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LAND RECLAMATION ARRANGEMENTS IMPACT IN SOILS EVOLUTION FOR HYDROGRAPHIC BASIN OF THE RIVER BEGA.

IMPACTUL LUCRĂRILOR DE ÎMBUNĂTĂȚIRI FUNCIARE ASUPRA EVOLUȚIEI SOLURILOR DIN BAZINUL HIDROGRAFIC BEGA

Ioana Alina COSTESCU, Nicoleta NEMEŞ

Politehnica University From Timişoara, Hydrotechnical Engineering Faculty
Corresponding author: G. Enescu Street No. 1A Timişoara, e-mail:ioanafair@yahoo.com

Abstract: *Soil and vegetation constitutes a system that is appreciated in consideration with the quantity of biomass accumulated. The natural conditions that favour the geo-dynamical phenomena are represented by a series of geological, geo-morphological, hydrographical, climatically factors that act together over the systems components. The land slip processes stabilised or semi stabilised, affect a considering part of the agrarian surface, especially grass lands which constitutes a severe soil degradation processes. Surface erosion affects all hydrographical basins in our county due to the natural factors but especially because of the negative long-term influence of the anthropic component. Simultaneously deep erosion affected surfaces are the one where the released factors is combined with the important potential factors, high slopes and the lack of protection from shrubby vegetation. In the hilly area the land slips have immediate and negative consequences over the agrarian terrains, communication paths, locality infrastructure. Soil pollution from anthropic activities in Timiş County is caused mainly by the improper depositing of industrial, domestically and animal wastes.*

Rezumat: *Solul şi vegetaţia constituie un sistem a cărui depreciere a calităţii se exprimă prin cantitatea de biomasă acumulată. Condiţiile naturale care favorizează fenomenele geo-dinamice sunt reprezentate de o serie de factori de ordin geologic, geo-morfologic, hidrografic, climatic, etc., care acţionează conjugat cu ponderea diferenţiată şi care după rolul pe care îl au sunt grupaţi în factori potenţiali şi factori declanşatori. Procesele de alunecare, fie stabilizate sau semistabilizate, afectează o parte considerabilă din suprafaţa agricolă, afectând în special păşunile care constituie cele mai grave procese de degradare a solurilor. Eroziunea de suprafaţă afectează practic toate bazinele hidrografice ale judeţului datorită atât factorilor naturali dar în mod deosebit influenţei negative şi pe termen lung a factorului antropic. În zona colinară alunecările de teren au consecinţe imediate şi negative asupra terenurilor agricole, căilor de comunicaţie, infrastructurii localităţilor, etc. Poluarea solului în urma unor activităţi antropice, la nivelul judeţul Timiş, este cauzată în principal de: depozitarea necorespunzătoare a deşeurilor industriale, menajere şi dejecţii animaliere.*

Keywords*: hydrographic basin, soil pollution, land improvements.*
Cuvinte cheie *:bazin hidrografic, poluarea solului, îmbunătăţiri funciare*

INTRODUCTION

The soil and vegetation are a system whose quality depreciation is expressed by the accumulated biomass quantity. The process regarding the quality of soil depreciation involves three stages:

- stage I – when the main system function are normal, and the productivity variation are self-regulated, accomplishing a balance estate (climax);
- stage II – when happens a disequilibrium of the main functions and through self-regulation the system is not capable to achieve the balance estate, in long term the soil quality are depreciated. The system rehabilitation can be obtained by anthropical interventions (changing the usage type, the usage structure, fertilizers appliance, works and arrangements

with anti-erosion role, etc.);

- stage III – when function deregulation is very strong and irreversible. In this case are required specified measures of ecological reconstruction.

MATHERIAL AND METHODES

Analyzing the natural conditions of our county, it results that considering the erosion degradation forms in Timiş County have the following value:

- potential surface erosion: 9,6 t/ha/year;
- effective surface erosion: 3,8 t/ha/ year;
- surface erosion and landslips: 3,8 t/ha/ year.

The natural conditions that favourites the geo-dynamics phenomenon are presented as a series of geological geo-morphologic, hydrographical, climatic factors etc., that acts differently as the role that they occupy can place them in potential and releasing factors.

The land slip processes stabilised or semi-stabilised, affects a considerable part from the agrarian area, especially the grass lands constituting the most severe soil degradation form.

Surface erosion affects practically every county hydrographical basin, due to the natural factors but mostly because the negative and long term influence of the anthropic factors.

The surfaces most affected with deep erosion are those where the realizing factors action is combined with the potential important factors, heavy slope lines and the lack of shrub vegetation protection.

In the hilly area the land slips have immediate and negative consequences over the agrarian lands, communication paths, localities infrastructure etc.

The agrarian terrains are appreciated considering the fertility degree. From this point of view they are divided in many classes: class I, II, III, IV, V, of qualities.

From the total of agrarian terrains of 702262 ha real surface in the table 1 we present the soils types and classes for Timiş county, year 2007.

Terrains repartition on pretability classes is presented in table 2.

Table 1.

Types and classes f soil in Timiş County

Usage	Class I		Class II		Class III		Class IV		Class V	
	ha	% from the total usage	ha	% from the total usage	ha	% from the total usage	ha	% from the total usage	ha	% from the total usage
Arable	67117	12.6	141606	26.7	172196	32.5	109351	20.6	38219	7.2
Grass land	12166	9.3	32603	24.9	50836	38.9	23242	17.8	11603	8.8
Hayfield	677	2.3	3473	11.8	8758	29.9	10369	35.4	5984	20.4
Vineyard	366	7.7	965	20.4	1878	39.8	973	20.6	534	11.3
Orchardings	59	0.6	1738	18.5	2392	25.5	3949	42.2	1208	12.9

Table 2.

Terrains repartition on pretability classes in Timiş County

Crt. no.	Usage	Soil quality classes					
		I	II	III	IV	V	Total
1	Arable	67117	141606	172196	109351	38219	528489
2	Grass land	12166	32603	50836	232342	11603	130450
3	Hayfield	677	34723	8758	10369	5984	29261
4	Vineyard	366	965	1878	973	534	4716
5	Orchardings	59	1738	2392	3949	1208	9346
Agrian total 702262							

RESULTS AND DISCUSSIONS

At county level were elaborated a series of considerations in order to fundament The national strategy for drought effects decreasing in short and long term.

The dry climate when natural precipitation do not assure the plants water requirement in the hole vegetation period or in various seasons of the year are manifested in the Banat Plain, respectively in The high Plain (Vinga, Gătaia), The terrace Plains (Recaş Țipari, Darova) and in The low plain (Timiş - Bega - Bârzava; Jimbolia - Bulgaria; Sânnicolau; Aranca; Cenei - Ionel - Livezile; Moravița). Are affected from drought also the meadows of Timiş and Bega (inferior and middle course).

In this area fighting and preventing the drought effect implies:

1. Ponds arrangements in the Hilly area (Lipovei, Lugojului, Buziaşului) for water reserves and fighting erosion (attended by river blocking).

2. Creating forests curtains along side of roads (at 30 m distance), draining-drainage channels (that have a net of 11,000 km in Banat), at the properties limit. This involves pedological studies to establish the species, distances, etc.

3. Rebuilding the surface draining – drainage channels and irrigation systems existing in 1990.

4. Utilization of underground irrigation accumulating the water inside the draining – drainage channels and rising the underground water table to use the phreatic supplementary waters.

This involves pedological studies – soil, phreatic water, drainage water, to prevent degradation through salinization, alkalization.

5. Due to the heavy soil compactation in Banat Plain and presence of the compresses layer at 20 - 30 cm depth is imposed periodic tilled soil scarification to increase permeability and water reserve in soils profile.

6. Adequate agro-technical designated to conserved water in soil and to agro-ameliorative measures to increase the organic matter in soil since the percent of humus has decreased in the first 50 cm of all tilled soil types. This will led to the increase of the soil storing capacity.

7. Permanently maintaining at the tilled terrains surface of a vegetal carpet.

8. Elaboration of anthropic degraded terrains (compacted, salinization, alkalized, polluted) and adequate, specifically ameliorative solutions.

9. Extending the soils monitoring network (level I and II) and effectuation of case studies to permanently control the areas from Aranca and Timiş-Bega hydrographic basin. For this we propse to organize a network at county level of pedo-hidrological stationary for Banat Plain where OSPA Timişoara will make the periodical determination to control the physical and chemical soil index, phreatic water level and capillary ascension, the salts content of phreatic waters, nitrate pollution, heavy metals and establish the accessible water reserve in the vegetation period, the nutrient supply etc.

To fundament The national strategy for drought effects decreasing in short and long term at county level, OSPA Timişoara effectuated in the year 2000 n inventory of degraded terrains based on existent data in the institution archive, resulting the following:

Soil pollution as a result of anthropic activities, at Timiş county level, is caused mainly by: improper depositing of industrial, domestically and animal wastes.

The most important soil pollution source in Timiş County is due to the passed and actual activities of industrial swine growing trough the clearing thanks with liquid and dehydrated animal wastes locate near the farms that belonged to S.C. COMTIM S.A. Timişoara.

The intensive animal growth complexes generate serious ecological problems due to

the production in restrained environment, of high concentration of digestive-metabolic residues. Because the residues are evacuated being washed away with water, means that this ecosystems are major tail waters producers with heavy pollution potential to surrounding ecosystems.

Soil degradation is a complex process that involves various factors. One of the factors with big influence is erosion. The natural and anthropic erosion phenomenon are presented in the high plain and hilly area being influenced by slope, hydric regime, culture structure, soil processing technology, other human activities as excessive grazing and deforestation.

The factor that determinates hydric erosion can be principal (precipitation, anthropic activities) and increasing (relief, soil, rocks, vegetation).

At Timiş county, according to the data from D.A.D.R Timiş and O.S.P.A Timişoara, was identified a total surface of 6615,0 ha seriously depleted terrains with natural and anthropic erosion processes that were constituted in inventory units or ecological reconstruction.

Total inventory surfaces are: 6615,0 ha - represents 100%, from who :

- surface erosion 12533,5 ha 19,0%
- depth erosion 875,0 ha 1,3%
- land slips 1724,0 ha 2,6 %
- excavations 90,0 ha 0,1%
- wastes deposits 10,5 ha -
- humidity excess 36239,8ha 54,8%
- salinization 12280,2 ha 18,6%
- litosoils 1199,0ha 1,8%
- vertosoils 400,0 ha 0,6%
- psamosoils 803,8 ha 1,2%
- phreatic humidity excess 4427,5 66,9%
- floods 23235,5 35,1%

CONCLUSIONS

In the last ten years of the so called transition, the concern to maintain such works operational was quite low, as result a large part of them were deteriorated and became out of order. As result, the rehabilitation of theses land reclamation works is imperative, being the protection shield of the Romanian agriculture. Present time, the policy of the Romanian Government includes, besides other measures, the rehabilitation of the land reclamation sector.

For the lower lands, previously diked and reclaimed for cultivation, where in present time large areas are proposed to be renaturalised, special studies are going to be carried out concerning the environmental impact, also analysing the re-harmonization of the natural land use and the future use prospects of these important agricultural areas, especially where large lakes were partially or totally reclaimed. The rehabilitation of the present soil erosion control works and the new developments of such works should be carried out in the watersheds of the small valleys within the hilly and mountainous zones where there are severe torrents with high discharges which passing through villages cause disastrous floods.

Within the framework of the soil erosion control measures and the rehabilitation of the canal network for conveying the water on the slope lands, some facilities should be provided for the farmers in such areas.

These measures will have in view:

- association of farmers in order to plough the soil on the contour;
- mitigation of liquid and solid surface run off;

- development of the experimental standard lots, as a measure for a better persuasion of farmers to adopt the adequate land management measure on the slope lands;

- cleaning and rehabilitation of the river beds;

- rebuilding the unsuitable bridges and footbridges, and building such new works.

National Programme, which should be supported with financial resources, strictly necessary for short-term (2001 - 2004), medium-term (2004-2008) and long-term (2008 - 2012).

This programme should also include the connected actions, namely:

- remediation of the deterioration regarding the electrical energy supply of the irrigation and drainage pumping stations (electrical lines, transformation installations, etc.) with the operation terms and financial resources corresponding to the requirements for putting in good order these equipment;

- supplying the watering equipment and the adequate financial resources, having also in view the revitalizations of the factories producing such equipment;

- promoting by the state agricultural agencies of certain programs aiming at the introduction of some highly efficient agricultural crops under the irrigation conditions, within some crop rotation for which the needed chemical fertilizers should also be provided;

- updating the operation regulations with concrete actions for each more important agricultural enterprise.

The programme will have in view to provide a maximum efficiency of investments, first of all the analysis of the technical, economic and social aspects which allows the identification of the developed areas presenting a high viability degree. The programme will also provide a special selection regarding the irrigation systems, subsystems and even plots where the investments for the rehabilitation of the land reclamation works will ensure the efficiency of the agricultural development in the respective area and only in such areas investments should be provided. The areas which will not be proposed to be irrigated in this stage should be included in a preservation programme with special measure to protect the existent works. All these actions for putting into a good operation the irrigation schemes should be undertaken in a close connection with those regarding the water management and environmental protection in order to achieve, under an unitary idea, the concept of a sustainable agriculture in the respective areas. It is important to start, at least within some complex land reclamation works, the cadastral operations of the land reclamation works.

BIBLIOGRAFY

1. CAZACU E., 1989 - Irrigation, Ceres Publishing House, Bucharest.

2. DOBRE V., 2001 - Measures for Rehabilitation of the Irrigation Works, Romanian Agricultural Journal, Bucharest.

3. MIHNEA I., M. PODANI, 2001 - Water Gate Against Water in Romanian Agriculture, Romanian Agricultural Journal, Bucharest.

4. MIHNEA I., M. SELARESCU, 1998 - The Necessity of Rehabilitation of the Hydrotechnical and Land Reclamation Works Imposed by the Last Climatic Evolution in Romania, The Construction Magazine, Bucharest.

5. * * * * * - 2008 „Rapport concerning environment estate 2008" Regional Agency of Environment Protection Timişoara;