econstor* 282.
- Busby, Joshua. 2008. "Who Cares about the Weather? Climate Change and US National Security." *Security Studies* 17 (3).





- Buzan, Barry, Ole Waeber, and Jaap de Wilde. 2011. *Securitatea. - un nou cadru de analiză*. Cluj-Napoca: CA Publishing.
- CCMESI. 2023. *Managementul adecvat al speciilor invazive din Romania, in conformitate cu regulamentul UE 1143/2014, referitor la prevenirea si gestionarea introducerii si raspandirii speciilor alogene invazive*. Accessed on 12 August, 2023. <https://invazive.ccmesi.ro/despre-speciile-invazive/impactul-sai/>.
- Cîrciumaru, Florian, and Dan-Lucian (coord.) Petrescu. 2022. *Amenințări și riscuri la adresa securității României - orizont 2040*. Bucharest: “Carol I” National Defence University Publishing House.
- Climate Adapt. 2014. “Climate change adaptation measures in Romanian agriculture.” Accessed on 20 November, 2023. <https://climate-adapt.eea.europa.eu/en/metadata/case-studies/climate-change-adaptation-measures-in-romanian-agriculture>
- . 2023. “Step 2. Assessing climate change risks and vulnerabilities.” Accessed on 08 November, 2023. <https://climate-adapt.eea.europa.eu/en/mission/knowledge-and-data/regional-adaptation-support-tool/step-2-assessing-climate-change-risks-and-vulnerabilities>
- Climate Change Performance Index. 2023. *CCPI 2023: Ranking and Results*. Accessed on 01 November, 2023. <https://ccpi.org/>
- Climate Change Post. 2023. “Romania.” November 13. Accessed on 11 November, 2023. <https://www.climatechange.org/post/romania/biodiversity/>
- Climate Home News. 2020. *Which countries have not ratified the Paris climate agreement?* 08 13. Accessed on 12 January, 2023. <https://www.climatechangenews.com/2020/08/13/countries-yet-ratify-paris-agreement/>
- Counter Extremism Project. 2021. *White Supremacy Groups in the United States*. Accessed on 05 January, 2023. [https://www.counterextremism.com/sites/default/files/supremacy\\_landing\\_files/U.S.%20White%20Supremacy%20Groups\\_111422.pdf](https://www.counterextremism.com/sites/default/files/supremacy_landing_files/U.S.%20White%20Supremacy%20Groups_111422.pdf)
- Democracy. 2022. “China’s Assertive Authoritarianism.” *Democracy. A journal of ideas* <https://democracyjournal.org/magazine/62-special-issue/chinas-assertive-authoritarianism/>
- European Commission. 2021. “Romania’s recovery and resilience plan.” Accessed on 17 November, 2023. [https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility/country-pages/romania-recovery-and-resilience-plan\\_en](https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility/country-pages/romania-recovery-and-resilience-plan_en)
- European Environment Agency. 2022. “Early warning assessment related to the 2025 targets for municipal waste and packaging waste.” June. Accessed on 10 November, 2023. <https://www.eea.europa.eu/publications/many-eu-member-states/romania>





- European Investment Bank. 2021. “88 % dintre români consideră că schimbările climatice au impact asupra vieții lor zilnice (mai mult cu 11 puncte decât media europeană de 77 %).” November 10. Accessed on 19 November, 2023. <https://www.eib.org/en/press/all/2021-398-88-of-romanians-feel-that-climate-change-has-an-impact-on-their-everyday-lives-11-points-above-the-european-average-of-77?lang=ro>
- FAO Statistics Division. 2023. “Food Insecurity Experience Scale 2021.” *World Bank*. January 11. Accessed on 12 November, 2023. <https://microdata.worldbank.org/index.php/catalog/5431>.
- Food and Agriculture Organisation of the United Nations. 1996. “THE STATE.” *FAO*. Accessed on 14 November, 2023. [https://www.fao.org/3/w1358e/w1358e14.htm#P36\\_6144](https://www.fao.org/3/w1358e/w1358e14.htm#P36_6144).
- Fukuyama, Francis. 1992. *The End Of History and the Last Man*. New York: The Free Press.
- GHI. 2023. “Global Hunger Index 2023; Romania.” Accessed on 20 November, 2023. <https://www.globalhungerindex.org/pdf/en/2023/Romania.pdf>
- Global Governance Forum. 2022. *The Origins of the UN Veto and Why it Should be Abolished*. April 28. Accessed on 10 January, 2023. <https://globalgovernanceforum.org/origins-un-veto-why-it-should-be-abolished/>
- Government of Canada. 2023. “Climate change concepts.” Accessed on 11 October, 2023. <https://www.canada.ca/en/environment-climate-change/services/climate-change/canadian-centre-climate-services/basics/concepts.html>
- Institute for Economics & Peace. 2020. *Ecological Threat Register*. Sydney: Institute for Economics & Peace. [https://www.visionofhumanity.org/wp-content/uploads/2020/10/ETR\\_2020\\_web-1.pdf](https://www.visionofhumanity.org/wp-content/uploads/2020/10/ETR_2020_web-1.pdf)
- Intergovernmental Panel on Climate Change. 2007. “Climate Change 2007: Impact, Adaptation and Vulnerability.” Accessed on 12 September, 2023. [https://www.ipcc.ch/site/assets/uploads/2018/03/ar4\\_wg2\\_full\\_report.pdf](https://www.ipcc.ch/site/assets/uploads/2018/03/ar4_wg2_full_report.pdf)
- . 2023. “Climate Change 2023. Synthesis Report.” *IPCC*. Accessed on 12 October, 2023. [https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC\\_AR6\\_SYR\\_LongerReport.pdf](https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf)
- Ivanescu, Larisa Maria et al. 2023. “The Risk of Emerging of Dengue Fever in Romania, in the Context of Global Warming.” *Tropical Medicine and Infectious Disease*. [https://click.endnote.com/viewer?doi=10.3390%2Ftropicalmed8010065&token=WzMwMTAzMTAsIjEwLjMzOTAvdHJvcGljYWxtZWQ4MDEwMDY1Ii0.c\\_NQ0HVLO7lWx9LzWnw\\_mngF96w](https://click.endnote.com/viewer?doi=10.3390%2Ftropicalmed8010065&token=WzMwMTAzMTAsIjEwLjMzOTAvdHJvcGljYWxtZWQ4MDEwMDY1Ii0.c_NQ0HVLO7lWx9LzWnw_mngF96w)
- McDonald, Matt. 2015. *Ecological Security*. Nov 28. Accessed on 23 September, 2023. <https://www.e-ir.info/pdf/59858>
- Ministry of Environment and Climate Change. 2014. “CBD Fifth National Report - Romania (English version).” *Convention on Biological Diversity*. October.



- Accessed on November 10, 2023. <https://www.cbd.int/doc/world/ro/ro-nr-05-en.pdf>
- NASA. 2020. *De ce ciclurile Milankovitch (orbitale) nu pot explica încălzirea curentă a Pământului*. February 27. Accessed on 22 September, 2023. <https://climate.nasa.gov/explore/ask-nasa-climate/2949/why-milankovitch-orbital-cycles-cant-explain-earths-current-warming/>
- . 2023. “How Do We Know Climate Change Is Real?” Accessed on 23 September, 2023. <https://climate.nasa.gov/evidence/#:~:text=Earth's%20climate%20has%20changed%20throughout%20history,era%20%E2%80%94%20and%20of%20human%20civilization>
- National Bank of Romania. 2021. “Climate risk dashboard for the banking sector in Romania.”
- Nature. 2023. “Climate-change ecology articles from across Nature Portfolio.” Accessed on 21 October, 2023. <https://www.nature.com/subjects/climate-change-ecology#:~:text=Climate%2Dchange%20ecology%20is%20the,physiology%20of%20populations%20and%20communities>
- Organski, AFK. 1968. *World Politics, Second Edition*. New York: Alfred A. Knopf.
- RAND Corporation. 2006. “Antiglobalization Movements.” In *Beyond al-Qaeda: Part 2, The Outer Rings of the Terrorist Universe*, by Angel et al. Rabasa, 85-100. Rand Corporation.
- ReliefWeb. 2020. *Ecological Threat Register 2020*. Sept 10. Accessed on 11 September, 2023. <https://reliefweb.int/report/world/ecological-threat-register-2020>
- SNAp . 2020. “Strategia Națională de Apărare a Țării pentru perioada 2020-2024. “Împreună, pentru o Românie sigură și prosperă într-o lume marcată de noi provocări”.” *presidency.ro*. Accessed on 12 October, 2023. [https://www.presidency.ro/files/userfiles/Documente/Strategia\\_Nationala\\_de\\_Aparare\\_a\\_Tarii\\_2020\\_2024.pdf](https://www.presidency.ro/files/userfiles/Documente/Strategia_Nationala_de_Aparare_a_Tarii_2020_2024.pdf)
2021. *The Center for Climate and Security*.
- The Ecological Society of America. 2023. “What Is Ecology?” Accessed on September 12, 2023. <https://www.esa.org/about/what-does-ecology-have-to-do-with-me/>
- The National Institute of Statistics. 2023. “Press Release.” *INSSE*. April 6. Accessed on 16 November, 2023. [https://insse.ro/cms/sites/default/files/com\\_presa/com\\_pdf/abf\\_tr4e22.pdf](https://insse.ro/cms/sites/default/files/com_presa/com_pdf/abf_tr4e22.pdf)
- The Security Council of the Russian Federation. 1996. *Environmental security of Russia* (2): 55. <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/environmental-security#:~:text=Environmental%20security%20is%20protectedness%20of,ecosystems%2C%20and%20survival%20of%20humankind>



- UN. 2002. "Rome Statute of the International Criminal Court." *Article 12 (3)*, July 1.
- . 1945. *Charter of the United Nations*.
- . 2015. *Convention of Biological Diversity*. Accessed on 12 January, 2023. <https://www.cbd.int/information/parties.shtml>
- UN Environment. 2018. "Environmental security: dimensions and priorities." June. Accessed 08 24, 2023. [https://www.thegef.org/sites/default/files/publications/52103%20STAP%20Report\\_WEB.pdf](https://www.thegef.org/sites/default/files/publications/52103%20STAP%20Report_WEB.pdf)
- United Nations Regional Information Center and Western Europe. 2023. *The UN and the war in Ukraine: key information*. 01 30. Accessed on 30 January, 2023. <https://unric.org/en/the-un-and-the-war-in-ukraine-key-information/>
- United Nations University. 2008. "Legality and Legitimacy in International Order." *Policy Brief* (United Nations University Press) (5): 1. Accessed on 14 May, 2022. [https://www.files.ethz.ch/isn/89752/PB\\_08-05.pdf](https://www.files.ethz.ch/isn/89752/PB_08-05.pdf)
- Wijninga, Peter, Willem Theo Oosterveld, and Jan Hendrik Galdiga. 2014. "STATE AND NON-STATE ACTORS: BEYOND THE DICHOTOMY." In *Strategic Monitor*, 146. Hague: Hague Centre for Strategic Studies.
- World Bank; GDFRR. 2023. "Romania. River Flood." *Think Hazard*. Accessed on 16 November, 2023. <https://thinkhazard.org/en/report/203-romania/FL>
- . 2020. "Romania. Water scarcity." *Think Hazard*. 09 25. Accessed on 12 November, 2022. <https://thinkhazard.org/en/report/203-romania/DG>
- World Economic Forum. 2023. "Global Risks Report 2023, Eighteenth edition." Accessed on 20 November, 2023. [https://www3.weforum.org/docs/WEF\\_Global\\_Risks\\_Report\\_2023.pdf](https://www3.weforum.org/docs/WEF_Global_Risks_Report_2023.pdf)
- World Health Organization. 2023. "Climate change." *WHO*. October 12. Accessed on 15 November, 2023. <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>
- World Meteorological Organization. 2020. *COP22 advances global action on climate change*. Accessed on 25 October, 2023. <https://public.wmo.int/en/resources/meteoworld/cop22-advances-global-action-climate-change>