DOI https://doi.org/10.30525/2661-5150/2025-3-4

THE EUROPEAN UNION CLIMATE POLICIES AND THEIR INDIRECT EFFECTS ON THE ECONOMY OF THE REPUBLIC OF MOLDOVA

Mariana Stoica[1]

Abstract. The growing importance of the European Union's climate agenda, reflected in strategic frameworks such as the European Green Deal and the Fit for 55 legislative package, makes the analysis of their external effects increasingly significant for neighboring countries. In this context, the present study examines the ways in which the EU's environmental and climate policies influence the economic development of the Republic of Moldova. The subject of the study is the Moldovan economy and the structural transformations it undergoes as a result of its deepening integration into the European economic space. As Moldova becomes more closely linked to the EU market through trade, energy cooperation, and regulatory approximation, understanding the indirect transmission of climate policy measures becomes essential for evaluating national economic resilience and adaptation capacity. The purpose of the study is to identify the main economic consequences that EU climate policies generate for Moldova and to highlight both the risks and opportunities associated with this regulatory shift. Specifically, the research seeks to assess how new climate-related standards affect Moldova's export sectors, how the decarbonization of the European economy reshapes investment flows, and in what ways the energy transition influences national energy security and long-term competitiveness. The methodology is based on a mixed approach that combines qualitative policy analysis with quantitative examination of recent trade, energy, and investment data. Comparative, analytical, and interpretative methods are used to evaluate the extent to which stricter carbon regulations, sustainability requirements, and green transition instruments introduced at the EU level influence Moldova's economic performance. The study also draws on secondary data, reports, and EU legislative documents to contextualize the implications for Moldova's policy environment. The findings indicate that Moldova's strong economic interdependence with the EU amplifies the effects of climate-related regulations on key export-oriented sectors such as agriculture, agro-food processing, industry, and energy. While the adaptation to climate standards may generate higher compliance costs and require substantial technological upgrades, the research shows that these same policies open new development perspectives. Opportunities include increased access to green financing, expansion of renewable energy projects, modernization of infrastructure, and stimulation of innovation in low-carbon production. The study concludes that Moldova can enhance its economic resilience and strengthen its competitive position by aligning national strategies with European climate goals, accelerating regulatory harmonization, and supporting sustainable investment and technological modernization.

Keywords: European Union, climate policy, Green Deal, Fit for 55, Republic of Moldova, economic impact, energy transition, trade relations, sustainability, carbon regulation.

JEL Classification: F18, Q56, Q58, O13

1. Introduction

The growing importance of environmental sustainability within the European Union has led to the development of ambitious climate policies that influence not only member states but also their trading partners. For the Republic of Moldova, which maintains strong economic and political ties with the EU through the Association Agreement and the Deep and Comprehensive Free Trade Area, these policies have significant implications. The scientific relevance of this research lies in understanding how external environmental regulations can indirectly shape the economic structure, competitiveness, and development trajectory of a non-EU country. Although the topic

[1] Moldova State University, Republic of Moldova
E-mail: stoicamarianamd@gmail.com
ORCID: https://orcid.org/0000-0002-1624-7353

has been discussed broadly at the European level, its specific impact on smaller transition economies such as Moldova remains insufficiently studied.

The main problem addressed in this paper is the limited assessment of how EU climate initiatives, such as the European Green Deal, Fit for 55 package, and the Carbon Border Adjustment Mechanism, affecting Moldova's economy through trade, investment, and energy sectors. The novelty of the research is in linking EU climate policy spillovers with Moldova's economic adaptation strategies and exploring potential pathways for green transformation.

The goal of the study is to analyze the indirect economic effects of EU climate policies on Moldova and to identify opportunities for sustainable growth and policy alignment. The main research tasks include: (1) reviewing the core EU climate instruments; (2) examining Moldova's economic structure and vulnerability to new environmental standards; (3) proposing recommendations for policy adaptation.

The research applies a mixed methodology that combines qualitative policy analysis with quantitative examination of trade and energy data from national and European sources. The main limitations relate to data availability and the evolving nature of EU environmental legislation. The paper is structured as follows: the first section presents the theoretical framework and key EU climate policies; the second section analyzes Moldova's economic profile discusses the indirect economic effects of EU policies; and the final section offers conclusions and policy recommendations.

2. The Core EU Climate Instruments

The continuous rise in CO_2 emissions has been a major driver of global warming causing climate deterioration, leading to more frequent extreme weather events, rising temperatures, and significant environmental degradation (Figure 1).

The Figure 1 shows a sharp and continuous rise in global CO_2 emissions over time, especially since the mid-20th century. After remaining relatively stable for centuries, emissions began increasing rapidly with industrialization and economic expansion, reaching record levels in recent years.

As about the Republic of Moldova, contributes as little as 0.03% to the total global greenhouse gas (GHG) emissions and is amongst the lowest range of the per capita footprint per region with 4.4 t CO_2. The main emitter sectors in 2020 were:

Recognizing the urgent need to address these challenges, the European Union decided to implement a set of climate instruments designed to curb emissions at their source, promote cleaner technologies, and transition toward a sustainable, low-carbon economy. These measures not only aim to mitigate the effects of climate change but also to ensure that economic development within the EU remains competitive and resilient in the face of global environmental pressures.

The European Union's climate policy has developed progressively over more than three decades, evolving from environmental protection measures into a comprehensive climate governance system. The key milestones are as follows (Figure 3).

Each instrument has its goals, helping the EU to diminish the effects of the global climate changes but also not to stop the economic development of the region (see Table 1).

The Table 1 outlines the European Union's principal climate policy tools, each designed to curb greenhouse gas emissions while supporting sustainable economic progress. Rather than acting in isolation, these instruments work together to form a comprehensive and balanced climate strategy.

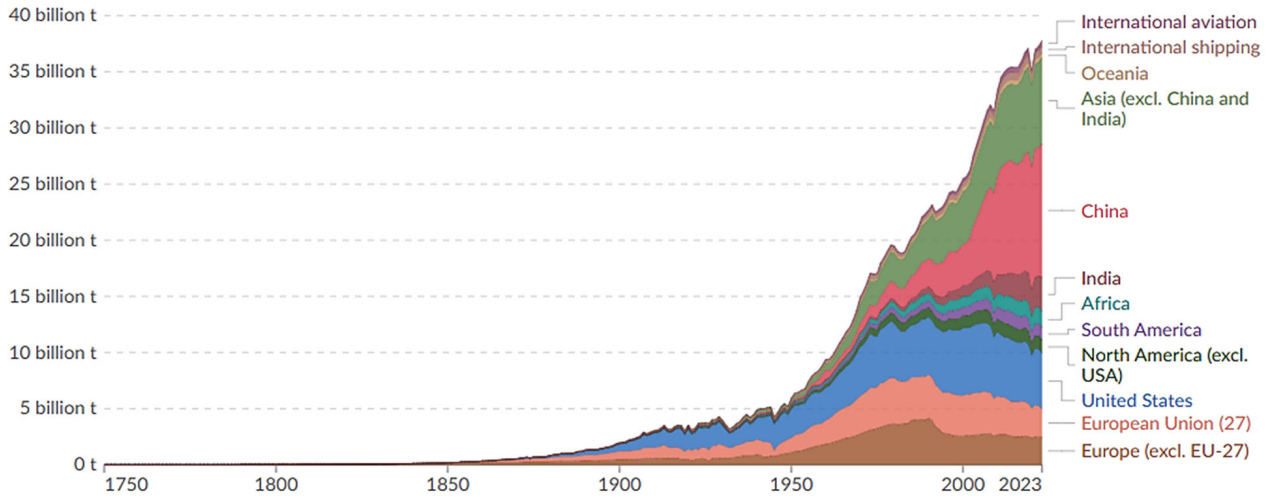

Figure 1. Annual CO2 emissions by word region, including EU27

Source: https://ourworldindata.org/co2-emissions

Figure 2. Key emitter sectors of CO2 in Republic of Moldova, y. 2020

Source: https://eu4climate.eu/moldova/?utm_source=chatgpt.com

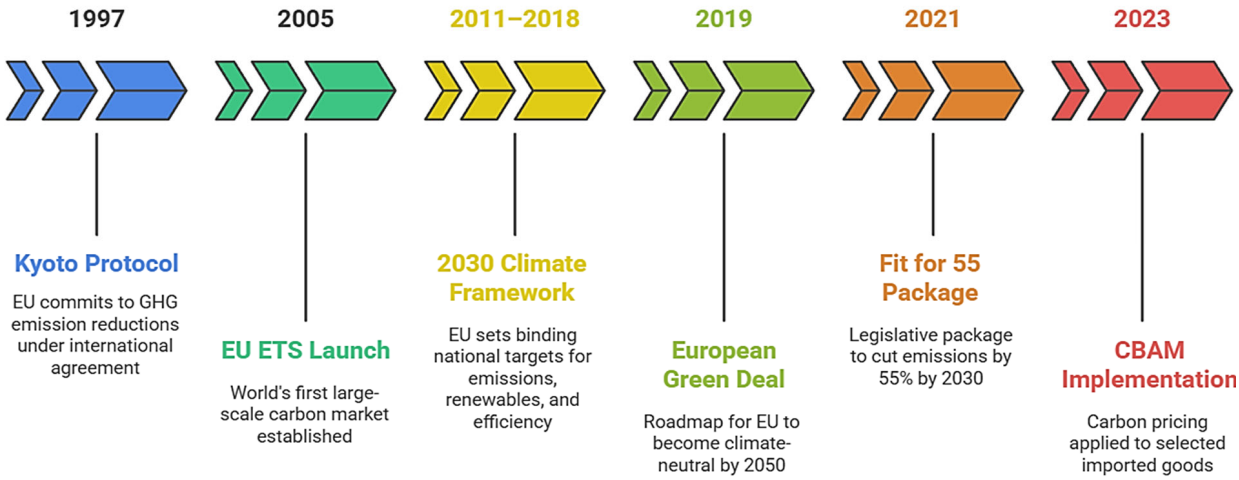

Figure 3. Key milestones of EU climate change instruments

Source: author's elaboration

Table 1
European Union main climat instruments

EU climate instrument	Main goal
EU Emissions Trading System (EU ETS)	Limit greenhouse gas emissions from power and industry sectors via a cap-and-trade system, encouraging low-carbon investment.
European Green Deal	Achieve climate neutrality by 2050 through integrated policies across energy, transport, industry, and agriculture.
Fit for 55 Package	Reduce EU greenhouse gas emissions by 55% by 2030, updating multiple directives and regulations to operationalize the Green Deal.
Carbon Border Adjustment Mechanism (CBAM)	Apply a carbon price to selected imported goods to prevent carbon leakage and ensure fair competition with EU-produced products.

Source: author's elaboration

3. Moldova's Economic Structure and Vulnerability to New Environmental Standards

Over the last decade, Moldova's economy showed moderate but uneven growth. Between 2013 and 2019, real GDP grew on average by 2.9% per year (FocusEconomics, 2023). In 2020, the economy contracted by 7% due to the COVID-19 pandemic, which disrupted trade and remittances. Recovery was strong in 2021–2023, with GDP expanding by 16.5% in 2023, largely driven by a 32% increase in agricultural output, particularly in wine, fruits, and vegetables (Intellinews, 2023).

Over the last 10 years, the Republic of Moldova has made progress in aligning its economic priorities with the European Union's climate change policies. The country's economic structure composed of services (around 64.8% of GDP), industry (21%), and agriculture (7.1%) (National Bureau of Statistics, 2024). This particular structure offers a strategic foundation for the gradual integration of EU climate and environmental standards. Each of these sectors interacts directly with the EU's main climate frameworks, such as the European Green Deal (2019), the EU Climate Law (2021), and the Fit for 55 package, all designed to achieve climate neutrality in Europe by 2050.

The service sector, which now is the largest contributor to Moldova's GDP, plays a central role in supporting the green transition. Within this sector,

information and communication technologies (ICT) have become a national growth engine, expanding from 3% of GDP in 2016 to over 7% in 2023 (Invest Moldova Agency, 2024). This digital expansion aligns closely with the EU Green Deal's twin transition, the simultaneous push for digitalization and decarbonization. ICT and financial services provide essential tools for energy monitoring and sustainable investment. Furthermore, the rise of knowledge-based services positions Moldova to participate in EU-funded programs promoting green innovation, smart infrastructure, and low-carbon business models.

The industrial sector, having a smaller share of GDP, is essential for Moldova's sustainable transformation. Industrial activities such as food processing, construction materials, and automotive components are increasingly expected to comply with EU climate standards, particularly those introduced under the EU Industrial Strategy and Circular Economy Action Plan. The structure of Moldova's industry which is dominated by light manufacturing rather than heavy emissions-intensive production, it gives it a comparative advantage in adopting clean technologies and resource efficiency standards. Integration with the EU Emissions Trading System (ETS) mechanisms and preparation for the Carbon Border Adjustment Mechanism (CBAM) will, in the long term, facilitate industrial modernization and improve competitiveness in European markets.

In the agricultural sector, although its share in GDP has declined to about 7%, it remains crucial to the country's export base and rural employment. Agriculture's structure aligns with several EU initiatives promoting sustainable and resilient food systems, such as the Common Agricultural Policy (CAP) and the Farm to Fork Strategy. Through cooperation with the EU4Environment and ENPARD programs, Moldova has begun to adopt greener agricultural practices, including climate-smart farming, soil preservation, and reduction of fertilizer and pesticide use. The structure of Moldova's agriculture, based on diversified crops and significant organic potential, allows it to transition effectively toward sustainable food production and low-emission rural development, key objectives under EU climate policy.

Thus, the current structure of Moldova's economy provides a balanced platform for implementing EU climate change policies. Rather than requiring radical restructuring, Moldova's economy is positioned for gradual green integration, in which the service sector drives innovation, industry adopts clean technologies, and agriculture transforms into a sustainable and resilient production system. This structural composition allows Moldova not only to comply with EU environmental standards but also to benefit economically from the ongoing European green transition through access to green finance, technology transfer, and market opportunities within the EU.

The following table (Figure 4) presents the composition of Moldova's exports to the European Union in 2022, broken down by economic sector, highlighting the relative shares of agriculture, industry, and services.

So, according to this structure we will examine the vulnerabilities of these main exporting categories of goods of these sectors to the EU's climate change policies.

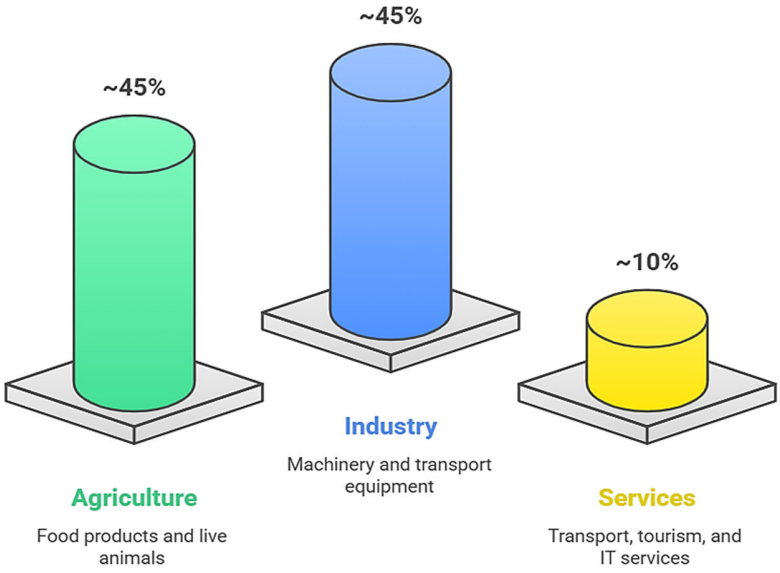

Figure 4. The Republic of Moldova's exports to the European Union, y. 2022, by sector of provenience

Source: author's elaboration based on the data of National Bureau of Statistics

The agricultural sector has long been a cornerstone of the Republic of Moldova's economy, both historically and structurally. Despite its declining share in GDP, the sector remains of strategic economic and social importance. It employs over 27% of the labor force, contributes significantly to exports, and sustains rural livelihoods across the country. Main agricultural outputs include grains, fruits, vegetables, sunflower oil, and wine, products that define Moldova's international trade profile and cultural identity (Invest Moldova Agency, 2024). The wine industry, in particular, has positioned Moldova as one of the largest per-capita wine producers in the world, with over 70% of total wine exports directed to EU markets following the EU-Moldova Deep and Comprehensive Free Trade Area (DCFTA) agreement.

Over the last three decades, Moldova's agricultural development has faced multiple structural and environmental challenges. The fragmentation of land ownership following post-Soviet privatization led to the emergence of numerous smallholder farms with limited capacity for mechanization or investment. Based on the statistical overview of the National Bureau of Statistics of Moldova, approximately 75% of farms operate on less than 5 hectares, which restricts economies of scale and the adoption of modern technologies. Furthermore, climate variability has become a defining factor in the sector's volatility. Prolonged droughts in 2007, 2012, and 2020 caused agricultural output to decline by over 25% in some years, directly reducing national GDP growth (FAO, 2022).

Another persistent issue is soil degradation. Around 26% of Moldova's arable land is affected by erosion and nutrient loss, while irrigation infrastructure covers only about 10% of cultivated areas (European Environment Agency, 2023). These problems, combined with low investment in agricultural research, outdated irrigation systems, and dependence on fossil-fuel-based machinery, have limited productivity and resilience. Despite recent improvements, agriculture in Moldova still contributes over 11% of total greenhouse gas emissions, primarily from fertilizer use, livestock, and inefficient energy consumption.

The agricultural sector is also the most climate-sensitive and resource-dependent, making it directly exposed to EU climate instruments such as the European Green Deal (2019), the Farm to Fork Strategy (2020), and the Common Agricultural Policy (CAP) reforms.

The Farm to Fork Strategy, a central component of the EU Green Deal, promotes environmentally sustainable food systems through targets such as reducing pesticide use by 50%, fertilizer use by 20%, and increasing organic farming to 25% of total farmland by 2030 (European Commission, 2023). These objectives will directly influence Moldovan agriculture, as the country seeks to align its production and export standards with EU markets:

– Moldovan farms will need to adopt precision agriculture, integrated pest management, and soil conservation techniques.
– The government will have to establish national eco-schemes to reward farms that reduce emissions, improve soil carbon, and adopt organic certification.
– Over time, these changes would increase production efficiency, reduce vulnerability to droughts, and improve access to EU agri-food markets, where environmental standards are increasingly non-negotiable.

EU climate policy will open access to green finance mechanisms designed to support agricultural modernization. Moldova, as an EU candidate and Eastern Partnership member, is eligible for financial instruments such as the EU4Environment and the European Bank for Reconstruction and Development (EBRD) Green Economy Financing Facility (GEFF). These programs can fund irrigation modernization, energy-efficient farm machinery, renewable-powered storage, and climate-resilient crops. The CAP's "Green Architecture" can serve as a model for Moldova's domestic agricultural subsidies, encouraging eco-friendly practices while maintaining farm income stability. In practice, this could mean grants and low-interest loans for farms that switch to drip irrigation, install solar-powered water systems, or engage in reforestation of degraded land.

Moldova's participation in the EU Emissions Monitoring and Reporting Mechanism (MRV) and its future linkage with the Carbon Border Adjustment Mechanism (CBAM) will affect the agricultural supply chain indirectly. Processed agricultural exports (e.g., wine, vegetable oils, canned fruits) will need to demonstrate carbon-efficient production and traceable supply chains. Moldovan producers will be required to maintain emission inventories, track fertilizer-related greenhouse gas emissions, and comply with EU sustainability labelling.

The sector is dominated by light manufacturing, particularly food processing, textiles, and automotive components, as well as construction materials and energy-intensive industries such as cement and metallurgy.

As Moldova deepens its integration with the EU through the Association Agreement and the Deep and Comprehensive Free Trade Area (DCFTA), its industrial policy is increasingly shaped by the EU's climate change agenda, notably the European Green Deal (2019), the EU Industrial Strategy (2020), and the Fit for 55 Package (2021) (Table 2).

The services sector is the dominant component of the Moldovan economy. It includes a wide range of subsectors – transport and logistics, information and communication technologies (ICT), finance,

Table 2
Influence of EU climate change policy on the industrial sector of the Republic of Moldova

Policy area	Relevant EU climate policy instruments	Concrete impacts / expected changes
Energy efficiency & emissions reduction	EU Energy Efficiency Directive (EED), Industrial Emissions Directive (IED), Energy Community Treaty	Need for industrial energy audits, low-carbon technologies, and renewable integration
Carbon Border Adjustment Mechanism (CBAM)	EU CBAM (2026 onward)	Need to prove low-carbon production for cement, metal, glass, etc.; risk of export barriers if non-compliant
Circular economy & Waste management	EU Circular Economy Action Plan, EU Waste Framework Directive	Implementation of eco-design, recycling standards, Extended Producer Responsibility (EPR)
Energy mix decarbonization	EU Green Deal, EU4Energy Initiative, Renewable Action Plan (Energy Community)	Integration of renewables (solar, biomass) into industrial production; carbon intensity reduction
Digital & Technological Innovation	EU Industrial Strategy, Horizon Europe Program	Adoption of digital carbon tracking, smart manufacturing, ISO 14001 standards
Green Industrial Development	EU Green Industrial Strategy, Fit for 55 Package	Development of renewable components, EV parts, sustainable materials

Source: author's elaboration

public administration, trade, and tourism. As Moldova advances toward European integration, this sector is becoming the main channel for the implementation of the EU climate and environmental agenda (Table 3).

The costs of transitioning to a cleaner production model in response to climate change, resulting from the application of the EU's climate change instruments, as estimated on average by various international and European organizations such as the EBRD, the Institute for European Environmental Policy (IEEP), and others, indicate that the costs borne by each sector are expected to increase as follows (Table 4).

Table 4. shows that EU climate policies will moderately raise production costs across Moldova's economy. Agriculture faces the largest increase (+5–15%) due to sustainable farming investments and certification. Industry will see +3–8% higher costs from energy efficiency upgrades and CBAM compliance, while services experience a smaller +1–4% rise linked to green transport and digital reporting.

Considering the challenges that the economy of the Republic of Moldova will face in aligning with the European Union's climate policies, we propose the following recommendations to the Government:

– establish a national green transition fund, by creating a dedicated financing mechanism to support businesses and farmers in adopting low-carbon technologies, renewable energy sources, and sustainable production methods. This fund could pool resources from the national budget, EU pre-accession instruments, and international donors such as the EBRD and World Bank;

– introduce fiscal incentives for green investment, by offering tax reductions, grants, or low-interest loans for companies investing in energy efficiency, waste reduction, or carbon-neutral production systems. This will reduce the short-term financial burden of compliance with EU standards;

– support sustainable agriculture modernization, expanding programs that assist farmers in implementing precision farming, organic production, and efficient

Table 3
Influence of EU climate change policy on the services sector of the Republic of Moldova

Service subsector	EU climate policy instruments	Concrete impacts and expected changes
Transport and logistics	EU Sustainable and Smart Mobility Strategy (2020); EU4Transport; TEN-T Extension; Fit for 55	Transition to low-emission vehicles, electrification of public transport, rail network modernization, better logistics integration with EU standards
Information and Communication Technologies (ICT)	Digital Europe Programme; Green Digital Coalition; Horizon Europe; EU4Digital	Development of smart climate data tools, emission monitoring systems, and sustainable ICT solutions
Financial and banking services	EU Sustainable Finance Framework; Taxonomy Regulation (2020); EBRD GEFF; EU4Environment – Green Economy	Integration of ESG and sustainability disclosure standards; creation of green credit lines and investment funds
Tourism and hospitality	EU Strategy for Sustainable Tourism (2021); EU4Business; Black Sea Sustainable Tourism Initiative	Eco-certification of facilities, sustainable resource management, digitalized eco-tourism services

Source: author's elaboration

Table 4
Cost increase as a result of EU climate change instruments implementation in the Republic of Moldova's economy (by sectors)

Sector	Estimated cost increase (medium term, 5–10 years), %	Main cost drivers	Long-term outcomes
Agriculture	+5% to +15%	Sustainable inputs, irrigation systems, eco-certification, new machinery	Higher productivity, better quality standards, improved EU market access
Industry	+3% to +8%	Energy efficiency upgrades, emission control, CBAM compliance, renewable integration	Lower long-term energy costs, modernization, increased export competitiveness
Services	+1% to +4%	Green transport, digital monitoring systems, eco-certification in tourism and ICT	Operational efficiency, sustainability reputation, integration with EU standards

Source: author's elaboration based on IEEP, BERD's data

irrigation systems. Provide technical training and access to EU certification schemes to ensure competitiveness in the EU market;

– accelerate industrial decarbonization, developing sectoral roadmaps for energy-intensive industries to gradually reduce emissions, supported by innovation grants and partnerships with EU industrial clusters. It is necessary to prioritize modernization in construction materials, food processing, and light manufacturing.

4. Conclusions

The findings indicate that the European Union's climate framework will increasingly influence Moldova's economic direction, shaping how the country produces, trades, and manages its resources. The gradual integration into the EU environmental agenda is not only a political necessity but also an economic turning point that demands structural change. Although the implementation of climate regulations may temporarily raise operational expenses, especially in agriculture and manufacturing, but the overall effect is expected to be positive in the long run. These adjustments stimulate innovation, encourage cleaner production methods, but also create opportunities for new green industries.

Moldova's evolving economy, with a strong services component and growing industrial potential, provides a foundation for transitioning toward sustainability. Success will depend on the country's ability to attract investment, strengthen institutional capacity, and guide private enterprises through this transformation. In essence, aligning with the EU's climate commitments should not be seen merely as a cost, but as a path to modernization, energy independence, and improved competitiveness.

References:

European Bank for Reconstruction and Development (EBRD) (2024). Green Economy Financing Facility (GEFF) – Moldova Overview. Available at: https://www.ebrdgeff.com/moldova/

European Commission (2021). Fit for 55. Available at: https://www.consilium.europa.eu/en/policies/fit-for-55/

European Commission (2021). European Climate Law and Fit for 55 Package. Available at: https://climate.ec.europa.eu/eu-action/european-green-deal_en

European Commission (2023). European Green Deal and Fit for 55 Package. Available at: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en

European Commission (2023). Farm to Fork Strategy and EU Green Deal targets. Available at: https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en

European Environment Agency (2023). Agriculture and climate change in Eastern Europe.

European Environment Agency (2023). Eastern Partnership countries and agricultural climate resilience. Available at: https://enlargement.ec.europa.eu/system/files/2020-12/c_2020_9248_f1_annex_en_v1_p1_1117679.pdf

Food and Agriculture Organization of the United Nations (FAO) (2022). Climate impacts on agriculture in Eastern Europe and Central Asia. Available at: https://openknowledge.fao.org/server/api/core/bitstreams/0618aa17-4de7-452b-aaaa-d0eec346e2cd/content

FocusEconomics (2023). Moldova economic outlook. Available at: https://www.focus-economics.com/countries/moldova

Intellinews (2023). Available at: https://www.intellinews.com/moldova-s-gdp-up-16-5-in-2023-317232/

Invest Moldova Agency (2024). Economic overview 2024. Available at: https://invest.gov.md/en/pages/economic-overview

Macrotrends (2023). Moldova economic growth rate 2013–2023. Available at: https://www.macrotrends.net/global-metrics/countries/mda/moldova/economic-growth-rate

EBRD (2024). Green Economy Financing Facility – Moldova. Available at: https://ebrdgeff.com/moldova/

UNDP, EU4CLIMATE (2024), Climate policy development and advancing cooperation with the EU in Moldova. Available at: https://eu4climate.eu/wp-content/uploads/2023/06/MOLDOVA_EU4Climate_2023.pdf

Received on: 08th of October, 2025
Accepted on: 12th of November, 2025
Published on: 28th of November, 2025