

THE PRESSURE OF ANTHROPIC ACTIVITIES ON NATURAL CAPITAL OF SATU MARE COUNTY

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Abstract

The relationship between man and the natural environment, that provides the most valuable resources for existence, has transformed over time into an artificial and destructive manifestation. The increase of the standard of living of society has been achieved through the drastic reduction of natural resources and the damage of the environment, endangering the welfare of future generations. Activities such as discharges of waste in the rivers, inappropriate use of land, uncontrolled deforestation, fragmentation of habitats due to infrastructure development pose the greatest risks to natural capital. This article aims to analyze by statistical methods, on the basis of the documents studied, the negative effects of anthropogenic activities on the natural capital of Satu Mare County.

Keywords: waste, pollution, environmental risk, natural resources

Clasificare JEL: B20, Q57

1. Introduction

The economy of a country depends upon a large scale of resources so that the concern for protecting these regardless of the fact whether they are raw materials, environment factors, energy fluxes or physical territory represents the object of numerous legal regulations, strategies, speciality studies. The surrounding environment belongs to all, and its protection requires collective actions that imply the collective actions of institutional factors as well as economic operators.

2. The natural capital- the fundament of sustainable development

The conservation and rehabilitation of the natural capital represents the principle that is at the core of the sustainable development of the society. The goal of sustainable development is to identify ways of improving the welfare of society concomitently with a judicious usage of common natural resources in such a way that regenerable resources might be maintained and the non-regenerable ones might be used in a rhythm that assures also the welfare of future generations as well .

The National Institute for Durable Development defines the natural capital as representing „water, air, living organisms and all the formations of biosphere that provide goods and services of ecosystems for surviving and prosperity”. According to other authors (Zaman, Gherasim, 2010) the natural capital represents an „amount of subsoil riches, wooded forest resources and those free of forests, protected areas, cultivated lands, piscicultural areas, pasture or wilderness.” The resources are taken from their natural environment and transposed in the production environment and that of services in order to be capitalized on the market, so that they can be transformed in products and services, contributing to the growth of financial activities in the economy, „economic growth and welfare are subsidized by the natural capital of the planet”¹, whereas the ecosystemic services provided by the environment are not evaluated and as a consequence they cannot be found in the final price of goods and services. The actions to extract and process natural resources have caused according EC documents² the degradation

¹Falimentareanaturii Anders Wijkman. Johan Rockstrom, EdituraCompania , p.222

²Foia de parcurs pentru o Europă eficientă din punct de vedere energetic, {SWD(2017) 33 - 60 final}, p.12

by 60% of ecosystemic services in the past 50 years, the exploitation of fish stocks by more than 88 % over sustainable yield.

The degradation of the natural capital is the result of a long-term process, a process under the influence of the driving forces, forms and rhythm of society's development. The impact of socio-economic development can take the following forms:

- the loss of some ecological system components of natural capital, along with the loss of the habitats of some plants and animals species;
- isolation of some elements of natural capital;
- increasing the number of vulnerable or endangered species.

The process of absorbing renewable and non-renewable raw materials involves the technical diversification and refinement of the support infrastructure, for all the mechanisms by which raw material, energy and labor are converted into finished products or by-products, namely waste and entropy. The continuous increase in consumption has resulted in an increase in the density of material and informational energy flows in the infrastructure needed to produce goods and services. The absorption of natural resources has been dimensioned according to consumers' needs and market requirements, without taking into consideration the limited character of the natural resources. The impact of the exploitation of the resources is manifested through:

- drastic decreasing of the stock of non-renewable and renewable resources;
- diminishing biological diversity;
- erosion and salinization of soils;
- desertification of arid and semiarid areas;
- decreasing of renewable and non-renewable resources of the planetary ocean;
- exhaustion of underground water reserves as a result of the hydrological circuit disturbance.

To reduce and annihilate the effects of overexploitation of resources, development strategies and economic growth programs focusing on sustainable development have been developed and implemented. The concept of sustainable development was approached as a model for development in 1987 in the Brundtland Commission Report, which analyzed on a global scale the interdependence of environmental issues, on one hand, and economic, cultural and social issues, on the other hand. As defined by the Brundtland Commission in the Report "Our common future," sustainable development is a development model that "seeks to meet the needs of the present without compromising the ability of future generations to meet their own needs".

Since 1997, sustainable development has become a priority policy of the European Union, being included in the Treaty of Maastricht, and at the Gothenburg Summit in 2001, the European Union's Sustainable Development Strategy was adopted. The graphical representation of the three pillars on which the concept of sustainable development is based is depicted in Figure 1.

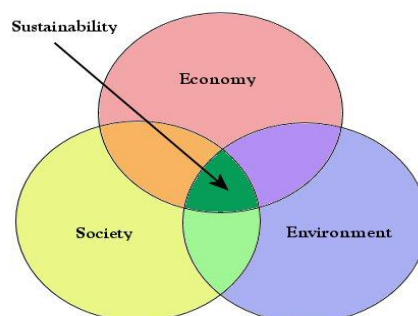


Figure no.1 The concept of sustainable development

3. The natural capital of Satu Mare County

Situated in the North-West of Romania, Satu Mare county has an area of 4418km², representing 1.9% of Romania's territory, with a population of 363488 inhabitants. The territory of Satu Mare County is occupied by agricultural lands, forests - 18%, rivers -3% and other destinations -7%.

The dominant landform is the plain - 63%, the largest being the Someș Plain, the Tășnad Plain and the Ierului Plain, the volcanic mountains, bordering the Oas Depression, which occupies 17% of the relief of the Satu Mare County. The hilly area called Codru's Hill occupies 20% of the county's area. The highest altitude is 1200m on Pietrosu Peak in the Igriș Mountains, the minimum altitude is 100 m in the Somes Valley. The hydrographic network is represented by the rivers: Someș - at a length of 60 km, the Tur - 66 km long and Crasna, 57 km long.

The hydrographical reserves are complemented by the anthropic lakes: Calinesti, the Crystal Lake and the Apa gravel pit.

The economy of Satu Mare County is based on industry and services. In gross value added in 2014, the industry contribution was of 31.06%, 48.19% services, agriculture having the lowest share - 36%. In other words, the county economy can be characterized as an industrial-agrarian economy, specializing in: machine building, textile industry, food industry, furniture production. As far as the tertiary sector is concerned, the turnover with the largest share is held by the wholesale and retail trade, followed by auto repair services, transport and construction. The evolution of the turnover of the national economy by activity, made by the local units in industry, agriculture, services is shown in table no.1.

Table no.1 Turnover of economic units in Satu Mare County in 2011-2015

Satu Mare County	2011	2012	2013	2014	2015
Total județ	10548 mii lei	11807 mii lei	12210 mii lei	12713 mii lei	13695 mii lei
Industrie	4378	5075	5415	6064	6306
- Extractive industry	12	17	11	10	11
- Manufacturing	4175	4862	5210	5828	6059
Electricity and heat, gas and wat	71	77	87	91	117
- Water distribution and salubrity	120	119	107	135	119
Building	1354	1247	1074	980	1389
Wholesale and retail trade, etc.	3832	4290	4528	4330	4585
Hotels and restaurants	82	96	94	111	131
Transport, storage and mail activities	451	522	597	668	719
Information and communications	91	178	124	142	138
Real estate transactions and servicing. to enterprises	255	278	250	263	303

Source: County Statistics Directorate of Satu Mare County

Socio-economic activities carried out at an alert rate with the sole purpose of stimulating consumption and increasing profit, lead to environmental damage and the destruction of natural values.

The prevention of these negative phenomena is possible by monitoring the socio-economic activities in order to counteract the changes occurred in the area. One of the most important indicators

that reflect the level of development of a country is the environmental protection indicator, expressed by the ratio of the number of protected areas from the total area. The importance of protected natural areas is determined by the capacity to maintaining biodiversity - the ecosystems, the genetic variety that forms the diversity of life. In the county of Satu Mare 6 natural protected areas of national interest spread over an area of 6339.5 ha:

- Foien sand dunes with a surface of 10 ha;
- The Vermeș Swamp, with a surface of 10 ha;
- Tinoavele from Oas Mountains, with a surface of 1 ha;
- Urziceni Forest with a surface of 38 ha;
- Tur River (lower course), it has an area of 621 ha;
- The Runc Forest has an area of 68.5 hectares

The natural capital of Satu Mare county is a result of the interaction between existing landforms and climatic factors that determined the formation of 3 biogeographical regions: alpine, continental and Pannonian one, each one of which being characterized by a certain type of vegetation and specific fauna. The composition of the natural capital of Satu Mare county includes regenerable and non-regenerable resources. The non-regenerable resources from the area of Satu Mare County can be found in an enormous underground reservoir that provides springs of mineral waters with carbon dioxide, chlorosodic ones, sulphurous, bicarbonated or thermal waters with temperatures between 50-70 degrees Celsius.

The underground ascending waters are accumulated at the depth of 250-400 m, while those of deposit are found in localities such as Turț, Băile Puturoasa, Luna, Tarna Mare, Bixad, Ghenci, Valea Măriei, Noroieni, at depths between 800 and 2000 meters. *Hiperthermal waters* were identified in the Western part of the county in places like Tăsnad, Beltiug Acâș, Ady Endre. The surface waters of Satu Mare are represented by the rivers Someș, Crasna Tur, Homorod, Ier și Talna, rivers that cross the county of Satu Mare in a total length of 285 km. On the territory of Satu Mare county there are more than 30 artificial lakes that extend on a total surface of more than 800 ha. The lake that has the largest surface- 357 ha- is the dam lake Calinesti Oas on the Tur river. The lakes found in the county have different destinations: fish, water reserve for agriculture. *The soil reserves* of Satu Mare county extend on a surface of 317515 hectares of agricultural land according to the data provided by OSPA Satu Mare. These are a part of the categories chernozem, brown luvisc soils, brown acid soils, podzols, hydromorphic soils, holomorphic soils, psamosoil, strongly eroded soils, alluvial soils. The biggest part of the *land fund* is comprised of agricultural grounds, forests and other forms of vegetation that represent 71,8% from the surface of the county out of which arable soils take a surface of 50,17 %.

Concerning the *fauna resources*, the territory of Satu Mare county falls into the zone of forest steppe being characterized by grassy vegetation as well as compact or locally developed forest vegetation in the form of forest clumps. In the Western part of the county the vegetation specific for continental sands alternates with tree and tree-viticulture plantations, field cultures and willow forests. Satu Mare county has a varied cynegetic fund and important piscicultural resources.

Regarding regenerable resources in the subsoil of Satu Mare county different categories of mineral substances were identified that are necessary for the development of economy. Thus in the volcanic area from Oas mountains complex ores were exploited such as: pyrite, zinc, lead, gold and silver; iron ores- including limonite, siderite and perlite- and bentonite used in the chemical industry. Satu Mare also has important quantities of resources of construction materials from the category andesite, grit stones, calcareous stones localized in the Land of Oas, gravels, sands and clay identified and exploited in the Somes river bed. Kaoline clays are exploited from the area of Racsa and Orasu Nou while coloured fields can be found in the area Negrești-Oaș, Călinești Oaș and Crucișor. All these categories of resources create favorable conditions for the growth of welfare, the economical and social progress of these area.

4. Anthropogenic factors specific for satu mare county

The evolution of society-environment relationship has known multiple ways of manifestation in the course of time having positive or negative impact on the natural environment but modern society has had the worst effects on nature so that „a shift of attention becomes necessary from the capital produced by man to the ways in which natural capital is used.”³ The anthropogenic factors are defined as the total number of human activities concerning the nature and the consequences of these actions upon landform, natural conditions, vegetation and fauna.

The destructive effects of anthropogenic factors upon natural capital are directly influenced by demographic growth and the level of socioeconomic development. One of the major threats that makes a pressure upon natural capital in all the areas of the country is the overexploitation of resources or their unsustainable exploitation. These phenomena take place when the consume of resources exceeds their capacity of reproduction. The phenomenon of deterioration of natural capital is more emphasized through the extension of urban agglomerations. The occupation of areas generated by the urban extending and the the extending of necessary infrastructure produces irreversible pressure upon natural capital leading to the impermeability of the soil by covering the grounds with buildings, roads and other construction works.

The most hostile anthropogenic factors that act upon the natural capital of Satu Mare county are: unfitting agricultural and forest practices, the industrial development and that of agricultural infrastructure. As such:

- **The intensive agriculture** through which for obtaining big harvest for one product big amounts of fertilizers and pesticides are used is practiced in the Oas Basin and Carei Flatland. The use of big amount of fertilizers contributes to the impurifying of the soil, through the accumulation of nitrates and phosphorus. The development of agriculture in the county generates pressure upon water resources.
- **The artificially deposited amount of water** necessary for production and consume reduces the quantity of water allotted to natural systems bringing upon the fragmentation of water flows because of the barrages. The extraction of great amounts of water as well as prolonged periods of drought have led to the drawback of the flow rate of the rivers have reduced the level of lakes and phreatic waters diminishing the wet areas from Satu Mare county. The critical areas regarding the deterioration of the soil of Satu Mare County are: Ier Valley - an area with hydromorphic soils and salsodic soils: the pluvial erosion area from the South- Eastern part of the county known as an arid and aeolian eroded area.
- **Erecting buildings** at the expense of taking agricultural areas out of the agricultural circuit had as an effect the diminishing of agricultural areas by 62 hectares in the yeas 2016.
- The degradation of the soil through the invasive plant species such as parlor grass (*ambroziaartemisii*), dwarf willow (*amorphafructicosa*), artichoke (*helianthus tuberosus*), Japanese knotweed (*reynoutria japonica*), American ash-leaved maple (*acer negundo*), spread in the meadow of the rivers Somes, Tur, Crasna, Ier;
- **Loading a polluting the soil with nutrients** - phosphorus and azote - are major causes that bring about the loss of diversity as well as the degradation of the ecosystems. Through its deposition in the atmosphere azote can bring about the eutrophication of the ecosystems. The depositions of azote lead to the decrease of the number of plant and animal species, through the eutrophication of the lakes planktonic algae develop excessively, a fact which causes the

³Dachin A., Evaluări ale dezvoltării durabile în România, Editura A.S.E, București, 2003, p.22

growth of the accumulation of organic material, which generates changes in the composition of plant species;

- **Unsustainable administration of forests**, the ratio of growing and cutting wood shows the sustainability of the production of wood mass in time as well as the actual availability of wood mass and its potential. The forest fund has a share of about 17% from the surface of the county being much smaller than the one recorded at country level (26,7%)
- **Industry** is the economic sector that has a major contribution to polluting the environment. Industrial activities generate a big amount of gas, solid and liquid pollutants that are dissipated in the air and soil in the year 2016 the average annual concentration of azote was $34.85\mu\text{g}/\text{m}^3$ according to the data delivered by APM⁴.
- **Depositing urban and rural waste** represents one of the biggest sources of pollution that affect the natural environment. These deposits pollute the environment through exfiltrated waters, gases degassed through fermentation and the incineration of waste. Municipal waste in Satu Mare county were 52850,2 tons, respectively 157,66 kg/ inhabitant. The quantity of waste has grown concomitantly with the demand of the population for goods and services.

Limiting the action of anthropic factors can be done through educating the population regarding a sustainable consume and capitalization of waste according to the principles of circular economy.

5. Conclusions

Human richness cannot be evaluated only through the lens of the capital accumulated by men, the natural resources provided by the surrounding environment also have to be taken into account. In order to face the challenges society is confronted with a change in the way of production and consume is necessary. More efficient production processes and the efficient administration of waste can contribute decisively to reducing pollution and saving regenerable and non-renewable resources.

6. Bibliography

- [1] Bran F., Manea G., Ioan I., Rădulescu C.V. - Economia în clepsidra entropică, Editura Economică, 2015, București;
- [2] Wijkman A., Rockstrom J., Falimentare anaturii, Editura Compania, 2013, București, p.222;
- [3] Zaman Gh., Gherasim Z. “Evaluarea capitalului natural și a bunurilor intangibile, domenii majore ale educației pentru dezvoltarea durabilă”, Buletin AGIR, Editura Agir, 2010;
- [4] Dachin A, Evaluări ale dezvoltării durabile în România, Editura A.S.E, București, 2003;
- [5] Gabor D., Colombo U., King A., Galli R., Să iesim din epoca risipei, Editura Politică, București 1968
- [6] Cogălniceanu D., Managementul capitalului natural, Editura Ars Docendi, București, 1999
- [7] Vădineanu A., Managementul Dezvoltării Durabile o abordare sistemică, Editura Ars Docendi, București, 2004
- *** Report elaborated by APM Satu Mare regarding the condition of environment in Satu Mare County
- *** Roadmap for an efficient Europe from an energetica point of view, {SWD(2017) 33 - 60 final}, p.12
- *** County Statistics Directorate of Satu Mare County, 2016

⁴Raport privind starea mediului în județul Satu Mare elaborat de APM Satu Mare