REHABILITATION OF THE POLLUTED SOILS-ZLATNA AREA

REABILITAREA SOLURILOR ÎN ZONELE AFECTATE DE POLUARE – ZONA ZLATNA

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Abstract: *The paper aims at presenting and characterizing the soils and the degradation processes taking place on the studied land - surroundings of the small town of Zlatna. 19 soil profiles and 62 prospecting by boring were made, of which over 30 soil samples were harvested. It result that the perimeter studied are 10 units of soils that have been defined according to the characteristic of morphological and physic-chemical properties of the soil profile. The types of soil are litosoil, aluviosoil, eutricambosoil, preluvosoil and luvosoil the cause of soils degradation in this area is the pollution. As a result, the herbal and wooden vegetation suffered greatly or disappeared completely leading to erosion and landslides. In order to rehabilitate the polluted soils, some soil ameliorative recommendations are presented. The main restrictive factors are: strong pollution, deep erosion, soil acidity, slope land, surface erosion, landslides, patchy of land, strong settle of soil.*
The soils grouping was performed according to lend oneself of the use of meadow. It also was an improved grouping of land to grade management the meadows and depending on the state land agrochemicals has established measures to increase fertility.

Rezumat: *Lucrarea îşi propune să delimiteze, să descrie şi să caracterizeze solurile şi procesele de degradare care se manifestă pe terenul studiat-zona localităţii Zlatna. Pentru aceasta s-au efectuat 19 profile de sol şi 62 de sondaje din care s-au recoltat peste 30 probe de sol. A rezultat că în perimetrul studiat sunt 10 unităţi de soluri care au fost delimitate în funcţie de însuşirile morfologice şi fizico-chimice ale profilului de sol. Tipurile de sol sunt: litosol, aluvisol, eutricambosol, preluvosol şi luvosol. Cauza degradării solurilor din această zonă este poluarea. Ca urmare vegetaţia ierboasă şi lemnoasă a avut de suferit sau a dispărut complet ceea ce a dus la declanşarea proceselor de eroziune şi alunecări. Deci, în funcţie de gruparea ameliorativă a terenurilor şi a factorilor restrictivi sunt prezentate recomandările pedoameliorative. Principalii factori restrictivi sunt: poluarea puternică, eroziunea în adâncime, aciditatea solului, panta terenului, eroziunea de suprafaţă, alunecările de teren ,neuniformitatea terenului, tasarea puternică. S-a efectuat gruparea terenurilor după pretabilitatea la folosinţa păşune. De asemenea, s-a făcut o grupare ameliorativă a terenurilor în vederea amenajării şi gospodăririi pajiştilor şi în funcţie de starea agrochimică a terenurilor s-au stabilit măsurile de creştere a fertilităţii*

Key words**:** *pollution, deep erosion, soil acidity, slope land, landslides*
Cuvinte cheie: *poluare, eroziunea în adâncime, aciditatea solului, panta, alunecări de teren*

INTRODUCTION

The analyzed area is on the southern part of the Trascău Mountains, on the right and left slopes of the Ampoi River, near the town of Zlatna. The analysed surface is of 623.42 ha.

The area was affected by the surface erosion which led to the loss of a part of the organic matter accumulation horizon or to the formation of the parental rock right from the surface.

Likewise, the deep erosion occurred, being represented by active streamings, ditches, gullies and ravines. The landslides in this area are stabilised and active. The humans had a negative impact on the environment through a long and continuous pollution. The pollution resulted from the sulphur dioxide emissions which had a negative impact on the soil and on the

herbal and wood vegetation. The maximum sulphur dioxide emission was of 0.326 while the excess frequency of MAC (maximum admitted concentration) was of 29.86%.

MATERIAL AND METHODS

In order to establish the soil types and surfaces, 19 soil profiles and 62 soundings were made. Soil samples were harvested in order to establish the soils morphological and physical and chemical properties. In order to establish the necessary fertilizers and amendments for the rehabilitation of these lands, on the harvested soil samples, the pH and the hummus, phosphorus and potassium content were determined. The work methods were the ones set up by the ICPA methodology.

It was established that the analysed perimeter had 10 soil units (table 1) which were found taking into account the morphological and physical and chemical properties of the soil profiles.

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Table 1

Soil types

No.	Soil type	Surface (ha)
1	Skeletal district litosoil	21.13
2	Distric aluviosoil	35.27
3	Moderately eroded subskeletal eutricambosoil	59.53
4	Highly eroded skeletal preluvosoil	73.21
5	Stagnic luvosoil	66.16
6	Moderately eroded stagnic luvosoil	122.87
7	Subskeletal rodic stagnic luvosoil	38.32
8	Stagnic albic luvosoil	68.28
9	Moderately eroded subskeletal stagnic albic luvosoil	121.47
10	Subskeletal rodic stagnic albic luvosoil	17.18
	TOTAL	623.42

The classification of the soils according to their capability of being used as meadows was made according to limitative factors. The limitative factors creating the biggest problems are: the strong pollution, the deep erosion, the soil acidity, the land slope, the surface erosion, the landslides, the soil non-uniformity and the strong settling.

The classes of capability established according to the limitative factors are presented in table 2.

Table 2

Classes of capability of being used as meadows

No.	Class	Characterization	Surface (ha)
1	III	Lands with limitations or with dangers of moderate degradation within their use as meadows	542.76
2	V	Lands with limitations or dangers of severe degradation. Cannot be used as meadows at the present time.	80.66

RESULTS AND DISCUSSIONS

An ameliorative classification of the lands was made with a view to meadows rehabilitation, classification taking into account only the ameliorative restrictions. For this classification, the limitative factors are: the surface erosion, the deep erosion and the landslides. These classes are presented in table 3.

Table 3

Ameliorative classes

No.	Class	Characterization	Recommendations	Surface (ha)
1	I	Lands with meadows, no limitations. No ameliorative measures required.	Preventive works for some degradation processes of the meadows (removing the knobs, the wood vegetation and the shrubs, gathering the stones, flattening the hills, fertilizing and amending, auto-seeding and over seeding.	190.73
2	II	Lands with meadows, little limitations.	Preventive measures for soil degradation (fertilizing and amending, auto-seeding and over seeding with a mixture of 60-70% graminaceae and leguminous plants, creating a shelter-belt on the contour lines, banning the grazing during rainy periods).	101.16
3	III	Lands with meadows, moderate limitations.	Preventive and ameliorative measures for soil degradation (seeding and over seeding, fertilizing and amending, creating shelter-belts on the contour lines, banning the grazing after over seeding and seeding processes until after the disappearance of the vegetal sheet, elimination of the water by drains, flattening the land for the even drainage of the rain waters.	271.57
4	IV	Lands with meadows, severe limitations.	Intensive preventive and ameliorative measures for soil degradation (gathering the stones, removing the wood vegetation and the shrubs, fertilizing and amending, over seeding, creating shelter-belts.	21.13
5	V	Lands with severe limitations, cannot be used as meadows at the present time. May be used as meadows after reclamation.	Occupy surfaces on which deep gullies of about 2-3 m or high density ravines were formed. Ameliorative works are recommended (flattening the gullies and the ravines, planting the surfaces).	33.83

Following the chemical analyses, it resulted that:

- the supply with organic matter was weak on approximately 61% of the surface, while the rest of the 32% was medium.

- the supply with mobile phosphorus was very weak on 29% of the surface, weak on 59% and medium on 12%.

- the supply with mobile potassium was medium on 86% of the surface and good on 14%.

In order to improve the meadows growth and development conditions, a fertilizing and amending program must be applied.

CONCLUSIONS

Due to the altitude and the air currents which carried the sulphur dioxide and the suspension and settling powders, the polluting factors acted with a different intensity. Therefore, the most powerful pollution caused by the destruction of the wood and herbal

vegetation took place in the areas with abrupt slopes and with medium or coarse-textured soils. Here, during torrential rains, huge quantities of land are carried on the slopes leading to the loss of huge quantities of hummus, of nutritious elements and of calcium. As a result of these losses, the soil structure is destroyed causing thus disorders in its air and hydro-thermal regime and favourising the erosion and sliding processes. In order to supply for these losses, a fertilizing and amending program was established.

It implies quantities of 142 kg/ha N, 25-65 ka/ha P, 35-60 kg/ha K and 1,50-4,60 t/ha Ca CO3.

During the ecological reclamation of the polluted areas, a group of unitary and integrated measures must be applied, starting with the organization of territory works, continuing with the soil ameliorative works (fertilizing, amending) and finishing with the monitories of the executed works.

All the strongly affected areas, which present numerous ravines and gullies, must be flattened by bulldozer, must have calcareous amendments applied to them, and must have the adjacent torrents rectified in order to prevent other landslides and erosions.

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