Environmental degradation due to anthropic actions.  
Case study: Saratel drainage basin (Romania)

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Abstract: - This study aims to analyze the environment components which have been degraded due to human actions, in a deeply rural area, after December 1989, which marked the transition from communist to the democratic regime. It also aims to identify the causes that led to environmental deterioration and the measures to be taken to prevent, mitigate and / or stop human activities with negative impact on the environment. The ultimate goal of this paper is to launch a warning regarding the progressive degradation of the environment in deeply rural areas, under the pressure of anthropogenic activities.

Key-Words: - environmental degradation, anthropic action, poverty, Saratel drainage basin, Romania

1 Introduction

During recent decades, experts’ concerns have turned increasingly towards identifying ways for sustainable development of human settlements. According to Bruntland report, this means finding a balance between economic and social development and the environment. It is therefore necessary to rethink the human-environment relationships by identifying ways of sustainable use of natural resources. However, in Romania, most of the countryside faces many dysfunctions, such as demographic and social destabilization, progressive depopulation, decline of traditional economy, low quality of life, environmental degradation, etc.

In this conjuncture, the question, whether these communities have the capacity to carry out activities in the direction of sustainable development arises. In this context, the paper will analyze a deeply rural area in Romania, through the status of the environment and the negative impact of anthropogenic activities on it.

Saratel drainage basin is situated in the southeastern part of Romania (Fig. 1), falling mostly into the Curvature Sub-Carpathians, namely the Buzau Sub-Carpathians. Its surface is of 187 km² [1].

The landscape is represented by a sequence of hills and depressions, passed through by a river.
system, mostly temporary. Region’s composition of sediment complexes of variable thickness and extension and different resistance to the action of external agents has favored selective shaping of slopes, by processes differentiated on reduced areas and has conditioned the overall appearance of the landscape [6].

In this area there are located entirely a number of 26 rural settlements, most of them (88.5%) with a population of less than 500 inhabitants. The total population in 2009 was of about 5600 people. The southern and southeastern parts (Fig. 1), with smooth slopes and much lower altitudes, concentrate most of the population. Villages located on top of the hills or in depressional basins, at the contact of Carpathians and Sub-Carpathians have a very rugged terrain, high relief energy and altitudes, which determine much more harsh life conditions than in the case of settlements located along the valleys, this favoring, together with other factors, progressive depopulation [5].

![Figure 1 Geographical location and distribution of settlements on elevation classes](image)

The inappropriate anthropic exploitation of various natural resources in the past centuries has left deep traces in the morphology of the region, flora and soil cover... [4]. As a result, the slopes associated with several types of mass movements, which often affect the entire surface, are very frequent, determining their inclusion in the category of less productive terrains [5]. In this context, the main characteristic of the region is the fragility of the natural components accentuated by the relief dynamic and by the tectonic influences, but mainly by the anthropic processes [2]. Degradation produced in the study area is not a particular case, but is specific to other rural areas of Romania, showing the need to identify national level measures of environmental protection.

2 Problem Formulation

The present study focuses on identifying the degraded environmental components in a deeply rural area and the causes of their deterioration. The hypothesis of this approach is that human intervention, even punctual and diffuse, by maintaining and increasing the intensity of manifestation for a long time, overlapping the lack of environmental protection measures, leads to gradual degradation, on areas more and more extensive of environmental components.

In this context, which measures can lead to the limitation of environmental degradation by reducing the human activities with negative impact on the environment?

The paper aims to analyze the environment components from Saratel Basin which have been degraded after December 1989, moment marking the transition from communist to the democratic regime. In order to register the changes with positive or negative impact on the environment, a series of comparisons with the past are made.

The data used are qualitative, obtained through field observations and through discussions with local people in the last 10 years. Also, the documents from historical and municipalities archives were checked for identifying information preceding year 1990.

Since the analysis is performed on a micro-level, on a confined space, there is no statistical data, measurable and relevant, that would allow an accurate explanation for environmental degradation under the action of the anthropogenic elements. At the same time, the intervention is carried out punctually, thus the systematic field research become very important for identifying the anthropogenic actions with negative impact on the environment.
3 Problem Solution

3.1 Anthropic actions that lead to environment degradation

In the study area, an environment degradation due to negative impact human actions during recent decades can be observed, as follows:

- abusive and systematic deforestation. Political and economic changes that followed the revolution of 1989 had a strong impact on vegetation distribution, because, by Law no. 18/1991, collective ownership was abolished and parcels of land were returned to original owners. Thus, the people were returned also large forested parcels, most of them being deforested later, for selling the wood. The interviews with local people revealed that a secondary motivation for cuttings was the fear that land restitution is only a temporary measure to be followed by future confiscation. A further factor is also the fact that people (excepting some villages: Joseni, Policiori, Scortoasa, which are connected to the gas network) use for heating in winter the wood they get from the forests near their village, so that the forestry fund is gradually reduced. If during the communist period, to compensate deforestation, wide areas of land were afforested, currently, large areas are deforested, so the forest fund doesn’t have time to regenerate anymore, and the forests are systematically reduced [5].

- cutting of plantations, which were designed to protect degraded areas. Until 1989, degraded surfaces or torrential basins were forested in order to stabilize them. The pin was more frequently used; presently whole slopes covered with this species arise in the landscape. Other species used were Acacia and more rarely other trees like walnut, ash, etc. The archive documents commonly show the authorities concerns to establish tree nurseries [7] and to afforest [8], [9], [10], [11], [12], [13]some areas with different types of seedlings [5]. After 1990, after the land was returned to the owners, some of them were cut. An indirect cause for woods and / or plantations deforestation is the installation on some slopes of the mass movement processes, conditioned by the friable substrate.

- intensive pasturing. In the study area, after 1990, some terrains were overused for pasturing animals, especially sheep and goats, resulting in shallow soil erosion due to frequent use of trails.

- execution of inadequate agricultural works causing soil degradation, such as plowing done perpendicular to level curves, which favor soil erosion, especially torrential one. Inappropriate agricultural use of terrains presenting risk of mass movement processes, leads to their degradation. Therefore, in the last five years, the occurrence of shallow small-sized landslides can be observed in several parts of the study area.

- the rise of roads connecting the settlements located along steep slopes. These are mostly unmodernised and used extensively on certain sections, which contributes to deterioration of the slope equilibrium and to the increase of erosion (under the action of precipitations), so that they gradually became unusable.

- accidental or deliberated fires on pastures, aiming to destroy vegetal remains, especially in autumn. This action leads to the diminishing of the vegetal cover diversity, air pollution, and in some cases poses risks to settlements and local people.

- exploitation of crude oil, cause environmental deterioration, both in actual operating perimeters and adjacent areas through heavy traffic due to heavy equipment and inadequate downhill roads, which favor the mass movement processes. The high costs of decommissioning the out-of-use wells and decontamination of land polluted by crude oil and its derivatives impede the reuse of the affected land by the local population, which amplifies Subcarpathian landscape degradation [3].

- sand and gravel exploitation, through the excavation of deposits on small areas, in villages Plopeasa and Joseni, determines landscape degradation;

- inappropriate waste management. In the analyzed area there are no ecological landfills, specially designed for waste management. Therefore, the garbage is stored in the vicinity of villages near the hydrographic network, or is burned in the households of local people. However, in more remote areas, the waste from constructions is inadequately deposited, affecting the quality of soil, groundwater, surface water, and vegetation cover.

- building of houses / annexes in areas where mass movements are likely to occur, result in overloading the slopes and therefore installation and / or reactivation of mass movement processes [5], particularly landslides, due to clay-sandstone-shale geological substratum.

3.2 Causes of environmental degradation

Environmental degradation, in the study area, after 1990, is determined by a sum of factors, as follows:

- upheaval induced by the change of the communist regime, based on collective ownership, managed by the State, with the democratic regime, which reinstalled the individual property. As a result, the restitution of land to the initial owners is understood...
in most of the cases as "this is my property, so I do whatever I want with it";
- lack of clear legislation to prevent and / or reduce the environmental degradation;
- measures to combat and prevent soil erosion were conducted only in small measure because of an acute lack of funds;
- local authorities don’t have adequately trained specialists in environmental protection;
- inadequate measures of local authorities after the occurrence of landslides, like land-slide body smoothing or late intervention, which led, in time, to the reactivation of some of them;
- construction authorizations were granted to local people in areas susceptible to landslides;
- lack of the practice of mapping the natural processes risks;
- lack of public awareness actions showing the importance of sustainable exploitation of available resources;
- mentality of the people, who do not perceive the importance of environmental protection;
- migration of a significant share of the population, especially young adults, under the communist regime, especially to urban areas, has led to destabilization of the local population and to demographic unbalances. As a result, a significant share of land is currently owned by owners who have inherited properties in the analyzed area, but live outside of it [5]. Some of them have inherited parcels, overexploited them, especially by abusive cutting of parcels of forest or orchards, without quantifying the effects of medium and long term;
- demographic aging, which decreases the resilience of the local community;
- low standard of living of local population, induces a concern for obtaining livelihoods and secondary places other issues, such as environmental protection;
- subsistence farming on small size parcels, using rudimentary methods;
- inadequate exploitation of resources (sand and gravel, petroleum) and lack of greening measures for affected areas.

3.3. Measures which may determine diminishing and/or mitigation of environmental degradation

Measures which may diminish or even stop environmental degradation require on one hand limitation of human actions with negative environmental impact and on the other hand actions of rebuilding / greening affected perimeters. These can be summarized as follows:

- afforestation of degraded lands, represented by unproductive land;
- limiting the shrinkage of the forest fund due to illegal cutting;
- identification of perimeters liable to occurrence of mass movement processes and proper agricultural use in accordance with their suitability; marking these perimeters on the synthetic risk maps;
- carrying out works for collecting and evacuating water on slopes affected by landslides;
- building gabions, ditches, embankments in river beds, near which communication routes are located;
- sustainable exploitation of natural resources;
- carrying out adequate agricultural works, along the level curves;
- seeding crops according to soil’s suitability;
- carrying out works in order to control soil erosion;
- collection and disposal of waste in places specially designated;
- avoiding location of roads connecting the settlements on unstable slopes;
- hiring specialists on environmental protection in local institutions;
- paying greater attention to the granting of construction authorizations, only for areas that do not present risk of active geomorphologic processes;
- public awareness actions for local population presenting the negative effects of deforestation, improper waste storage, etc.

Among indirect measures which could reduce environmental degradation is the identification of ways to increase the income of local population, by developing market outlets that would allow agricultural surplus to be exploited. In this way, some of the human actions with negative environmental impact but with positive impact on the income of some people, such as timber sales due to illegal deforestation, might diminish.

If some of the above measures can be achieved with reduced funds, through a better organization and coordination of local authorities, others require high funding, unavailable at the moment. At national and international level, a number of programs that could be used to improve degraded land or forests are active at present, but the authorities’ ability to access these funds is very low. In this context, priority actions are to prevent environmental degradation, through public awareness, by hiring specialists in local institutions, by avoiding placement roads and constructions on unstable slopes, etc.
4 Conclusion

After 1990, a degradation of environmental components can be observed in analyzed area, due to anthropic actions having a negative impact on environment as abusive deforestation, intensive pasturing, placement of construction in areas with high risk of mass movement processes, poor waste management, etc. Summarizing, the deterioration has multiple causes, the general lack of environmental protection measures overlapping the incapacity or disinterest of authorities, the activities of the local population and its mentality. In addition, the local population is mostly aged, having low living standards, concerned with finding ways to survive, so it doesn’t have the necessary capacity for sustainably exploiting local resources. At the same time, it doesn’t seem to realize that environmental protection is a crucial element for sustainable development on medium and long term. Over all these overlaps the freedom to exploit, according to their needs and decisions, the properties they own.

Practically, the installation of a vicious circle can be observed, due to a population having limited financial means, (mainly from pensions and social benefits and only a small part from wages), practicing subsistence agriculture and overusing the available resources. In such circumstances, it is clear that some directions for local development must be identified, leading to reduction of environmental damage. In the current local context, action of public awareness and accountability of local authorities in order to prevent further environmental degradation, plus the ecological reconstruction measures of perimeters affected, should be imposed. At the same time, because poverty leads to an increase of human pressure on the environment it is necessary to identify measures for raising local incomes through sustainable usage of resources.

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