# ENVIRONMENTAL IMPACT ASSESSMENT AND THE CHARACTERISTIC OF NATURAL RESOURCES IN SCULENI VILLAGE

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**Abstract**

The environment and natural resources are the main components of the functioning of the agricultural system from an economic point of view. These are the "natural foundation of agricultural activities", which can favor or limit the development of society. Insofar as we consider man as part of the natural environment, we can appreciate that the natural environment has a decisive role in the development of society. In this paper will be examined the impact on the environment and the characteristics of natural resources in Sculeni village, Ungheni district. The Prut River is one of the largest rivers in the studied territory. Further south of the village of Sculeni in the west is the Central Moldavian Plateau. This plateau (Codrii) is strongly dismembered by the deep valleys of the rivers, by numerous ravines and valleys, by the innumerable landslides from the upper part of the hills. Compared to the period of 2020 and the period of 2021 until May on the territory of Sculeni village, it was reported with the usual weather according to the thermal regime and predominantly with precipitations. As of April 8, 2021, the reserves of productive moisture in the arable soil layer on land with autumn crops were in the center of the country - 35-45 mm (125-155% of the norm). The territory - the square of the Center of Family Physicians „Sculeni" is 1 pedunculate Oak tree of IUCN III category: as a natural monument located in Ungheni district, Sculeni village, - code MD-UN-mn.Cb-115. At the moment, in Sculeni village, 1 land is pre-selected for the location of household and solid waste landfills. I am in the process of elaborating the execution and authorization projects of the respective area. There is a danger that for 4-5 years a considerable part of the land will be completely degraded and removed from the agricultural circuit. No threshold systems are created in the complex with the planting of forest protection strips. The scientifically substantiated crop rotations are not respected, practically the simple rotation of the crops has been passed. On the lands of the locals, maize is mainly cultivated in monoculture. The forest protection strips were destroyed.

**Key words**: environment, natural resources, Sculeni village, Ungheni district

Environmental impact assessment, strategic environmental assessment and state ecological expertise are mechanisms for ensuring environmental protection performed at the initial stages of planning activities for the purpose (www.legis.md).

Natural resources are objects, phenomena, natural conditions and other factors, usable in the past, present and future for direct or indirect consumption, which have consumption value and contribute to the creation of material and spiritual goods (Environmental legislation of the Republic of Moldova, 2008).

Water security is vital for economic development, environmental sustainability and social inclusion. Compared to other countries in the region, the water resources of the Republic of Moldova are relatively limited. The Republic of Moldova is the country with the largest water deficit in the region, with approximately 3000 $m^3$/head of inhabitant/year of renewable water resources, of which only 400 $m^3$/head of inhabitant/year is formed on the territory of the country. Given that the main source of water supply for the population and to cover the needs of the economy is surface water, which constitutes 85% of the total volume of water consumed, in 2020 the requirements for collecting, treating and discharging wastewater were changed (Decision Government 90/2020).

The management of the quality and use of water resources is in an unsatisfactory and even unsatisfactory state (Porubin *et al*, 2008). A periodic problem in the districts of the Dniester, Danube-Prut and Black Sea river basins are floods. For the management and prevention of flood risks, a series of measures for the period 2020-2025 have been developed and approved (Government Decision no. 562/2020), such as: strengthening the flood protection infrastructure, ensuring the security of the population and agricultural lands in risk areas, increasing institutional capacities in the

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field of water resources management, etc. It is known that these resources are limited in our country. An inhabitant of the Republic of Moldova has on average for consumption about 330 $m^3$ of water from local resources and 1700 $m^3$ when taking into account the volume of water in transboundary rivers, which is 2.5 times less than the European average (approx. 4800 $m^3$/place). The available resources are poorly used. If in the $70^s$ and $80^s$ of last century was irrigated an area of 316 thousand ha, then in 2007 - only 35 thousand ha. The quality of the water used and intended for use is far from being clarified (Porubin *et al*, 2008).

A particularly important component of the environment is forest resources. According to statistical data, in 2019 the surface of land covered with forests was 380.7 thousand ha (about 11.25% of the country's surface). In 2020, despite the drought and the epidemiological situation, it was managed to plant 1070 ha with seedlings, helping the natural regeneration of the forest fund on an area of 2899 ha, an area of 396 ha being naturally regenerated.

Also, for the protection of river waters and water basins, in 2020 36.58 ha of forest strips were planted, which serve as a natural „filter" in freshwater protection. In order to strengthen institutional capacities for monitoring and assessment of air quality, for the identification and implementation of effective measures to reduce pollutant emissions to levels that minimize harmful effects on human health and the environment, the draft was developed and approved. law on atmospheric air quality (Government Decision no. 863/2020). In the same context, the Regulation on the control of emissions of volatile organic compounds resulting from the storage and distribution of gasoline from terminals to petrol stations was drafted (Government Decision no. 587/2020).

The lands with fertile soil have a special role, which have always had, have and will have a primordial importance in ensuring the food security of the population of any state in the world (Ursu, 1999). As a result of the significant annual numerical increase in the Earth's population, which has already exceeded 6.5 billion people, and the activation of climate change processes, expressed by increasing the average annual temperature with real signs of desertification in different regions of the earth, they resulting in the reduction of agricultural land areas and the worsening of agro-climatic conditions as a whole in their areas, many people suffer from hunger. Nearly one billion people, or about 15% of the world's population, are affected by malnutrition, which also affects the activation of emigration, mostly illegally, of the tens of millions of people in the poor population who are moving to the United States. developed or towards those in which there is a somewhat stable food security (Statistical Yearbook, 2019).

The poorer the population of a country, the greater the dependence of its development on natural resources, and conversely, the more advanced the welfare of the population, the lower the dependence on its own natural resources. The twentieth century and the beginning of the twenty-first century are marked by the continuous reduction of vital natural resources per capita, by the worsening of the ecological status of resources and by the reduction of the quality of resources as economic and social values. Under these conditions, food is always more expensive. According to UN data, food has now reached its highest cost in 50 years. There are signs that their increase will continue in the next 10 years (Statistical Yearbook, 2019).

## MATERIAL AND METHOD

The Sculeni commune from Ungheni district was selected as a research object. Sculeni is the village of residence of the commune of the same name in Ungheni district, Republic of Moldova (*figure 1*). It is located in the northwest of the district, on the left bank of the Prut, 24 km from the district center and 7 km from the Buciumeni railway tation.


Figure 1 **Location of Sculeni commune on the map of the Republic of Moldova**

In this paper, the natural resources from Sculeni commune, Ungheni district will be examined. Resources such as water, soil, clean air and ecosystem services are vital for health and

quality of life, but are only available in limited quantities. The researches were carried out according to the standards and normative acts of the Republic of Moldova.

Environmental Impact Assessment (EIA) is a procedure carried out to assess the possible impact of the planned activity on the environment, as well as to develop proposals for preventing and minimizing the negative impact on natural resources.

The research methodology consists in the study, synthesis and evaluation of publications, scientific papers on related issues of natural resources, laws and regulations governing relations in the field of use of natural resources and their protection, programs, plans and strategies for sustainable development of environmental factors, statistical and activity reports of the State Ecological Inspectorate and the Ungheni Ecological Inspection.

## RESULTS AND DISCUSSIONS

Sculeni is the village of residence of the commune that bears the same name being part of Ungheni district (*figure 2*). And the coordinates are: 47 ° 19′31 ″ N and 27 ° 37′24 ″ E.

Figure 2 **The appearance and distribution of the land fund in Sculeni locality**

Compared to the period of 2020 and the period of 2021 until May on the territory of Sculeni commune, it was reported with the usual weather according to the thermal regime and predominantly with precipitations. The average decadent air temperature was +8.0 ... + 9.8ºC, being basically within the norm, only isolated by 1.0ºC lower than it. The maximum air temperature over the decades has risen in the territory to + 22ºC (*figure 3*). For example, on April 11-12 and April 17, isolated frosts in the air with an intensity of -1 ... - 4ºC were reported. Frosts on the surface of the soil with an intensity of -1 ... - 5ºC and at a height of 2 cm from the ground (-1 ... - 8ºC) on a large part of the territory were recorded on April 11-13 and 17-18.

In Sculeni commune, the amount of rainfall was sufficient for this period of 2020-2021. Their amount during the decade was 15-36 mm (100-240% of the decadent norm). In the center of the country - basically 9-14 mm (65-90% of the decadent norm), in some districts - 18-20 mm (105-155% of the decadent norm).

Compared to the second decade of April 2020, this decade was 1-3ºC colder and with more rainfall (5-25 mm). Analogous year according to the thermal regime is the year 2017.

The meteorological conditions are basically favorable for the growth and development of autumn crops and for the sowing of spring crops. The frosts in the air, signaled in isolation on the territory of the country, did not represent a great danger for flowering fruit trees.

At the situation of April 8, the reserves of productive moisture in the arable soil layer on the lands with autumn crops were: in the center of the country - 35-45 mm (125-155% of the norm).

According to the activity program of the Ecological Inspectorate from Ungheni district, during the year a study was carried out on the water quality of the Prut river in agreement with the specialists of Î.M. "Apa-Canal Ungheni". The Prut River is one of the largest rivers in the studied territory. Further south, the plateau of Central Moldova is joined to the west by the village of Sculeni. This plateau (Codrii) is strongly dismembered by the deep valleys of the rivers, by numerous ravines and valleys, by the innumerable landslides from the upper part of the hills.

A specific feature of the Codrilor relief is the succession of long and narrow water bodies, with deep and long river valleys.

The situation is more complicated in localities that use underground water sources, because in Ungheni district the quality of groundwater is unsatisfactory and is characterized by exceeding the maximum acceptable concentrations of such compounds as: nitrates, fluorine, chlorides, ammonium, sulfates and dry residue.

Solving the problem of groundwater quality by treating it is not very feasible. From a strategic point of view, the optimal solution for supplying the district with drinking water is to be based on capturing and treating water from the Prut River.

The Ungheni District Council, for several years, has been developing a system of regional water supply from the Prut River (Zagarancea - Cornești), meant to cover in perspective with service 28 localities in the district with a population of about 40,000 inhabitants.

For this purpose, a series of installations have already been built, which are part of the respective water supply system.

At the moment, about 4.3 thousand inhabitants of the Mănoilești cluster (10 localities) are provided with centralized water supply services from the regional aqueduct.

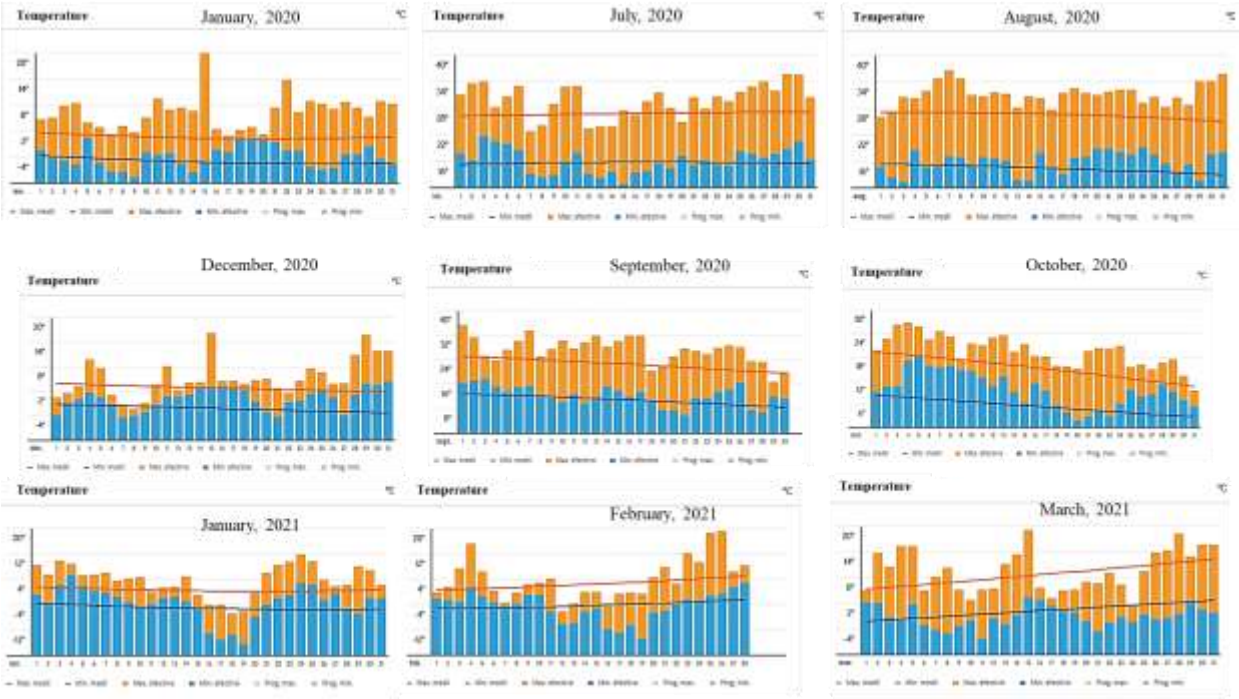


Figure 3 **Representation of temperature variation in Sculeni commune for the years 2020-2021**

In the future, the development of the regional aqueduct for all the clusters in the Center Area of Ungheni district is planned. Also, the possibility of changing the supply source of the supply is examined: from the capture station of the Agency “Apele Moldovei” (raw water) to the “water-canal” system of Ungheni municipality (drinking water). To this end, the project documentation for the interconnection of these 2 systems has already been developed.

The water supply networks in the rural localities of Ungheni district are relatively new. Out of a total of 426.4 km of water networks, 410.9 km or 96% are made of polyethylene or polypropylene. The need to expand water networks in rural areas, where there are centralized water systems, is estimated at 120 km.

The current state of the enterprises generating atmospheric air pollutants on the territory of Sculeni commune has improved compared to previous years, most of the registered companies that operate have carried out the inventory of pollution sources and operate based on permits to emit pollutants into the air.

The volume of pollutant emissions from stationary sources is 8.2 t by 1.4 t less than in the previous year. The decrease in emissions is due to the fact that the production volume has decreased, many economic agents have gone bankrupt.

Secular trees are solitary specimens or small isolated groups of trees, impressive in age, size, beauty, rarity or in the fact that they witnessed historical events. The territory - the square of the Center for Family Physicians "Sculeni" is 1 pedunculate oak tree of IUCN III category: as a natural monument located in Ungheni district, Sculeni village, on the territory of the Sculeni sector hospital - code MD-UN-mn.Cb- 115 (*figure 3*).

Protected areas in the Republic of Moldova are categorized into several types, one of which is natural monuments. These, in turn, are divided into geological or paleontological, hydrological and botanical. The list of botanical monuments includes representative sectors with forest vegetation and sites of secular trees. The given list contains sites with secular trees, according to Law no. 1538 of 25.02.1998 regarding the fund of natural areas protected by the state. Annex 3 of this law lists 158 sites, which total a total of 433 secular trees.

Figure 3 **Pedunculate oak (Quercus robur), natural monument located in Ungheni district, Sculeni village, on the territory of the Sculeni sector hospital**

At the beginning of the hunting season were registered the following species of mammals, birds, which later during 2020 were partially acquired, as follows: - Spotted deer - 1, was not acquired; - Deer - 21, in 2012 1 copy was acquired for the National Museum of Ethnography; - Wild boar - 14, of which 3 were acquired; - Rabbits - 116, of which 25 were legally acquired and 4 were illegally acquired; - Foxes - 56, of which 6 were legally acquired and one fox acquired illegally; - Geese - 12, of which 2 acquired; - Ducks - 28, of which 6 acquired; - Lysites - 87, of which 10 acquired; - Pheasants - 67, of which 4 acquired; - Pigeons - 120, of which 15 acquired; - Potârnichi - 13, were not acquired; - Quails - 51, of which 3 were acquired.

The total area of landfills for solid waste in Ungheni district is 54.29 ha of which the area of landfills for landfill of solid waste is - 34.09 ha and the area of unauthorized landfills is 20.2 ha, the amount of waste landed this year.55 thousand tons.

At the moment, in Sculeni commune, 1 land is pre-selected for the placement of household and solid waste landfills. I am in the process of elaborating the execution and authorization projects of the respective area.

The following quantities of unusable pesticides were collected from the territory of Sculeni commune: dust - 658 kg; packed in 48 bags, total stored - 658 kg collected on the land for the placement of landfills and solid waste.

In 2020, by the agricultural producers from Sculeni commune, chemical fertilizers were applied, including under agricultural crops 51.1 t, and organic fertilizers in the amount of 1600 tons, including under agricultural crops 1500 tons.

The use of agricultural land is a problem, which leads to their degradation, the cause being non-compliance with agrotechnical measures. Most farms are located on steep slopes.

In many cases these lands are cultivated along the slopes, which leads to the washing of the fertile soil layer. At the same time, the lands located on slopes with an inclination of more than 10 degrees are not excluded from the intensive processing circuit.

There is a danger that for 4-5 years a considerable part of the land will be completely degraded and removed from the agricultural circuit. No threshold systems are created in the complex with the planting of forest protection strips.

Gutters are not leveled, and landslides and ravines are not covered with vegetation (*table 1*). The scientifically substantiated crop rotations are not respected, practically the simple rotation of the crops has been passed. On the lands of the locals, maize is mainly cultivated in monoculture. The forest protection strips were destroyed. The mass cultivation of cereal and technical plants is determined by market demand, and is quite difficult to influence.

Table 1

**The structure of damaged and eroded agricultural lands in Sculeni commune**

| Locality | Year | Total land, ha | The surface of eroded agricultural lands, ha | | | The surface of the ravines, ha | Landslide surface, ha | Weighted average credit rating, points |
|---|---|---|---|---|---|---|---|---|
| | | | weak | medium | strong | | | |
| Sculeni | 2016 | 5640 | 835 | 496 | 227 | 3 | 23 | 63 |
| | 2019 | | 879 | 424 | 204 | 5 | 25 | 61 |

During the controls, mandatory prescriptions were given according to the ecological legislation in force: to carry out measures for environmental protection in agricultural households, to recultivated degraded lands, to ensure the protection of forest protection strips of soil and aquatic resources and to eliminate the shortcomings detected.

Soil quality monitoring, which is an essentially non-renewable resource that fulfills several functions (economic, social, cultural and environmental protection) and provides vital services for human activities and for the survival of ecosystems. Soil degradation has a strong impact on other aspects of life such as: water, population health, climate change, biodiversity protection and food security.

## CONCLUSIONS

The laboratory investigations, from the last 3 years, find that the main sources of pollution of the Prut river are the streams - tributaries from the territory of Ungheni district that pass through the populated centers that cross the Sculeni commune, namely Gîrla Mare, Vladnicul, Delia, Varşavca, Brătuleanca etc., which due to the anthropogenic

influence have a higher degree of pollution on aquatic resources.

Given the importance of water as an important natural resource, it is necessary to apply a set of specific measures related to the protection of water reserves. The purpose of water protection is to maintain and improve their quality and biological productivity, in order to avoid negative effects on the environment, human health and material goods.

Land degradation is also in the process of degradation, which supports a continuous decrease in soil quality and low productivity of agricultural land. Advances soil erosion and landslides.

At the moment, in Sculeni commune, 1 land is pre-selected for the placement of household and solid waste landfills. I am in the process of elaborating the execution and authorization projects of the respective area.

In 2020, by the agricultural producers from Sculeni commune, chemical fertilizers were applied, including under agricultural crops 51.1 tons, and organic fertilizers in the amount of 1600 tons, including under agricultural crops 1500 tons.

Maintaining and protecting the flora and fauna is the duty of each of us, those who live, create and use the environment in every moment of existence.

The environment and natural resources are the main components of the functioning of the agricultural system from an economic point of view. These are the "natural foundation of agricultural activities", which can favor or limit the development of society.

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