Environmental governance and sustainable development goals implementation in Romania: gaps, progress, and policy imperatives

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Abstract. This study explores the intricate relationship between environmental factors and governance mechanisms within the context of implementing the sustainable development goals (SDGs) in Romania. Focusing on six key SDGs: 3 (Health and Well-being), 6 (Clean Water and Sanitation), 13 (Climate Action), 15 (Life on Land), 16 (Peace, Justice and Strong Institutions), and 17 (Partnerships for the Goals), the research offers a critical examination of the gaps between global statistical indicators and Romania's national realities. By combining standardized global datasets with national reports, policy documents, and sectoral studies, the study adopts a dual analytical framework that contrasts official SDG performance metrics with on-the-ground institutional, infrastructural, and socio-environmental challenges. Methodologically, the study relies on a comparative and contextualized assessment, integrating data from the Sustainable Development Report 2025, the Romanian Environmental Status Report 2023, and various EU and national strategies. This mixed-methods approach enables the identification of key structural weaknesses, including institutional fragmentation, uneven administrative capacity, and limited policy coherence, that hinder Romania's ability to implement Agenda 2030 effectively. Emphasis is placed on environmental governance as a cross-cutting enabler for sustainable transitions, highlighting the relevant role of institutional reform, intersectoral partnerships, and enhanced transparency. The findings reveal that while Romania shows moderate progress in areas such as renewable energy deployment (SDG 13) and infrastructure development (SDG 6), substantial barriers persist in ensuring equitable access to services, protecting biodiversity, and enforcing environmental legislation (SDG 15 and SDG 16). The findings illustrate how discrepancies in data reporting, urban-rural divides, and governance inefficiencies contribute to stagnation or decline in specific SDG domains. The study advocates for a more integrated governance model that aligns environmental management with strategic planning and institutional accountability. It underscores the urgent need to harmonize national priorities with global sustainability frameworks, recommending tailored policy interventions and investment in capacity-building as critical pathways for accelerating Romania's SDG performance by 2030.
Key Words: Agenda 2030, biodiversity conservation, climate adaptation, institutional capacity, renewable energy, water management.

Introduction. This study examines the complex relationships between environmental factors and governance mechanisms, as well as the intricate connections between these factors and governance mechanisms, within the context of implementing the sustainable development goals (SDGs) in Romania. Thus, we aimed to highlight the interconnections between environmental factors, such as air quality, water resources, soil, biodiversity, and climate change, and the governance mechanisms that influence them. More precisely, SDGs directly linked to these environmental dimensions are addressed: SDG 3 (Health and Well-being), SDG 6 (Clean Water and Sanitation), SDG 13 (Climate Action), and SDG 15 (Life on Land). These are supported by SDG 16 (Peace, Justice and Strong Institutions) and SDG 17 (Partnerships for the Goals), which provide the necessary institutional framework and cooperation mechanisms for achieving environmental targets (see Figure

1). Through this integrated approach, the study contributes to understanding how institutional deficiencies influence environmental outcomes and proposes directions for optimizing environmental governance.

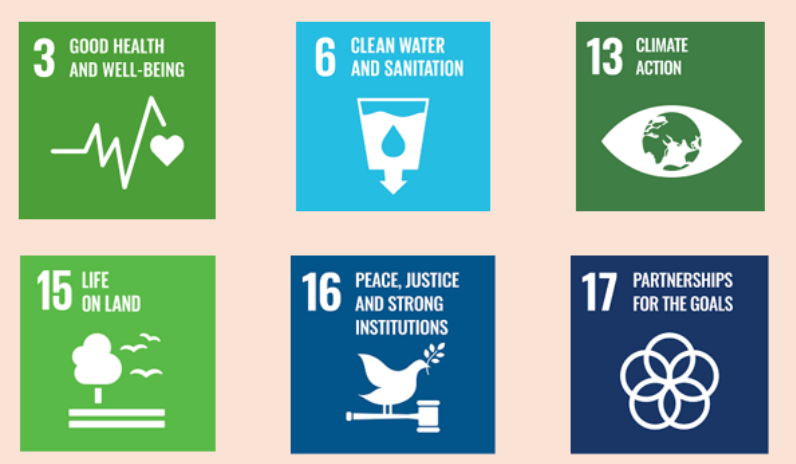

Figure 1. Analysed SDG for Romania.

In the current context of global challenges related to climate change, environmental degradation, and socio-economic imbalances, the 2030 Agenda for Sustainable Development, adopted by the United Nations, represents a fundamental framework for guiding public policies and national strategies. The 17 SDGs define an integrated set of targets aimed at environmental protection, promoting social inclusion, and stimulating sustainable economic growth, in an interdependent and complementary manner (United Nations 2015).

The case study about the progress of SDGs implementation in Romania uses updated data, including from the Annual Report on the State of the Environment in Romania from 2023, prepared by the National Environmental Protection Agency, which provides a detailed perspective on the real state of environmental factors at the national level (ANPM 2023). By integrating these statistical data with information extracted from strategies and official documents, both the progress made and the main challenges and gaps in implementing the 2030 Agenda in Romania are highlighted (Government of Romania 2018; Sachs et al 2025). This approach facilitates a complex understanding of how environmental factors and governance interact within national sustainable development efforts, underscoring the importance of efficient governance and the coherent integration of sustainable development objectives into environmental policies. In a context marked by increasing pressures on natural resources and the urgent need to adapt to climate change, this analysis provides a solid basis for formulating policy recommendations and implementing sustainable practices.

According to the Sustainable Development Report 2025 (Sachs et al 2025), Romania ranks 37th out of 167 countries evaluated in the global SDG Index ranking, with an overall score of ~77 points out of 100, reflecting a position above the global average. In the European context (41 countries analysed), Romania ranks 29th (score ~64), below the European Union's general average of 72.8 (Lafortune & Fuller 2025). Furthermore, 19 of the top 20 countries in the global SDG Index ranking are European states. Still, these performances are uneven across countries, and many dimensions of sustainable development have stagnated since 2015 (Lafortune & Fuller 2025). Thus, in accordance with data provided by the Sustainable Development Report (Sachs et al 2025), Romania faces significant challenges in achieving several SDGs, particularly in the areas of eradicating hunger (SDG 2), health and well-being (SDG 3), education (SDG 4), gender equality (SDG 5), industry, innovation and infrastructure (SDG 9), reducing inequalities (SDG 10), responsible consumption and production (SDG 12), climate action (SDG 13), protecting terrestrial ecosystems (SDG 15), strengthening institutions (SDG 16) and partnerships for the goals (SDG 17). In contrast, regarding poverty reduction (SDG 1), indicators reveal a generally positive trend, reflecting progress made in this sector.

Indicators for SDG 2 (Zero Hunger), 3 (Good Health and Well-being), 5 (Gender Equality), 6 (Clean Water and Sanitation), 7 (Affordable and Clean Energy), 9 (Industry, Innovation and Infrastructure), 10 (Reduced Inequalities), 11 (Sustainable Cities and Communities) and 17 (Partnerships for the Goals) show moderate improvement. In contrast, indicators for SDG 8 (Decent Work and Economic Growth), 13 (Climate Action), 14 (Life Below Water), 15 (Life on Land) and 16 (Peace, Justice and Strong Institutions) show stagnation, and for SDG 4 (Quality Education) and 12 (Responsible Consumption and Production) a decline in performance is noted. The indicator for SDG 1 (No Poverty) is classified as "on track", indicating the maintenance of current achievements in the field of poverty reduction.

The study is organized as follows. Section 2 details the methodology used in the comparative analysis of SDG indicators. Section 3 presents the results obtained for each of the six analysed goals (SDG 3, 6, 13, 15, 16, 17) and develops a critical discussion on the discrepancies between official reports and national realities. The study concludes with a series of final recommendations for improving governance and integrating sustainability into Romanian public policies.

Methodology. The method applied to achieve the objective was based on a structured comparative analysis, conducted in three main stages.

(1) Collection of official data: the reference point was the Sustainable Development Report 2025 (Sachs et al 2025), which uses standardized indicators to assess countries' progress in implementing the 2030 Agenda. As the report's authors emphasize, "SDG indicators are based on national averages and internationally comparable data" (Sachs et al 2025), which facilitates global comparison but may hide internal variations;

(2) Integration of national and sectoral sources: to capture the Romanian specific context, international data were supplemented with information extracted from annual reports on the state of the environment (ANPM 2023), the National Strategy for Sustainable Development 2030 (Government of Romania 2018), as well as from academic studies and independent analyses. These provided additional details on air quality, water resource pollution, biodiversity, as well as institutional capacity and territorial disparities;

(3) Comparison and contextualization: based on these sources, discrepancies between global indicators and national realities were identified. For example, the literature shows that "performances in achieving the SDGs are unevenly distributed, concentrating in the western and central regions, while the south and east lag behind" (Benedek et al 2021).

Therefore, our analysis did not focus solely on presenting statistical indicators, but also sought to incorporate contextual factors, such as administrative fragmentation, limited institutional capacity, and issues like illegal logging and habitat degradation, that directly impact the implementation of the 2030 Agenda in Romania.

This dual methodological approach (utilizing global indicators and contextual analysis) enabled the highlighting of differences between the "official" picture of progress and national realities, contributing to the formulation of more nuanced conclusions and policy recommendations tailored to the local context.

Results and Discussion

Assessment of SDG indicators for Romania. This subsection presents the main findings from a comparative analysis of Romania's performance in achieving some of the priority objectives of the 2030 Agenda. Six SDGs (3, 6, 13, 15, 16, and 17) were selected, as they are relevant to understanding the connections between governance, infrastructure, environmental policies, and social inclusion. The results are discussed from a dual perspective: official statistical reports and the contextual national reality, marked by structural challenges.

SDG 6. Clean water and sanitation. The analysis of Romania's performance regarding SDG 6 reveals a complex picture, where progress in the infrastructure system coexists with significant challenges regarding water quality and equitable access. Based on official data

from SDG6Data.org, we contextually compare the country's progress against the assumed targets of the 2030 Agenda and national strategic directions (UN-Water 2019).

Thus, in 2022, 82% of Romania's population benefited from safe drinking water services (according to indicator SDG 6.1.1), and approximately 88% had access to a properly managed sewerage network (according to SDG6.2.1). However, only 30% of wastewater was safely treated (SDG6.3.1), and in 2023, only half of the monitored water bodies met environmental quality standards (SDG6.3.2) (UN-Water 2019). These statistics indicate notable progress in drinking/wastewater infrastructure, but critical gaps persist in treatment systems, which risk the degradation of ecosystem status and public health (UN-Water 2019).

The economic benefit generated using water by the population and industry in Romania, according to indicator 6.4.1 of the Sustainable Development Goals (UN-Water 2019), is estimated at approximately 24 USD per cubic meter of water used, reflecting the high (economic) efficiency of managing this essential resource in the national context. However, these performances may be compromised by administrative fragmentation and a weak capacity for territorial cohesion.

These data reveal a delicate balance between the distribution of infrastructure (water and sewerage) and major districts in terms of wastewater treatment, with significant implications for environmental quality and public health.

In the field of integrated water resources management (SDG 6.5), Romania achieved an implementation rate of 79% in 2023, with all transboundary water basins covered by operational agreements. This reflects Romania's commitment within the EU and transnational conventions, with active participation in plans such as the Danube River Basin Management Plan or the Black Sea Plan (UN-Water 2019).

Regarding the rural environment, Romania's National Strategy for Sustainable Development 2030 (Government of Romania 2018) provides a phased plan for improving sewerage and treatment infrastructure, with progressive objectives. However, it does not establish precise quantitative targets for connection rates over specific time horizons (Department for Sustainable Development 2019). Related documents, such as the National Water Management Plan (NWMP) and the National Waste Management Plan (NWMP), emphasize the need to extend coverage in rural areas, primarily through projects funded by European funds, but do not mention clear quantitative targets for 2030 or 2050 (ANAR 2023; MMAP 2025). European Commission reports (2024) confirm that Romania has not yet met the objectives of Directive 91/271/EEC on wastewater treatment in the rural environment, where a significant proportion of localities remain without access to treatment plants that comply with EU standards, making them vulnerable to sanctions (European Commission 2024). The situation is exacerbated by institutional fragmentation. Thus, the National Administration "Romanian Waters" (ANAR) is responsible for planning water infrastructure at the national level. At the same time, local authorities implement projects that are technically non-compliant with PNRR requirements, resulting in financial rejections. Furthermore, according to statements by Diana Buzoianu, Minister of the Environment, ANAR failed to access funds of approximately 350 million euros intended for dikes and dams, resulting in major blockages and necessitating an audit and possible administrative measures (Buzoianu 2025). The European Commission warns that corrective measures must be accelerated to avoid triggering infringement procedures (a procedure for finding failure to fulfil obligations) for non-compliance with EU water directives (Rasenberg 2025). This blockade occurs in the context where Romania had payments of about 870 million euros from the PNRR suspended, and corporate governance structures and absorption capacity are considered insufficient (Europuls 2025). Despite the commitments in the SNDD 2030 and the PNRR, the slow pace of implementation and the lack of an integrated long-term vision show a governance crisis in the environmental field, which requires rapid reversal through strengthening institutional capacity and transparency in the use of European funds.

Currently, Romania is running a large-scale program to modernize water and sewerage infrastructure, with an estimated value of approximately 2 billion euros, in about 900 localities, targeting 8,500 km of water pipes and 9,500 km of sewerage, according to

statements by the Minister of Investments and European Projects, Marcel Boloș (cited in Luca 2025).

This initiative reflects a convergent approach between different European Union funding instruments: the Cohesion Operational Program (OP), the National Recovery and Resilience Plan (PNRR), and the Administrative Capacity Operational Program (SIPOCA 613). The strategy aims not only at infrastructure development but also at strengthening institutional capacity in managing and implementing projects (General Secretariat of the Government of Romania 2025).

The Sustainable Development Operational Program, managed by the Central Regional Development Agency through the Central Region Program 2021-2027 (Regional Development Agency Center 2025), provides financial support for regional water and sewerage infrastructure, especially for agglomerations with over 2,000 inhabitants. The updated guides (April 2025, January 2025) specify the eligibility conditions, technical principles, and performance indicators for project implementation, emphasizing the role of cohesion and administrative capacity instruments, as well as the mandatory compliance with ecological and co-financing criteria (Regional Development Agency Center 2025). The strategic objective at the national level is to connect over half (55%) of the rural population to sewerage systems by 2050, as well as to ensure complete treatment of urban wastewater by 2030, in accordance with EU Directive 91/271/EEC (Government of Romania 2018).

Although Romania benefits from funding through the Sustainable Development Operational Program and other instruments for infrastructure modernization, only 60% of the resident population was connected to the sewerage network in 2024, according to the NIS (2025). The EEA report indicates that countries in Eastern Europe, including Romania, record wastewater treatment rates significantly below the EU average of 80-90% (EEA 2021). These data indicate major delays and require sustained investments and governance reforms to achieve compliance with EU Directive 91/271/EEC.

In conclusion, Romania has made significant progress in achieving Sustainable Development Goal No. 6, as reflected in the expansion of water and sewerage infrastructure and the strengthening of regional operators' capacity to manage services efficiently. However, the field remains marked by structural challenges, including gaps between urban and rural environments, administrative fragmentation, and an insufficient level of integration between water policies, environmental protection, and climate change adaptation policies. To ensure the sustainability of investments and improve service quality, an integrated approach is essential, combining technological modernization, strengthening institutional capacity, and actively involving local communities.

SDG 13. Climate action and clean energy. Goal 13 of the 2030 Agenda imposes immediate and coordinated measures to combat climate change. In Romania, these efforts are articulated through the Integrated National Plan in the field of Energy and Climate Change 2021-2030, revised and published in October 2024 (Government of Romania 2024). The new version sets an ambitious target to increase the share of renewable energy from 30 to 38% of gross final consumption by 2030. Although this represents a significant improvement, the target remains below the European Commission's recommendation of approximately 41%, reflecting the challenges Romania faces in its energy transition (European Commission 2023b). This ambitious objective reflects Romania's commitment to accelerate the transition to a low-carbon economy, in accordance with European climate goals.

Significant funding for the energy transition is provided through the PNRR, which allocates approximately 1.6 billion EUR, of which 460 million EUR is destined for renewable energy, 300 million EUR for high-efficiency cogeneration, and 400 million EUR for modernizing transport infrastructure, funded through the Modernisation Fund (Ministry of Energy 2022). In 2024, Romania installed an additional 700 MW of generating capacity from renewable sources (solar and wind), out of a total of 1,200 MW of new capacity, primarily achieved through projects funded by the PNRR. Of this, 333 MW were connected in December through 116 separate projects (Strategic Energy Europe 2025). The target

for 2025 is to double this capacity, aiming for approximately 1,400-1,500 MW of renewable energy generation, thereby strengthening Romania's commitment to climate action.

Romania currently has approximately 3 GW of installed wind power and 1.8 GW of installed photovoltaic capacity, reflecting significant progress in developing renewable energy production capacity (Andronache 2023). However, requests for connecting new renewable capacities to the grid exceed 55 GW, indicating high interest in sector investments, but also major challenges for the existing infrastructure (ANRE 2025). This situation underscores the need to modernize transmission networks and integrate energy storage systems (BESS) to efficiently absorb the large volume of intermittent energy from wind and photovoltaic sources (Soare 2025).

The integration of offshore wind (i.e., located at sea) represents a strategic opportunity for Romania. The adoption of Law no. 121/2024 regarding offshore wind energy (Parliament of Romania 2024) established the necessary legal framework for the development of wind energy projects in the Black Sea. The law defines the responsibilities of public authorities and outlines the authorization procedures, as well as the conditions for leasing maritime areas and obtaining operating licenses. However, the implementation of projects depends on the elaboration of secondary normative acts and the realization of investments in associated port and transport infrastructure.

The Electricity Transmission Network Development Plan 2016-2025, developed by Transelectrica S.A. (2014), remains a reference document for the modernization and expansion of the national energy infrastructure. It sets strategic objectives regarding increasing transport capacity, integrating renewable sources, and ensuring the security of electricity supply. Furthermore, the Electricity Transmission Network Development Plan 2024-2033 emphasizes that network modernization and the implementation of storage solutions are essential for the massive integration of renewable energy, preventing system congestion and ensuring the stability of the national electricity grid (Soare 2025). Thus, although Romania already has significant alternative energy capacities, the success of the energy transition largely depends on the development of effective transport infrastructure and supportive policies for investments in wind and photovoltaics.

On the nuclear front, Romania signed a contract worth approximately 3.2 billion EUR for the construction of units 3 and 4 at Cernavodă, each with a capacity of around 700 MW, totalling 1,400 MW (EnergoNuclear 2024). These units will consolidate the national energy mix, contributing to non-polluting energy production and supporting the achievement of climate neutrality by 2045, a national target more ambitious than the European one. The project also involves the development of associated infrastructure, ensuring integration into the electricity transmission network and supporting the stability of the national energy system. The commissioning of units 3 and 4 is planned for the early 2030s, representing the most important nuclear energy project in Romania since the Revolution (Nuclearelectrica 2024).

Romania experienced stagnation in adding renewable capacity starting in 2013, due to reduced subsidies for renewable energy projects. To revitalize the sector, Romanian authorities introduced a "contracts for difference" (CfD) mechanism [these represent an agreement between two parties, one in the position of buyer and the other in that of seller, by which they agree to pay the difference between the market value of an underlying asset, such as stocks, currencies, commodities or indices, at the time of opening and its value at the time of closing the contract (ESMA 2015)], which provides for the organization of two rounds of auctions, in 2024 and 2025, with a total capacity of 5 GW, for onshore solar and wind energy projects. The goal is to support the development of 10 GW of renewable capacity by 2030. The success of this energy transition depends mainly on the rapid implementation of these measures, the stability of regulations, and the ability to attract investments in the necessary infrastructure (Energynomics 2024).

Thus, Romania's commitment to SDG 13 is supported by integrated policies, financial measures, and energy revitalization; however, success depends on the speed of implementation, regulatory stability, and the absorption of strategic investments in infrastructure and renewable energy capacities.

SDG 3. Health and well-being. Goal 3 of the 2030 Agenda aims to ensure healthy lives and promote well-being for all ages. According to the 2023 Environmental Status Report of the National Environmental Protection Agency (ANPM 2023), Romania did not exceed the annual EU limit for PM_{10} of 40 μg m^{-3}. However, in certain cities, such as Constanța, frequent daily exceedances of the limit values were recorded. In Bucharest and industrial areas such as Galaţi, pollution with fine particles $PM_{2.5}$ and PM_{10} often exceeds legal limits and World Health Organization (WHO) recommendations, having a significant impact on public health (Ecopolis 2025).

According to WHO and Eurostat analyses, Romania ranks among the EU countries with the highest rates of preventable mortality (cardiovascular, cancer, and alcohol-related) and mortality associated with treatable diseases (HIV, tuberculosis) (Eurostat 2022; WHO Europe 2024). Universal access to health services in Romania remains incomplete and unequal, especially in rural areas. According to the World Health Organization Europe, although there is nominal coverage, reality demonstrates significant disparities between urban and rural environments, as well as differences in service innovation and costs borne directly by users (WHO Europe 2022, 2024).

The National Air Quality Monitoring Network (RNMCA), managed by environmental authorities, ensures the monitoring of atmospheric parameters in major urban agglomerations. However, territorial coverage remains uneven, as an important part of the stations operate partially or not at all, and in many rural localities, they are absent. According to public data from the calitateaer.ro platform, analysed by the central press (Isăilă 2024), over 60% of RNMCA stations do not transmit data consistently.

This network, administered by ANPM, is supplemented by citizen networks such as aerlive.ro (Ecopolis 2025), which operates over 44 sensors in Bucharest-Ilfov and 22 in Cluj-Napoca, in partnership with local communities and authorities. These initiatives provide real-time data, allowing for the identification of areas with high pollution levels and bringing the issue to the public agenda. However, the absence of a clear legal framework for the official integration of this data limits its integration into public health decisions, as highlighted by the "Air Quality" Working Group of the Sustainability Embassy, which insists on the need to harmonize independent networks with the RNMCA (Embassy of Sustainability in Romania 2020).

Environmental education and information campaigns represent a critical area where intervention is essential. Academic reports propose integrating environmental health components into the school curriculum and continuing professional training, especially for health professionals and public administration. Recent studies have revealed that education for sustainable development is included in specific university programs; however, its implementation is fragmented and hindered by obstacles such as limited resources and the absence of a coherent policy framework (Lazarov & Semenescu 2022).

SDG 15. Life on land. Goal 15 of the 2030 Agenda aims to protect, restore, and promote the sustainable use of terrestrial ecosystems, including forest management, biodiversity conservation, and preventing soil degradation. Romania holds one of the most important forest resources in the European Union, with a forested area of approximately 6.5 million hectares, corresponding to approximately 27% of the national territory. The analysis conducted in 2022 by MDPI/FAO confirms similar estimates: Romania had between 6.4 and 6.6 million hectares of forests, representing about 28% of the national territory (Albulescu et al 2022).

The European Commission's 2025 report highlights that although Romania has an extensive network of Natura 2000 sites and valuable biological ecosystems, the implementation of EU legislation remains incomplete, and ecosystem protection is affected by deficiencies in planning, coordination, funding, and administrative capacity. An urgent strengthening of environmental governance, increased funding, and efficient monitoring systems are needed (European Commission 2025).

Romania hosts one of the most valuable areas of virgin and old-growth forests in the European Union. According to the PRIMOFARO study conducted by EuroNatur and Agent Green, Romania holds over 525,000 hectares of primary forests, representing the largest area of this type in the EU after the Scandinavian countries. Of these, approximately

300,000 hectares are included in the Natura 2000 network, a strong signal of their ecological value, even if their adequate protection, as the report emphasizes, is undermined by institutional deficiencies. However, despite these valuable ecological assets, anthropogenic pressures remain significant. Between 2021 and 2024, approximately 4.7 million cubic meters of wood were logged from primary and old-growth forests, with almost half of this volume coming from protected areas (Schickhofer & Schwarz 2019; Agent Green 2024).

In response to these problems, in December 2024, the Romanian Parliament adopted a new Forestry Code (Law no. 331/2024), which brings a series of structural reforms. Among the most notable provisions are the ban on clear-cutting in sensitive areas, the introduction of a digitized National Forestry Register, the mandatory monitoring of forest roads through video systems, and the establishment of so-called "old-growth islands", i.e., forests entirely left out of exploitation to conserve biodiversity specific to the advanced stage of forest development (Parliament of Romania 2024). These measures align with the EU Biodiversity Strategy 2030, which provides that at least 10% of each member state's area be strictly protected (European Commission 2020).

Although these interventions represent positive steps, their effectiveness depends on practical implementation and the institutional capacity to manage socio-economic pressures on the forest fund. Overall, Romania presents both significant opportunities for conserving natural capital and major vulnerabilities resulting from unregulated exploitation, inadequate protection infrastructure, and administrative fragmentation of environmental governance.

In Romania, the existence of effective local practices of ecological restoration and circular economy, relevant for the transition to sustainable models of natural resource management, is noteworthy. A notable example is the initiatives implemented in the Danube Delta, coordinated by the Danube Delta Biosphere Reserve Administration (ARBDD), in collaboration with international organizations and research institutes. These include the hydrological reconnection of lake complexes such as Gorgova, Fortuna, and Matița, the restoration of specific vegetation, and the creation of habitats for vulnerable species, including pelicans, sturgeons, and otters (ARBDD 2024).

Although Romania has harmonized its legislative framework with EU directives on biodiversity conservation (Habitats Directive 92/43/EEC) and water resources management (Water Framework Directive 2000/60/EC), its application continues to face serious problems. The European Commission's "Review of the implementation of environmental legislation in Romania" report (2022) highlights significant delays in reporting, major gaps in national monitoring systems, and quality deficiencies in data transmitted to EU authorities. The data indicate that non-compliance with directives on water quality, air pollution reduction, and natural habitat protection persists, partly due to the lack of coherent surveillance and evaluation procedures.

Thus, the analysis of SDG 3 and SDG 15 emphasizes that the health of Romania's population is closely linked to the physical environment and natural resources. Despite some institutional progress, significant discrepancies persist in the implementation of health and conservation policies, as well as the lack of effective monitoring mechanisms and the absence of integrated control over natural resources. To address these deficiencies, the development of stable institutional frameworks, strengthening decision-making transparency, and efforts to educate and involve local communities are essential (Azadi et al 2020).

SDG 16. Peace, justice and strong institutions. Goal 16 promotes the building of effective, accountable, and transparent institutions, essential for sustainable governance and for the implementation of environmental and social objectives. In Romania, progress in this direction is mixed. On the one hand, Romania's National Strategy for Sustainable Development 2030 (Government of Romania 2018) emphasizes the need to strengthen governance, transparency, and institutional integrity, in accordance with Goal 16 of the 2030 Agenda. Developed under the coordination of the Government's Department for Sustainable Development (HG 313/2017), the Strategy provides for institutional monitoring mechanisms, strengthened administrative capacity, and inter-institutional

collaboration necessary for coherent implementation. Despite institutional reform efforts, Romania's public administration continues to be affected by structural challenges such as excessive bureaucracy, endemic corruption, and fragmentation of administrative competencies, aspects that limit the state's ability to effectively implement public policies and respond coherently to environmental and social challenges (Matei & Matei 2009; Transparency International 2024).

According to the analysis by Benedek et al (2020), the integration of SDG indicators at the regional level highlights deep disparities between counties, especially between the eastern and southern regions, compared to those in the west and centre of Romania, regarding the quality of institutions, access to justice, and public services. These inequalities have a direct impact on the capacity for coherent implementation of environmental and social policies, affecting the implementation and monitoring of sustainable development objectives, particularly in the environmental sector. ESPON studies on territorial governance and spatial planning (for example, the COMPASS project - Comparative Analysis of Territorial Governance and Spatial Planning Systems in Europe, 2018) show that administrative fragmentation and differences in institutional capacity at the local level represent critical factors that influence the efficiency of public policy implementation in Europe, including in the field of sustainable development (ESPON 2018).

The implementation of environmental legislation in Romania remains hindered by institutional weaknesses and a lack of inter-institutional coherence, which limits the state's ability to protect natural resources effectively. The WWF Romania report (2022) highlights recurring issues related to the inadequate application of legislation in critical areas, including the combating of illegal logging, ineffective management of protected areas, and reduced control over activities with a negative impact on biodiversity. In this context, negotiation emerges as a practical and cost-effective governance tool for resolving disputes, reconciling divergent interests, and distributing resources efficiently. It encourages cooperation, minimizes conflict, and adds value by transforming opposing positions into collaborative solutions. Additionally, it reinforces the principle of proximity by enabling local communities to take responsibility for decisions that directly impact their environment and well-being (Petrescu-Mag et al 2016). The document also emphasizes the need for consolidated collaboration mechanisms between public institutions, as well as increased involvement of civil society and local communities in the monitoring and implementation of environmental policies. All these indicate that the current institutional framework struggles to respond coherently to environmental challenges and ensure sustainable governance (WWF Romania 2022).

SDG 17. Partnerships for the goals. SDG 17 is the goal that supports all other SDGs, as it focuses on building effective partnerships between governments, the private sector, civil society, and international organizations. It promotes global, regional, and national cooperation for mobilizing financial resources, technology exchange, strengthening institutional capacities, and fair trade.

By its nature, SDG 17 emphasizes collaboration and the creation of standard mechanisms for action, which makes it an intersection point between national policies and international commitments. Rather than being addressed as an isolated goal, it functions as a support platform for sustainable development initiatives, adapted to the specific context of each country. From this perspective, analysing how Romania operationalizes partnerships is important for understanding the progress and future directions in achieving the 2030 Agenda.

It can be said that the achievement of the SDGs largely depends on Romania's ability to create solid partnerships among the public, private, and civil society sectors. The National Strategy for Sustainable Development 2030 emphasizes intersectoral collaboration and the mobilization of financial and human resources through effective partnerships (Government of Romania 2018).

Romania has made progress in transitioning to a green economy by fostering public-private partnerships that focus on renewable energy projects and environmental protection. The National Recovery and Resilience Plan allocates significant resources for the development of green infrastructure and the reduction of carbon emissions (Ministry of

Investments and European Projects 2023). In addition, the EU Modernisation Fund directed approximately 2.4 billion EUR to Romania to accelerate the energy transition, directly contributing to the expansion of the renewable sector and the strengthening of environmental protection (European Commission 2023b).

These public-private partnerships have been essential in implementing projects aimed at reducing CO_2 emissions and supporting green infrastructure, especially in the context of meeting international climate commitments. For example, the indicator "Persons who have interacted with public authorities using the internet" reflects the proportion of adults who have used the internet, in the last 12 months, for activities such as accessing public services or carrying out administrative procedures at the local, regional, or national level. For the North-West region, data available in the Eurostat database start in 2015. A positive trend is reported, with an increase from approximately 10% in 2015 to 13% in 2021 in the share of individuals using the internet in their interactions with public administration (Pop & Stamos 2023).

The data analysed for Romania within SDG 17 highlight a moderate level of commitment and progress in strengthening partnerships for sustainable development. Government spending on health and education accounts for approximately 9% of GDP (2020), a relatively stable percentage that reflects the importance placed on health and education in public policies, with potential for growth to align with high-performing European countries. Regarding international contributions, Romania allocates only 0.1% of Gross National Income for public concessional financing (including official development assistance), according to 2022 data. This value is below international recommendations for countries in its category, suggesting a low level of involvement in supporting global development (Sachs et al 2025).

According to the analysis by Sachs et al (2025), it appears that data on government revenues for other countries are not available (NA), which limits the assessment of general fiscal capacity in a comparative context. Romania's score on the tax havens index was 40 in 2024 (Tax Justice Network 2024), a median value that highlights, on the one hand, the presence of vulnerabilities within the fiscal system regarding transparency and fiscal equity (ICTD Government Revenue Dataset 2023; Sachs et al 2025). On the other hand, according to available data, Romania recorded a score of approximately 86 in the Statistical Performance Index (SPI) in 2022, suggesting a solid statistical framework and adequate institutional capacity for monitoring the SDGs (CEIC 2023).

Thus, the interdependence between effective governance and the capacity to build sustainable partnerships becomes evident in the convergent analysis of SDGs 16 and 17. Strengthening public institutions, promoting transparency, and ensuring equitable access to justice (SDG 16) cannot be dissociated from the imperative of mobilizing resources and intersectoral and international cooperation (SDG 17) (United Nations 2024; Sachs et al 2025).

In the Romanian context, the fragility of governance, manifested through bureaucracy, corruption, and uneven administrative capacity, functionally limits partnerships and affects the coherence of environmental and social policies, especially in regions with weak institutional infrastructure (European Commission 2022; World Bank 2023).

At the same time, the potential of public-private partnerships and international financial support remains underexploited, in the absence of a robust institutional framework capable of efficiently managing resources and implementing sustainable policies. Moderate performances in terms of international contributions and fiscal transparency, juxtaposed with a consolidated statistical system, indicate a structural asymmetry: Romania has the technical capacity for monitoring, but encounters difficulties in transforming this data into integrated public policies and functional partnerships (OECD 2021; Sachs et al 2025).

Therefore, achieving SDGs 16 and 17 requires a synergistic approach, in which deep institutional reform, focused on integrity, efficiency, and accountability, becomes a precondition for operationalizing multisectoral partnerships and ensuring a sustainable governance framework capable of responding to the socio-ecological challenges of the future (OECD 2021, 2023a, b).

Critical analysis of SDG performance. To obtain a more nuanced picture of progress, this research conducted a comparative critical analysis of Romania's performance on six selected SDGs, integrating the national and institutional context. While the SDG Index uses global statistical indicators and national averages, this analysis considers local particularities, territorial disparities, and institutional constraints that directly influence the implementation of the goals. The dual approach enables the identification of differences between official assessments and on-the-ground reality, allowing for more nuanced conclusions regarding Romania's progress and challenges in implementing the 2030 Agenda. Table 1 synthesizes Romania's performance at the level of the six analysed SDGs (3, 6, 13, 15, 16, and 17), comparing the official assessment from the Sustainable Development Report 2025 (Sachs et al 2025) with our assessment based on the national context.

Table 1

Comparison of the official assessment and our own assessment regarding Romania's progress on the selected SDGs

SDG	*Official (Sustainable Development Report 2025)*	*Own assessment*
SDG 3 - Health and Well-being	↗ Significant persistent challenges, moderate improvement	↗ Significant persistent challenges, moderate improvement
SDG 6 - Clean Water and Sanitation	↗ Persistent challenges, moderate improvements	↘ Persistent challenges, decreasing trend
SDG 13 - Climate Action	→ Significant persistent challenges, stagnant trend	↗ Significant persistent challenges, moderate improvement
SDG 15 - Life on Land	→ Significant persistent challenges, stagnant trend	↘ Significant persistent challenges, decreasing trend
SDG 16 - Peace, Justice and Strong Institutions	→ Significant persistent challenges, stagnant trend	↘ Significant persistent challenges, decreasing trend
SDG 17 - Partnerships for the Goals	↗ Significant persistent challenges, moderate improvement	↗ Significant persistent challenges, moderate improvement

Note: Up arrow (↗) indicates an improving trend, horizontal arrow (→) indicates stagnation, and down arrow (↘) indicates a negative trend (deterioration). Qualitative formulations (e.g., significant and persistent challenges) are drawn from the official report's methodology (Sachs et al 2025) or derived from our own analysis, with any differences highlighted in orange.

Next, we detail the situation of each analysed SDG, arguing the differences from the official assessment by highlighting relevant aspects from the national context.

SDG 3. Health and Well-being: ↗ Significant persistent challenges, moderate improvement. Romania continues to face significant challenges in the field of population health and well-being. The rate of preventable and treatable mortality remains high, mainly due to cardiovascular diseases, cancer, and conditions associated with alcohol consumption or infections such as HIV and tuberculosis (Eurostat 2022; WHO Europe 2024). Access to health services remains incomplete and unequal, particularly in rural areas, where disparities compared to urban environments are significant, and the direct costs borne by patients hinder progress toward universal coverage (WHO Europe 2022, 2024).

Air quality remains a significant public health problem. Although at the national level, Romania did not exceed the annual EU limit for PM_{10} of 40 μg m^{-3}, in certain cities (such as Constanța) frequent daily exceedances of the limit values were recorded. In addition, Bucharest and industrial areas such as Galați show levels significantly above the limits for fine particles $PM_{2.5}$ and PM_{10} recommended by the World Health Organization (ANPM 2023; Ecopolis 2025). The National Air Quality Monitoring Network (RNMCA), managed by authorities, has uneven territorial coverage, with over 60% of stations not

being operational or not transmitting data consistently (Isăilă 2024). In parallel, independent citizen networks, such as the aerlive.ro platform, have allowed the identification of areas with high pollution and brought the issue to the public agenda. However, the absence of a clear legal framework for the official integration of this data limits its use in public health decisions (Ecopolis 2025; Embassy of Sustainability in Romania 2020).

Environmental education and information campaigns remain insufficient and fragmented, despite the inclusion of sustainable development elements in university educational programs. Their implementation, however, is uneven and faces obstacles such as limited resources and the lack of a coherent policy framework (Lazarov & Semenescu 2022). Overall, although challenges persist, there is a moderate trend of improvement due to alternative monitoring initiatives, increased civic involvement, and greater visibility of public health issues. These developments justify the assessment "significant persistent challenges, moderate improvement" both in official reports and in our own analysis, indicating modest but real progress.

SDG 6. Clean water and sanitation: ↘ Persistent challenges, decreasing trend. Romania faces significant difficulties in ensuring universal access to safe drinking water and sanitation services. Although in the urban environment coverage of water supply and sewerage networks is almost complete, in the rural environment, considerable disparities persist, with over 35% of rural households not connected to centralized water supply systems, and more than 60% do not have access to sewerage and compliant treatment plants (Eurostat 2022; NIS 2025). These infrastructure gaps are accentuated by high water losses from networks (often exceeding 40%) and insufficient investments in modernizing outdated infrastructure, especially in small and isolated localities (ANAR 2022; Court of Accounts 2023). Furthermore, Romania is already under the European Commission's infringement procedure for non-implementation of the Directive on urban wastewater treatment, the compliance deadline having been exceeded in numerous urban agglomerations (European Commission 2023a).

Climate change intensifies pressures on water resources through increasingly frequent hydrological droughts, reduced water flows in southern and eastern regions, and contamination of groundwater with nitrates from agricultural activities (Ministry of Environment, Waters and Forests & National Administration "Romanian Waters" 2023; Teau et al 2023; European Environment Agency 2024a, b). Although dedicated European funds (PNRR, POIM) are available for water infrastructure, the low absorption rate, administrative delays, and limited local institutional capacity hinder real progress. Therefore, even if the official assessment indicates moderate improvement, our contextual analysis reveals a decreasing trend in SDG 6 performance, against the backdrop of accumulating unresolved problems and deepening urban-rural gaps.

SDG 13. Climate action: ↗ Significant persistent challenges, moderate improvement. Romania has strengthened its strategic framework on climate action, revising the Integrated National Plan for Energy and Climate Change (PNIESC) 2021-2030, published in October 2024, which raises the target for energy from renewable sources to ~38% of gross final consumption by 2030 (Ministry of Energy 2022). However, this target remains below the European Commission's recommendation of 41%, reflecting the structural challenges of the Romanian energy transition. Notable progress is being made through funding from the PNRR and the EU Modernisation Fund, which allocates over 1.6 billion EUR for major investments in renewable capacities, cogeneration, and energy transport infrastructure (Ministry of Energy 2022). In 2024 alone, approximately 700 MW of new renewable capacity was installed, with plans to double the added capacity in 2025, indicating an accelerating trend in the transition (Strategic Energy Europe 2025).

Currently, Romania has approximately 3 GW of installed wind capacity and 1.8 GW of photovoltaic capacity (Andronache 2023). However, connection requests for new projects exceed 55 GW, far exceeding the current network capacity (National Energy Regulatory Authority 2025), highlighting both the high market interest and the insufficient transmission and storage infrastructure. This imbalance requires urgent investments in

network modernization and the implementation of energy storage solutions, to efficiently integrate the large volume of intermittent energy (Pop & Stamos 2023).

Another important step is the adoption of the law for offshore wind energy (Law No. 121/2024), which creates the groundwork for developing projects in the Black Sea (Parliament of Romania 2024). However, effective implementation depends on the issuance of secondary norms and the development of necessary logistical infrastructure. In parallel, the nuclear projects at Cernavodă (Units 3 and 4), evaluated at ~3 billion EUR, promise to add 1,400 MW of carbon-free emissions in the early 2030s, supporting the climate neutrality objective (EnergoNuclear 2025). Additionally, in 2024, the Contracts for Difference (CfD) mechanism for 5 GW of renewable capacity was introduced, aiming to support the achievement of the 10 GW new capacity target by 2030 (BloombergNEF 2024).

Overall, Romania is on a moderately positive trajectory regarding climate action, with consistent policies and investments being implemented. However, significant structural challenges persist, including those related to energy transport infrastructure, regulatory stability, and the speed of implementing measures. This fact justifies the assessment "significant persistent challenges, moderate improvement", indicating that although there is visible progress (e.g., increased investments in renewables), they are not yet sufficient to change the trajectory of emissions and climate vulnerabilities fundamentally.

SDG 15. Life on land: →/↘ Significant persistent challenges, stagnant trend (official) vs. decreasing trend (own). Goal 15 aims to protect, restore, and promote the sustainable use of terrestrial ecosystems, sustainably manage forests, conserve biodiversity, and prevent soil degradation. Romania has one of the most extensive forest areas in the EU, ~6.5 million hectares of forests (~27-28% of the national territory), according to recent estimates (Albulescu et al 2022). Additionally, it encompasses over 525,000 hectares of primary and old-growth forests, the largest area of this type in the EU, after the Scandinavian countries (Schickhofer & Schwarz 2019; Agent Green 2024). However, anthropogenic pressures on terrestrial ecosystems remain high: in the period 2021-2024, approximately 4.7 million m³ of wood were exploited even from primary forests and protected areas (Agent Green 2024).

Although Romania has an extensive network of protected natural areas (including Natura 2000 sites) and high-value ecosystems, the implementation of European environmental legislation remains incomplete. The adequate protection of ecosystems is affected by deficiencies in planning, coordination, funding, and administrative capacity (European Commission 2025). A substantial progress in this field is the adoption of the new Forestry Code in 2024 (Law no. 331/2024), which introduces structural measures such as: the ban on clear-cutting in sensitive areas, the digitization of the forestry register, video monitoring of wood transports, and the designation of "old-growth islands" for biodiversity conservation (Parliament of Romania 2024). The effectiveness of these measures, however, depends on their practical implementation and administrative capacity, which, at present, is insufficient to ensure compliance with the new regulations.

There are also examples of good local practices; for instance, the projects of the Danube Delta Biosphere Reserve Administration on hydrological restoration and biodiversity conservation (ARBDD 2024) demonstrate a positive impact when adequate funding and coordination are in place. However, EU reports continue to signal delays and the lack of coherent systems for monitoring biodiversity conservation (European Commission 2022). In conclusion, although Romania has remarkable natural capital and has initiated ambitious legislative reforms, the on-the-ground reality indicates a continuous deterioration of biodiversity and primary forests due to illegal logging and poor application of regulations. Thus, our own assessment indicates a decreasing trend in SDG 15 performance, more pessimistic than the stagnation suggested by official data, underscoring the need for significantly intensified conservation efforts.

SDG 16. Peace, justice and strong institutions: ↘ Persistent challenges, decreasing trend. Sustainable governance and efficient institutions are key elements in achieving environmental targets. Romania adopted the National Strategy for Sustainable

Development 2030 (HG no. 877/2018), which emphasizes effective governance, transparency, and institutional integrity (Government of Romania 2018). However, despite the existing strategic framework, the institutional reality is marked by excessive bureaucracy, systemic corruption, and administrative fragmentation, factors that undermine the coherent implementation of public policies (Matei & Matei 2009; Transparency International 2024). Comparative analyses also highlight territorial disparities in the quality of governance, with regions in the east and south of the country being significantly more affected by weak institutions and limited access to public services compared to western and central regions (Benedek et al 2021). Moreover, European studies (ESPON 2018) confirm that administrative fragmentation and reduced institutional capacity at the local level are structural obstacles to sustainable governance.

In the environmental field, these deficiencies are reflected in the incomplete application of legislation and the lack of inter-institutional coherence. Control over activities with a negative impact (for example, illegal logging and management of protected areas) is inadequate. The WWF Romania report (2022) consistently highlights issues related to combating illegal logging and the inefficient management of protected natural areas. Although there are initiatives to strengthen institutional capacity and a legislative framework harmonized with EU directives, their practical effectiveness is limited by a lack of resources, deficient inter-institutional cooperation, and insufficient involvement of civil society in monitoring and decision-making.

Overall, Romania faces persistent challenges in environmental governance, with a general trend of deterioration in recent years. This is reflected in the structural inability to build strong, transparent public institutions capable of supporting the sustainable transition, which is why our own assessment indicates a regression (decreasing trend), compared to the stagnation suggested by quantitative indicators at the international level.

SDG 17. Partnerships for the goals: ↗ □ Significant persistent challenges, moderate improvement. The implementation of the 2030 Agenda depends largely on Romania's ability to develop solid partnerships between the public, private, civil society, and international community. The national strategy for sustainable development 2030 emphasizes the importance of intersectoral collaboration and resource mobilization in achieving the SDGs (Government of Romania 2018). In recent years, Romania has made progress in strengthening partnerships for a green economy by fostering public-private collaborations focused on renewable energy and environmental protection. The National Recovery and Resilience Plan (PNRR) allocates significant resources for the development of green infrastructure and the reduction of carbon emissions (Ministry of Investments and European Projects 2023). Complementarily, the EU Modernisation Fund directed ~2.4 billion EUR to Romania to accelerate the energy transition, contributing to the expansion of the renewable sector and environmental protection (European Commission 2023b).

Such partnerships and financial mechanisms have been essential in implementing CO_2 emission reduction projects and developing green infrastructure, in the context of meeting international climate commitments. In parallel, data on digitalization and governance indicate slow but constant progress: for example, the proportion of persons in the North-West development region who interacted online with public authorities increased from ~10% in 2015 to ~13% in 2021 (Pop & Stamos 2023). This fact shows an increased, though modest, involvement of citizens in digital administration.

On the other hand, Romania allocates only ~0.1% of its Gross National Income for official development assistance (ODA), which is below international recommendations, thereby limiting its contribution to global partnerships (Sachs et al 2025). Also, a score of 40 on the Tax Havens Index (Tax Justice Network 2024) indicates vulnerabilities in the transparency and equity of the fiscal system. However, the institutional capacity for monitoring sustainable development is relatively good. For example, Romania's score in the Statistical Performance Index was 86 in 2022, indicating a robust statistical framework for tracking the SDGs (CEIC 2023).

Overall, Romania demonstrates a moderate level of progress in strengthening internal and European partnerships, supported by financial instruments and public-private collaborations. However, challenges related to insufficient involvement in international

partnerships, fiscal transparency, and the slow pace of administrative digitalization persist. This situation justifies the assessment "significant persistent challenges, moderate improvement" both in official reports and in our analysis, indicating that although partnerships are evolving positively, sustained efforts are needed to reach their full potential.

Although Romania faces persistent deficiencies in implementing the 2030 Agenda, significant progress has also been made in certain areas, alongside these challenges. For example, in the sphere of health and air quality (SDG 3), although urban pollution levels remain high, monitoring networks have been expanded and programs to reduce industrial emissions have been launched. Regarding water and sanitation (SDG 6), although unequal access persists in the rural environment, the number of households connected to safe water and sewerage networks is increasing due to European and national investments. In the field of climate change and biodiversity (SDG 13 and SDG 15), critical problems such as illegal deforestation and habitat fragmentation coexist with the expansion of the Natura 2000 protected area network and the development of new support mechanisms for renewable energy (Kucsicsa et al 2020; Firoiu et al 2023). Even in the sphere of governance (SDG 16), where institutional capacity remains limited, Romania has established new structures, such as the Department for Sustainable Development, to coordinate policies in the field more efficiently. Regarding partnerships (SDG 17), although bureaucracy slows down project implementation, more examples of public-private collaborations and increased access to European financial instruments (including the Modernisation Fund) are appearing (Matei et al 2023). Thus, the critical analysis of SDG performance presents a mixed picture: major challenges persist, but are accompanied by positive trends that can serve as leverage points for accelerating the transition towards sustainable development.

Significant challenges in implementing the SDGs in Romania. Despite the mentioned punctual progress, the implementation of the 2030 Agenda in Romania is hampered by a series of systemic and contextual challenges:

i) Institutional fragmentation and lack of coordination: the administrative structure is characterized by overlaps and dispersed responsibilities among numerous institutions, which generates deficient coordination. Studies on the SDG index in Romania indicate that the multiplication of responsible authorities across various fields has led to unclear responsibilities and redundancies (Benedek et al 2020). This situation limits the effectiveness of policies and the capacity to monitor SDG progress coherently. Lessons from EU integration in the agricultural sector demonstrate that true institutional convergence is not achieved merely through adopting legal frameworks but through sustained investment in administrative capacity and the cultivation of a political culture genuinely committed to reform (Petrescu-Mag 2009). These insights are directly relevant to SDG implementation, as effective monitoring and policy enforcement require not only legal alignment with global sustainability standards but also the operational ability and institutional coherence to transform formal commitments into measurable progress. In response, authorities created institutional coordination mechanisms. One example refers to coordination centres for sustainable development at the ministerial level, intended to connect ministries and the Department for Sustainable Development (Department for Sustainable Development 2018). However, the effectiveness of these mechanisms depends on the level of political support and the clarity of their mandate.

ii) Insufficient financial resources and inefficient use: a major obstacle in implementing environmental and sustainable development measures is the low level of allocated funding and the deficient absorption of available funds. Although the absorption rate of European funds from 2014 to 2020 apparently reached ~99.2% (~23.9 billion Euros), this percentage includes temporary internal payments; in practice, the process was hindered by bureaucracy and limited administrative capacity (Ion 2024). For example, for the Large Infrastructure Operational Program, an effective reimbursement rate of only ~60% was reported, highlighting the difference between contracted funds and those obtained from the European Commission (ARENA Construcțiilor 2023). This situation illustrates suboptimal prioritization and a lack of strategic planning, resulting in wasted

funding opportunities and fragmented projects that hinder the implementation of integrated, long-term interventions.

iii) Deficiencies in data monitoring and reporting: the quality, timeliness, and interoperability of statistical data represent a constant challenge. National systems for monitoring the environment and progress toward the SDGs are hindered by institutional fragmentation and a lack of integration, which creates difficulties in objectively assessing progress (European Environment Agency 2022). For example, the national biodiversity datasheet highlights issues with updating and data completeness regarding ecosystems (European Environment Agency 2022). The Department for Sustainable Development collaborates with the National Institute of Statistics to update the set of SDG indicators and launched the digital platform Sustainable Romania for data aggregation. However, in practice, this platform has limited coverage and is not fully interoperable with administrative systems (ESDN 2024). In the absence of institutional reforms that introduce common data standards, digitalization tools, and clear reporting obligations, progress monitoring remains fragmented, providing an incomplete picture of SDG implementation.

iv) Regional and social disparities: persistent socio-territorial inequalities undermine the uniform implementation of sustainable development. Entire regions, such as the North-East of the country or South-West Oltenia, have significantly limited access to basic infrastructure (water, sewerage, health services), compared to more developed regions. According to NIS data, in 2023, only ~18% of the rural population was connected to public sewerage systems, compared to ~99% in the urban environment (Banciulea 2024). Additionally, in regions such as the North-East or South-Muntenia, the connection rate to water and sewage networks remains around 40-50%, well below the level reached in Bucharest-Ilfov (~95%). These territorial disparities generate risks of marginalization and expose vulnerable populations to disproportionate impacts of pollution and climate change (e.g., drought, floods). Reducing the gaps requires targeted investments in lagging areas and mechanisms of interregional solidarity, an aspect recognized but insufficiently addressed in current policies.

v) Lack of public involvement and awareness: the relatively low level of public awareness and participation in environmental and sustainable development issues represents a cross-cutting barrier. A 2020 global survey indicates that only ~60% of Romanians trust scientists' opinions on the environment, and around 40% consider environmental protection a priority only if it does not slow economic growth (World Economic Forum 2020). Although the media and civic organizations are perceived as key actors in information, the level of effective civic participation remains low. A recent study mapping environmental perceptions in Romania reveals concerns about air quality, forests, and water; Still, these concerns have not yet translated into consistent civic mobilization (Petrescu-Mag et al 2024). This gap between attitude and behaviour highlights the need to intensify education for sustainable development and awareness campaigns, so that citizens become active partners in achieving the SDGs.

vi) Challenges in adapting to climate change: the capacity to adapt to the effects of climate change is essential, given that Romania is increasingly feeling phenomena such as drought, floods, and heat waves. An IMF report (2023) emphasizes that the country's adaptive capacity is severely affected by outdated infrastructure, limited financial resources, and structural vulnerabilities of communities. However, public awareness of the need for adaptation is growing. A 2024 European Investment Bank survey reveals that ~97% of Romanians recognize the need to adapt to climate change, and around 90% support the rapid implementation of measures to mitigate long-term costs (EIB 2024a, b). In August 2024, the Government adopted the National Strategy for Adaptation to Climate Change 2024-2030, accompanied by a sectoral action plan (Government of Romania 2024). This initiative represents an important step, but its success will depend on the real integration of adaptation objectives into local and sectoral policies, the allocation of necessary resources, and strict monitoring of the implementation of the proposed measures.

Overall, the above problems underscore the need for systemic changes in governance, funding, and participation for Romania to accelerate the implementation of

the 2030 Agenda. Addressing these challenges will be essential in the coming years to transform current moderate performances into substantial and sustainable progress.

Research limitations. This study has several limitations that should be taken into account when interpreting the results. First, the analysis is primarily based on publicly available official data (Eurostat, UN, and national institutions), which may reflect delays in updating or the omission of relevant qualitative dimensions. Second, reports on SDG implementation in Romania are influenced by the lack of indicators adapted to the local context and the absence of robust integrated monitoring systems. Also, the contextual analysis was limited by the uneven availability of data at the regional level and the lack of access to detailed administrative sources. Finally, the study did not include a direct empirical component (interviews, questionnaires), which restricts the possibility of capturing subjective perceptions and informal institutional dynamics. These limitations suggest the need for complementary, multisectoral, and longitudinal research.

Conclusions. The analysis of the interconnection between environmental factors and the governance dimension in the context of the SDGs (3, 6, 13, 15, 16, and 17) reveals a mixed picture, marked by both progress and significant structural challenges. Romania has taken significant steps by incorporating the objectives of the 2030 Agenda into its legislative and strategic documents; however, its implementation remains fragmented, hindered by limited administrative capacities, insufficient financial resources, and persistent regional disparities. This section presents the main conclusions and policy recommendations for each analyzed SDG, considering the study's findings.

In the field of health and air quality (SDG 3), official data indicate repeated exceedances of air pollution limits, with direct effects on the incidence of respiratory and cardiovascular diseases. To counteract these effects and improve the health status of the population, it is necessary to expand air quality monitoring networks, correlated with medical prevention and screening programs, as well as public awareness campaigns on the risks of pollution. At the same time, investments in medical infrastructure in disadvantaged rural areas are essential to reduce territorial inequalities in access to healthcare services. Improving SDG 3 indicators depends on both environmental measures (pollution reduction) and strengthening the health system and health education of the population.

Regarding water resources and sanitation (SDG 6), Romania has a solid regulatory framework aligned with EU standards. Still, it faces diffuse pollution (e.g., nitrates from agriculture), inefficient waste management, and unequal access to safe drinking water. The urgent modernization of water supply and sewerage networks is imperative, particularly in rural and peri-urban areas, to address these gaps. Additionally, the introduction of digital water quality monitoring systems would enhance the ability to respond to pollution. Measures to protect water sources against industrial and agricultural pollution must be consolidated through rigorous controls and effective sanctions. Existing investments (PNRR, cohesion funds) should be directed primarily to at-risk communities, while also ensuring an increase in local administrative capacity to implement water-sewer infrastructure projects.

In the sphere of climate change and biodiversity (SDG 13 and SDG 15), Romania has policies and strategies aligned with European standards (e.g., for renewable energy, for biodiversity conservation), but their application is deficient due to persistent phenomena such as illegal logging, habitat fragmentation, and ecosystem degradation. In this context, public policy priorities should aim at: the effective implementation of integrated climate adaptation plans at the local and regional level; the reduction of greenhouse gas emissions in key sectors (energy, transport, agriculture) through clean technologies and energy efficiency measures; the restoration of degraded ecosystems through afforestation programs, ecological reconstruction, and combating desertification. Strengthening protected area networks and involving local communities in conservation actions (e.g., participatory administration of natural parks) are essential conditions for the success of these policies. Additionally, improving biodiversity and forest fund monitoring systems (e.g., expanding SUMAL and utilizing remote sensing technologies) is recommended to ensure effective control over logging and illegal activities.

Governance aspects (SDG 16) remain critical. Limited institutional capacity, administrative fragmentation, and lack of policy coherence continue to be major obstacles. To address these deficiencies, it is necessary to strengthen the competencies of public administration at all levels (through training, depoliticization, and institutional stability) and the digitalization of decision-making processes for efficiency and transparency. Increasing the transparency and integrity of governance can be achieved through genuine public consultation and oversight mechanisms, which involve civil society and citizens in the formulation and monitoring of policies. Additionally, reducing the aforementioned territorial inequalities requires supporting local administrations in implementing and monitoring environmental policies. For example, this can be achieved by allocating experts and resources to the town halls of small rural communes, ensuring that national legislation and strategies are applied uniformly.

Regarding partnerships (SDG 17), the national strategy for sustainable development 2030 provides an institutional framework through mechanisms such as the Advisory Council and the Coalition for Sustainable Development. However, the effectiveness of these structures depends on having adequate resources and promoting an institutional culture that is oriented towards cooperation and transparency. Romania must develop sustainable partnerships between the public sector, the private sector, academia, and civil society, including through the expansion of transnational cooperation. Access to European and international funds can be optimized by reducing bureaucracy and increasing institutional absorption capacity. Also, involvement in regional and global initiatives (such as cooperation within the EU for the green transition or South-South partnerships) could increase Romania's contribution to fulfilling the 2030 Agenda beyond its own borders.

Therefore, achieving the SDGs relevant to Romania requires an integrated approach, which combines well-defined sectoral policies with effective governance and solid partnerships. Achieving this objective requires a systemic transformation in how public policies are designed and implemented. They must be grounded in scientific evidence, supported by adequate resources, and carried out through genuine collaboration between the state, the business sector, and civil society. Only through such a strategic and inclusive vision can Romania make significant progress toward sustainable, equitable, and resilient development.

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