

Dinculescu, Corina

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BIODIVERSITY IN THE SUSTAINABLE DEVELOPMENT GOALS

CORINA DINCULESCU

INSTITUTUL DE ECONOMIE AGRARĂ, ACADEMIA ROMÂNĂ

corresponding author e-mail: corina.dinculescu@gmail.com

Abstract: *Biodiversity is influenced by the process of economic development, between the two there is a causal relationship – when development does not respect the environment, biodiversity experiences negative transformations. The EU Biodiversity Strategy 2030, which derives from the 2030 Agenda for Sustainable Development, calls for member states to step up their conservation efforts to protect 30% of Europe's land and marine area by 2030 (of which 10% will have to be strictly protected). Although Europe already has more protected areas than any other continent (mainly through the Natura 2000 Network) and among the highest proportions of its area covered by protected areas, the current network of protected sites is not large enough to protect biodiversity. This paper proposes an analysis of the significant aspects of biodiversity in Romania, based on statistical data, in the context of the sustainable development goals. Evaluating public data sources, national concerns in the field of environmental protection, respectively biodiversity, are highlighted, through the analysis of specific indicators, through which the progress made in achieving the goals of the 2030 Agenda is evaluated: protected areas, conservation and protection of wetlands, mountain ecosystems, sustainable forest management, transition to circular economy, relation with agriculture – influences and consequences, all in a statistical approach, at national level (without neglecting, however, the European context).*

Keywords: *environmental protection, biodiversity, protected areas*

JEL Classification: P48, Q01, Q15, Q56, Q57

INTRODUCTION

Although nature provides us with everything essential for life – food, medicine and health, materials, recreation and welfare means, the unsustainable human activities are causing the loss of biodiversity at a faster rate than ever. This is “not only an environmental problem, but also a problem of economic development, of global security, an ethical and moral problem, a self-preservation issue” (Living Planet Report 2020).

Thus, biodiversity is fundamental to human life, its conservation and protection being a priority for strategic investments in order to preserve human health and safety. Over time, certain areas have been declared protected areas, with the aim of protecting biodiversity.

The new EU Biodiversity Strategy for 2030 envisages connecting with nature, bringing nature back into our lives, setting ambitious targets to further promote the protection of Europe's nature. Although Europe has the largest number of protected areas than any other continent – more than 130,000 sites for Europe's Protected Area Objective – the EU has as central element of the Strategy the target to increase the coverage of terrestrial and marine protected areas, as well as the dedicated designation of strictly protected areas – *creation of protected areas that cover at least 30% of the EU's terrestrial and marine area, expanding the coverage of existing Natura 2000 areas by the year 2030.*

Thus, it is necessary to expand the terrestrial network of protected areas by about 4% and of strictly protected areas by 7%. In addition, greater efforts are needed for marine protected areas, which need to increase by 19% by 2030. At the same time, all primary and old-growth forests should be strictly protected, as should other biodiversity-rich areas that develop through natural processes.

MATERIALS AND METHODS

Evaluating public data sources, this study highlights national concerns in the field of biodiversity, of protected areas respectively. One of the methods used to prepare the raw analysis

material was the customized query of available official databases – the results published by NIS in the Environmental Statistics Series and the Tempo Online public database query, followed by author's own processing of data. Data from EUROSTAT, UN, European Environment Agency, FAO and World Bank were also used.

For documentation purposes, the national and international specialized literature (treatises, monographs, research projects, papers/scientific communications in established journals), various studies and analyses were significant benchmarks. The national reports, strategies and plans of action for biodiversity conservation and development in Romania were also consulted. The information from analyses, reports and official and unofficial studies was also used.

Another method used in this study was filtering, gathering and analysis of complementary information (internet, publications).

RESULTS AND DISCUSSIONS

The Sustainable Development Agenda 2030 comprises 17 Sustainable Development Goals (SDG) that, in their turn, include targets that need to be quantified to assess goal achievement. The European Commission has monitored progress towards each SDG, at EU level.

Two of these goals – **Life Below Water** (SDG14) and **Life on Land** (SDG15) – highlight the importance of biodiversity and ecosystems, as well as the quantification of various aspects of the two domains, through *specific indicators*. Throughout the five-year period under review, at EU level, significant progress has been made towards many socio-economic goals, while in the field of environmental protection, progress has been less favorable.

A *Progress Report on SDG achievement¹* in the last 15 years was produced by each individual member state. In the year 2023, Romania, through the National Institute of Statistics, carried out an objective assessment of the dynamics of changes in the last period, based upon statistical indicators. For each goal, the evaluation was carried out on the basis of national indicators on sustainable development, using the latest available data².

Monitoring progress indicators in SDG 14 – Life Below Water aims to prevent and reduce marine pollution, manage and sustainably protect marine ecosystems, conserve coastal areas and ensure sustainable fishing.

The ecological status of waters – presupposes the development of international collaboration with the countries of the Danube river basin in order to improve the ecological status of the Danube waters and reduce the negative impact of tributaries on marine ecosystems when they discharge into the Black Sea.

The Black Sea is the most isolated marine ecosystem in Europe. The analysis of existing data series for the period 2012-2020 reveals a linear evolution of the *volume of waste water discharged into the Black Sea*, the average volume being 63 million m³/year, according to data from the above-mentioned report. This indicator provides a picture of marine water pollution in coastal areas.

The area of marine sites of Community importance designated on the basis of Natura 2000 network, another indicator for evaluating the conservation of the marine environment, increased 4.5

¹ halfway through the deadline for Agenda 2030;

² given the time lag regarding the availability of statistical data, the latest available year differs from one goal to another, and that is why certain indicators refer to either 2020 or 2021.

times in 2022 compared to 2008, and the number of coastal bathing water sites classified as excellent increased 10.5 times compared to 2012.

Encouraging sustainable fishing – involves protecting and conserving aquatic living resources. The development of domestic fish production activity, which supports the national demand and ensures the sustainable management of living aquatic resources through an ecosystem approach to production, export and import activities should represent a priority for Romania.

Fish biomass from fishing and aquaculture experienced a steady increasing trend in the period 2012-2021, the amount of fish stocks being by more than 50% higher, the highest increase being noticed in the level of fish biomass from catch (over two thirds).

Given that domestic production is not sufficient to cover the domestic fish and crustaceans demand, Romania annually imported between 60 and 85 thousand tons of fish and crustaceans, with an annual value of over 200 million EUR (in the years 2018 and 2019).

However, in the year 2020, the annual value of *fish and crustaceans imports* decreased for the first time in the last ten years. *Exports*, accounting for about 10% of imports, slightly increased, which determined a significant diminution of the yearly trade deficit, to around 175 million EUR (as against 180-190 million EUR in previous years).

Monitoring progress indicators in SGD 15 – Terrestrial life targets the conservation and sustainable use of terrestrial ecosystems, the fight against desertification, the restoration of degraded land and soils, development of wetlands and green infrastructure, sustainable forest management, support of research in the field, elimination of abusive deforestation and plane cutting, transition to a circular economy.

The conservation status of ecosystems is characterized by indicators that highlight positive aspects, yet insufficient to counterbalance land degradation and the pressure exerted on soil so as to have a complete picture of terrestrial ecosystems.

The area of terrestrial sites of community importance designated on the basis of Natura 2000 network increased by 22% in 2022 compared to 2008.

The ecological status of ecosystems indicates how natural environment resists to pressures exerted by human activities, how forests are affected by pressures generated by habitat degradation and loss. This implies not only the sustainable management and safeguarding of forests, but also sustained afforestation actions in certain areas. In Romania, the *forestland area* increased by 0.6 percentage points in the period 2008- 2021, but this growth cannot be interpreted as positive, due to the too short data series.

As regards the regeneration³ of certain areas, it can be noticed that in the period 2008-2021, *the (total) land area on which regenerations were carried out* increased by 3.4 percentage points, mainly due to the increase in *natural regenerations* (by one third, in the above-mentioned period).

The land area on which artificial regenerations were carried out decreased by almost 30% compared to the reference year. The forested area had an uneven evolution, in the first part of the analyzed period, i.e. a decrease by 6 percentage points, followed by an increase by 20 pp, up to a maximum in the year 2014, followed by a continuous decrease in all subsequent years.

³ **Regeneration** represents the process through which a new generation of forest trees is established, which can take the form of natural regenerations and artificial regenerations (afforestation). **Natural regeneration** is the process by which woodlands are restocked by trees that develop from shoots or from germinating seeds that have naturally reached the ground. **Artificial regeneration (afforestation)** represents the set of works through which a land surface is planted or seeded, with the aim to create new stands, both on exploited forest land and on land without forest vegetation.

The conservation status of protected areas is also an indicator that completes the picture of the status of ecosystems. Although the number of protected areas increased in the last years, many protected habitats and species did not reach a favorable conservation status. More than two-thirds of protected habitats have a good conservation status and more than one quarter of these have a poor conservation status. At the same time, almost half of the protected species have a good conservation status and slightly over one third have a poor conservation status. One fifth of the protected species have a poor or unknown conservation status (according to the latest available data from the Biodiversity Information System for Europe).

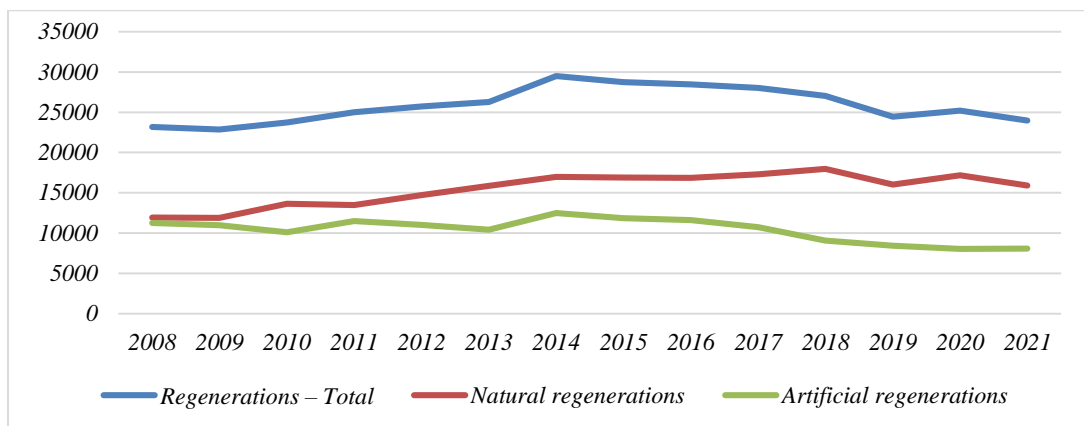


Figure 1. Land area on which regenerations were carried out, by regeneration categories, in the year 2021

Source: NIS, Tempo Online

Total water resources is another indicator by which the *water status* is evaluated. In 2020, the total water resources were at about the same level as 10 years ago; however, by analyzing them by the water resources development and utilization level, a doubling of the volume of underground water can be noticed. While in the year 2012, 86% of water resources came from surface waters, in the year 2020 this share was reduced to 70%, in favor of underground water.

As regards the *quality of surface waters*, it can be noticed that in the ten analyzed years, the structure of the length of watercourses has changed, by quality classes: while in the year 2012, about 60% of the length of monitored watercourses was of class I and II (very good and good status) and 40% of class III (moderate status), after ten years, the proportions have reversed.

The status of rivers deteriorated in the investigated period, and from data analysis it resulted a decrease by 13% of the length of rivers in classes I and II (good and very good status). While in the year 2012 there were no rivers in class IV (poor status), in the year 2020, their share in total monitored rivers reached 7.5%, and those in classes III and V (moderate and bad status) increased by 64%.

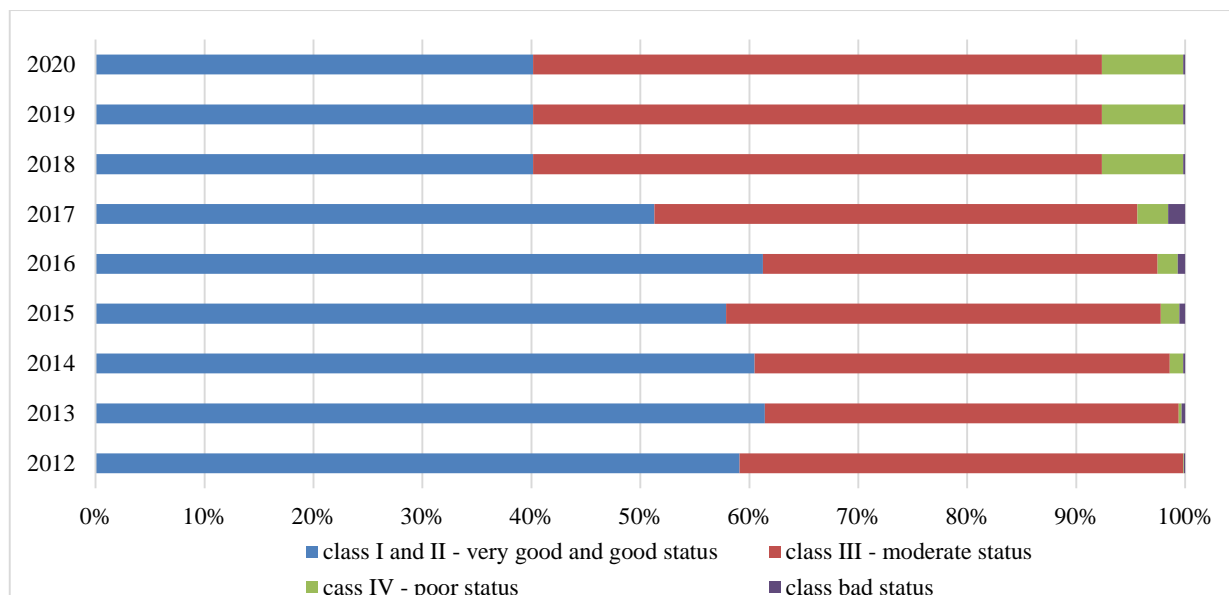


Figure 2. Quality of surface waters, by quality classes and length of monitored water courses, in the period 2012 - 2020

Source: NIS, Tempo Online, author's own calculations

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By their natural value and low degree of human intervention on their territory, **protected areas** are the best models for natural and semi-natural ecological systems. Within natural ecosystems there are complex connections that make it difficult to estimate the importance of each species in the functioning of these ecosystems. Thus, maintaining biodiversity is essential to ensure the survival of all forms of life, and the designation of protected areas is a first step towards the conservation and protection of their value.

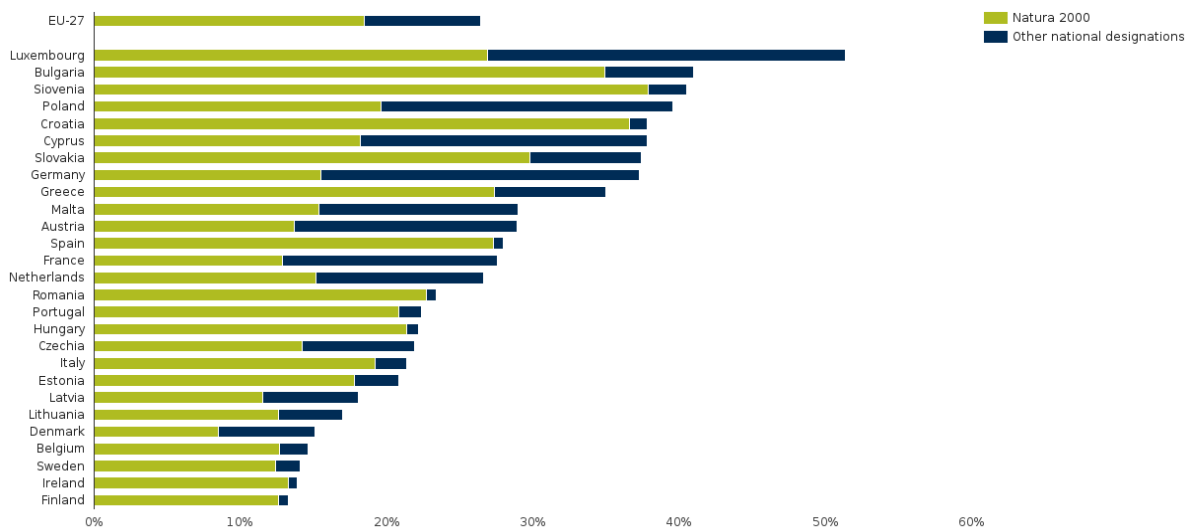
The designation of certain areas as protected areas represent the key to policies for biodiversity protection and conservation, a first step to protect their value, in terms of plant and animal species, (rare or valuable) habitats, landscapes or cultural values in the respective areas.

Biodiversity protection and conservation is achieved by imposing certain restrictions on the use of resources in such areas, intended to act as a barrier to human activities with high negative impact on the respective area, yet without preventing the normal life of inhabitants and the development of economic activities compatible with protecting these areas. At the end of 2021, according to Eurostat data, at EU level, about 1.1 million km² of the area of EU member states was designated for biodiversity conservation as Natura 2000⁴ sites or nationally protected sites. These covered 26.4% of the EU's total area (18.5% being designated as Natura 2000 sites and 7.9% having other national designations, representing over 100 thousand sites, in total.

Data analysis highlights 9 EU member states with more than 30% of their area designated as protected sites: Luxembourg (52%), followed by Bulgaria and Slovenia (41%), Croatia, Cyprus, Germany, Greece, Luxembourg, Poland, Slovakia and Slovenia. At the opposite pole, the lowest share

⁴ The action framework at EU level for biodiversity preservation, one of the European Community policy objectives in the field of environmental protection is established through two directives: "Bird" Directive (1979), the first legislative framework of the EU that includes provisions related to the protection of bird species and of their natural habitats and "Habitat" Directive (1992), which establishes the framework for the protection of several plant and animal species (except for birds) and of their natural habitats. These EU Directives aim to protect the biodiversity of the European continent by creating a network of protected areas at EU level, in which to conserve habitats and species characteristic to the biogeographical regions of Europe, a network called **Natura 2000**, which became the **largest network of protected areas in the world**, the cornerstone of biodiversity protection in the EU.

of protected areas is found in Finland (13.3%), Ireland (13.9%), Sweden (14.1%), Belgium (14.6%), Denmark (15.1%).



Share of protected terrestrial areas, designated as Natura 2000 sites and of nationally designated areas, in total country area (%), in the year 2021

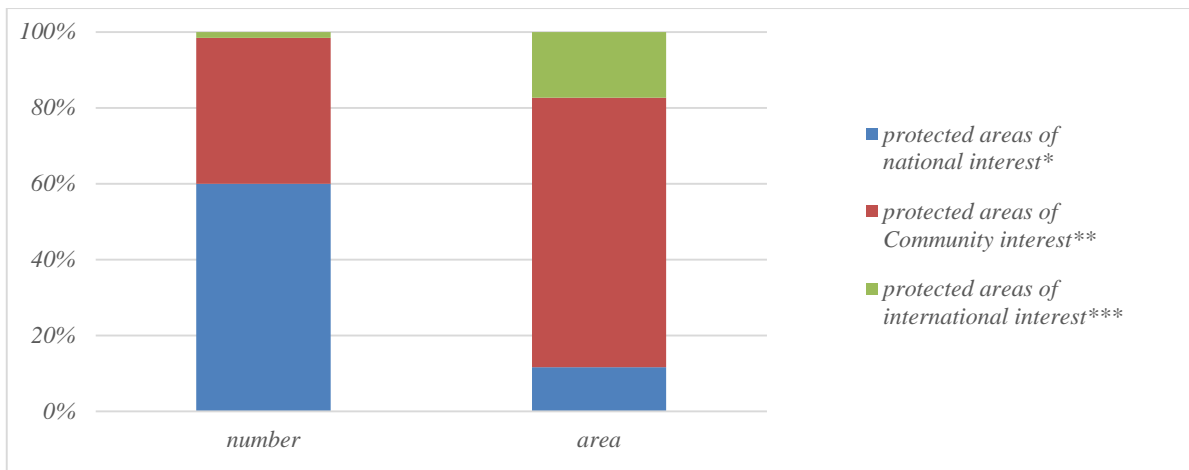
Source: European Environment Agency

In 20 of the 27 member states the protected areas represented minimum 20% of the total area of each state. 7 member states have protected areas below the European average (26.4%), much under the objective of the Biodiversity Strategy for 2030 – 30%.

Some member states protect a large part of their national territory as Natura 2000 sites. The countries that have designated at least 30% of their terrestrial area as Natura 2000 protected areas are: Slovenia, Croatia, Bulgaria and Slovakia, and those that have designated at most 13-15% of their terrestrial area as Natura 2000 sites are Finland, Ireland, Sweden, Belgium, Denmark. This ranking of the EU member states according to the land area protected as Natura 2000 sites highlights that biodiversity decreases from the south-east of Europe towards the northern countries.

Romania is one of the few countries in Europe that still has primeval forests, pristine landscapes and wild animals, natural values that have been lost for a long time in other European countries. Among the 11 biogeographical regions of Europe, five are from Romania. Currently, Romania has a network of protected natural areas (part of Natura 2000 network) covering over 23% of the country's total area. Regarding the *number of sites* in Romania, in the last ten years (2012-2021) other 43 new sites within the European ecological network Natura 2000 (designated as avifaunistic special protection areas) have been added to the number of protected areas (according to the National Agency for Protected Natural Areas), with an area of 1223 thousand ha, which reflects the interest of authorities (still minimal, however) for their identification, designation as sites and their conservation.

The specific indicators of protected areas make it possible to provide a picture of them. The analysis of the number of protected areas, by types, is not relevant, without being correlated with the corresponding surfaces, by types.

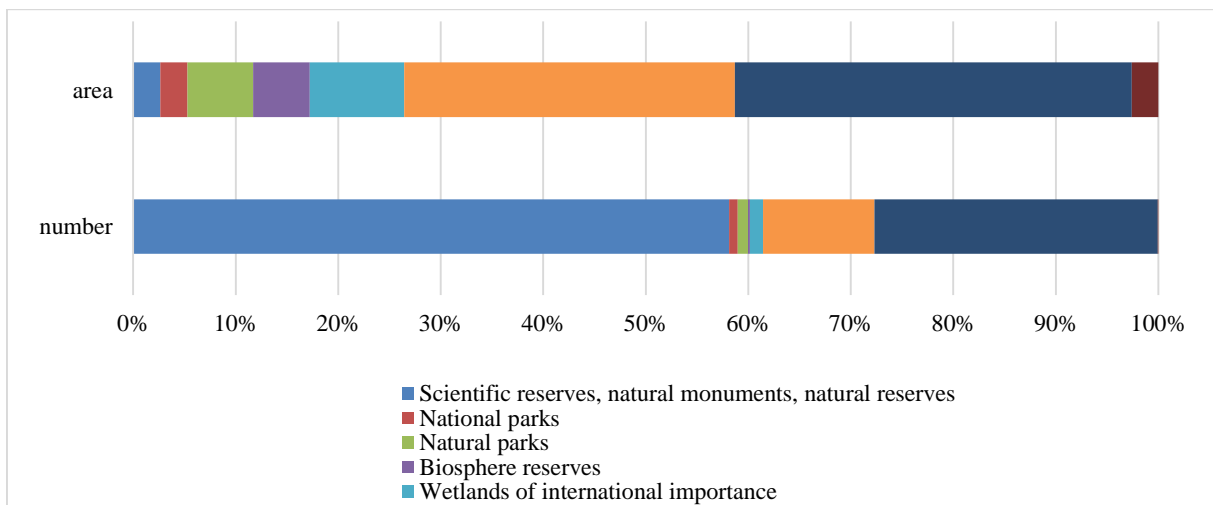


Number and surface of protected areas, by main categories, in the year 2021

* Scientific reserves, natural monuments, natural reserves, National parks and Natural parks;
 **Sites of Community importance and avifaunistic special protection areas;
 *** Biosphere Reserves, Wetlands of international importance, Natural sites of the Natural World Heritage
 Source: NIS, Statistical Yearbooks and Tempo Online, author’s own calculations

The correlation between the number, surface and types of protected areas reveals that a small number of protected areas (of a given type) cover a large surface or, reversely, a large number of protected areas cover a very small surface. Thus, the functional structure of protected natural areas highlights that, although 60% of the total number of protected areas are *protected areas of national interest*, these cover only 11.7% of the total surface of protected areas. By contrast, the *protected areas of Community interest*, although representing slightly over one third of the total number of protected areas, cover 71% of the total surface of protected areas. The same situation can be noticed in the *protected areas of international interest*, which represent only 1.5% of the total number of protected areas, but cover 17.3% of the total surface of protected areas.

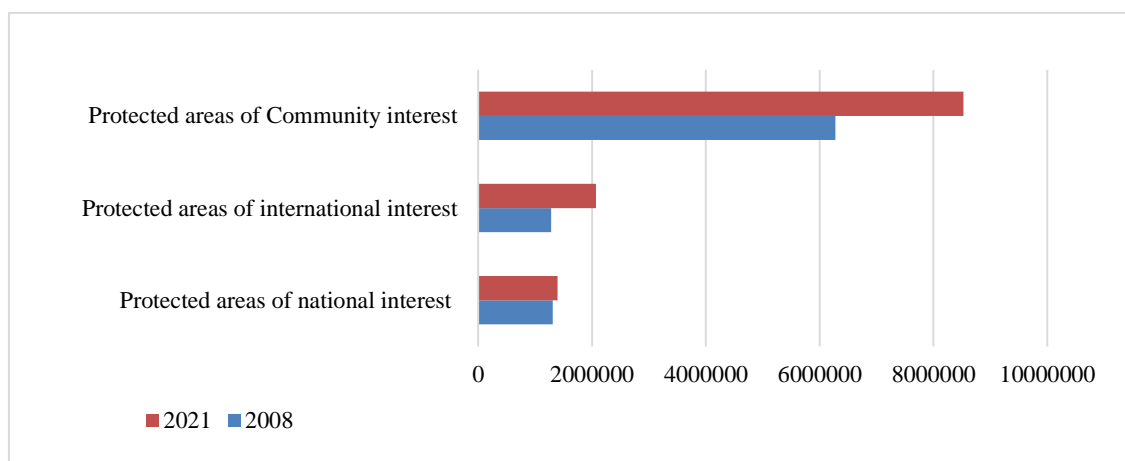
The distribution by types of protected areas. Out of the total number of protected areas, 58.1% were scientific reserves, natural monuments, natural reserves, 27.6% sites of Community importance and 10.9% avifaunistic special protection areas (the other types being in insignificant numbers – only 0.4% of total protected areas).



Structure of protected areas (number and surface), by types, in the year 2021

Source: NIS, Statistical Yearbook 2022

The evolution of protected areas over time highlights the expansion of protected natural areas by 35%, mainly due to protected areas of international interest.



Dynamics of protected areas (hectares), by main categories, in the period 2008 – 2021

Source: author's own calculations based on NIS, Statistical Yearbooks and Tempo Online data

As regards the *conservation status of protected areas*, the latest available data from the Biodiversity Information System for Europe reveal a good conservation status of *protected habitats*, of over two-thirds, and a poor conservation status (in more than one quarter of these). At the same time, almost half of the *protected species* have a good conservation status and slightly over one third have a poor conservation status. One fifth of protected species have a bad or unknown conservation status.

CONCLUSIONS

Biodiversity is all around us, in our agricultural landscapes, in the localities we are living, in parks and gardens. Our present and future depend on it.

The evolution of protected areas in Romania reveals that changes have been produced over time, in the sense of merging certain categories of protected areas or designation of new ones, which determined the (significant) expansion of protected areas nationwide. However, in reality, this expansion represents only a resettlement of protected areas by categories. However, the positive dynamics of protected areas cannot be denied, which proves the authorities' awareness, within minimal limits, of the need to stop biodiversity loss.

However, despite the expansion of protected areas, in recent decades, habitats and species have continued to face major deterioration (due to the irrational use of resources that nature provides and to the brutal impact of human activities on the natural environment), and restoring biodiversity shows minimal signs of improvement.

It is imperative to develop appropriate policies to protect and restore biodiversity, to implement them and to bring nature back into our lives.

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