The Anthropical Impact on te Rural Environment in South-Western Romania

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Abstract

On a typical pedogenetic frame, the intensive agricultural system practiced in the last 40 years, has determined secondary compactization and nutrition desequilibrium, acidifyins, lacks of natrium, phosphate, potasium and microelemente.

On the basis of an slow climatic acidification it has been noticed natrium reducing in the median and inferior part of soil prophile.

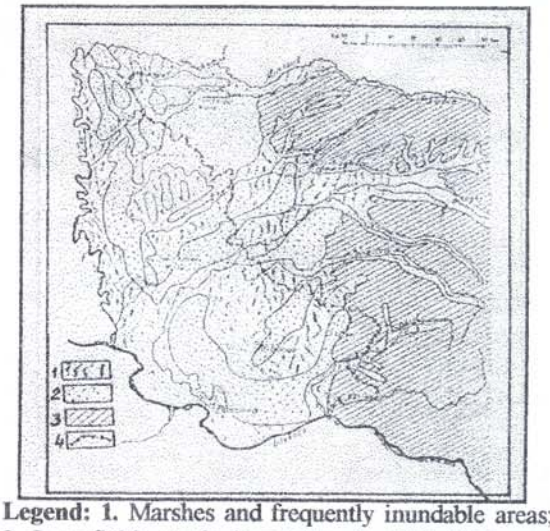
The humic consequences of the scale for agro-pedo-hydro-amelioration interventionswere stopped by a series of negative phenomen because of projects, executions, organization and exploitations the exagerated deepoing of the phreatical level, the unreasonable geometrization of the drain channels, the problems unsolved relating against the soil erossion, the cutting of the protection woods, etc.

The last decades of agricultural activity have marked a true quantitative explosion of products not only due to genetica engineering but also due to an intensive mechanisation and chemicalisation. On the other hand the rush of over production in agriculture means the deterioration of some physical properties and the exhausting of some nutritive elements in soil and finally the degradation of the environment.

The agriculture in the south-western part of Romania generally, and that of Timis District especially presents some particularities that are not similar with those in other districts of the country or with those of countries with a developed agriculture. Abot those particularities we shall refer especially in the context of some limitative or degradational phenomena.

The appreciations refering to the impact of the anthropical activities on soil relied on observations of relief, climate, phreatic water or vegetation, on chemical and physical analysis done on thousands of soil samples gathered during 40 years, grouped in four agrochemical cycles of maping and in two pedological cycles.

The drainage workings done during the last decades have been extending on 466,000 hectars. Therefore we can say that they gave huge lands to agriculture knowing that south-western part of Romania was covered by huge muddy areas (fig. 1) (Griselini- 1779).

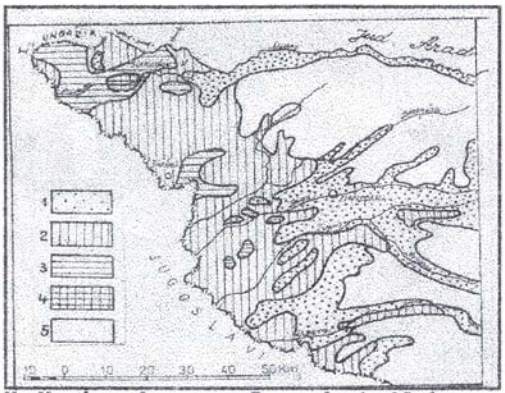


Legend: 1. Marshes and frequently inundable areas; **2.** Low fields rarely inundable; **3.** High fields and piemountain uninundable; **4.** State boundery.

Figure 1. The map in the south-western part of Romania in siecle XVIII-XIX.

The relatively short time that had passed ever since the stopping of the works concerning the controlling of the humidity excess in certain zones of south west of Romania did not facilitate the sesisation of some visible modifications in the morphology of the soil or other analytically determined ones. To these we have to add the lack of a determined scientific control referring to the evolution of the soil in these areas both past and present.

Yet some morphological characteristics indicate the more and more frequent becoming of gleisation phenomena as relict phenomenon on that got stronger also as a result of the humidity deficit perceived during the last decades. This humidity deficit had lead to the accentuationof the stepisation in the low plain with the whole chain of negative effects. Te poisonous salts have intensified their rise on the soil prophile and the natrium ion is slowly climbing the superiour horizons without the danger of reaching the epipedones. Te exudative hydric regimes placed in the low plain soils of south-western part of Romania during the last decade can create great problems in the future. The functionalityof the great drainage systems foressen with a great deal of pumping drainage stations in natural deversors is damaged by the lack of an adequate legislation and by the financiar and energical penury. The drainage chanels, that were periodically requesting drainage are more and more overfilled by used waste deversation from the zootechinical complexe. If to all these organising shortcomings one would add a longer perioud of pluvial excess of humidity, the phreatic level will rise, at least on certain sectors, fact that will surely lead to the natrium penetration in the coloid complex of the horizons that support and feed the plants (fig. 2).



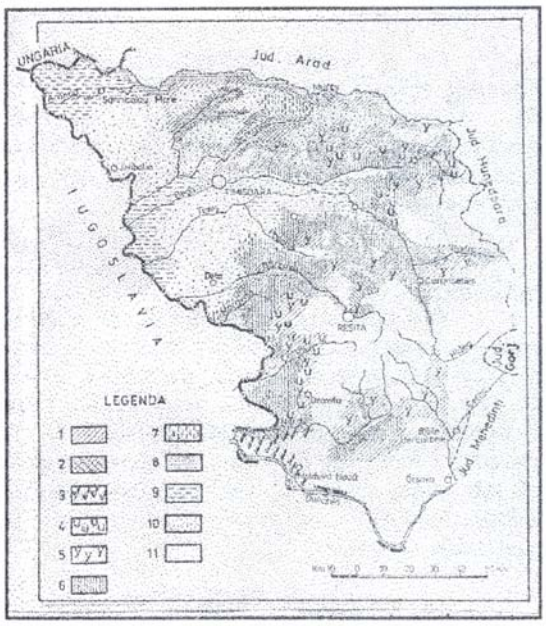
Alkalisation danger - Legend: 1. Nodanger; **2.** Weak danger; **3.** Moderate danger; **4.** Great and very great danger; **5.** over 5 m depth phreatic levels.

Figure 2. The clasification of the phreatic waters in the low plain zone function of the adsorbtion capacity of Natrium by soil.

Of course, the most affected zones will be those where there were signalised the highest accumulations of salts i.e. the low loess plains where there are even now going on changes of ion positions.

The accentuated geometrisation of the drainage system stopped the total solving of the excess of stagnant humidity. Together with the designing imperfections the natural compactation and the artificial settling as a result of the anthropical intervention, lead to the maintainance of a danger of stagnant excess on 282,699 hectars more (Ianoş-1994).

A definitely special problem but a very serious one with acute manifestations in the past and probably in the future too is the errosion. Recently the surface errosion is afecting in different degrees of intensity about 13.27% of the surface of the agricultural soils placed on differently enclined slopes (fig. 3).



Legend: 1. Strong water errosion; **2.** Very strong and excesive water errosion; **3.** Wind errosion; **4.** Stabilized landslides; **5.** Gully errosion; **6.** Pluvial water-logging (frequent); **7.** Pluvial water-logging (periodical); **8.** Phreatic water-logging (frequent); **9.** Phreatic water-logging (periodical) associated with pluvial water-logging (periodical); **10.** Lands unaffected by weatherings; **11.** Forest and nonagricultural terrains, unresearched.

Figure 3. Agricultural lands affected by weathering by errosion, landslides and humidity excess.

The little extended antierosional systems of 82,313 hectares (of which half in Caraş Severin

District) did not solve only in a few cases the phenomena and only partially.

The marking of the usual agricultural works at improper states of humidity have lead to the extension of compactness phenomena. The most affected soils in this case are these of vertisoils type, brown eu-mesobasic soils, brown argiloiluvial soils. In the sout-western part of Romania there are 39,451 hectars (3.39%) of soils affected by severe limitations (strongly compacted), 201,845 hectars (26.84%) lands occupied by soil affected by limitate moderations (medium compacted) and 285,955 hectars (23.86%) lands occupied by soils with reduced limitations (weakly compacted) (Ianoş-1995).

Obvious modifications of the rural agricultural space under the influence of the anthropical preasures were seen also in the soil's nutrients contents.

Humus, a complex organical substance, typical for soil is somehow in a balanced proportion in the sout-west of Romania soils: 1/2 levels of middle assurance and 1/2 levels of reduced and high levels of assurance.

During the last 35 years there were seen mutations of theassurance levels with growths of the contents of humus in the low plain and dwindlings in the high plain piedmountain hills.

The causes are multiple without pretending to tell them all, we shall here present a few of them specially those anthropically enduced. As the majority of the south-western Romanian soils were cultivayed over 100 years, their content in humus touched or are almost touching a half stabile level. In this state, as the yearlyloses of humus determined by the mineralisation processes are made up for yearly contribution of fresh organical substances, the humus content is stationary or it registeres reduced dwindlings or growings. By practicing (during the last 20 years) an intensive agricultural system, that did not ensure the compensation of the mineralised humus by new formed humus, the yearly dwindlings of very low proportions were accumulated on long terme determining dwindlings of the humus contentup to the level of reaching a new limit level.

The phenomen is not new and it has in been observed in other zones in the country or in the world. Vintilă Irina et al. (1963) for Romania and Grincenco et al. (1970) for Russia sustain that after passing from the traditional agriculture to the inclusive one the values of the humus content of the soils dwindled with about 0.5%.

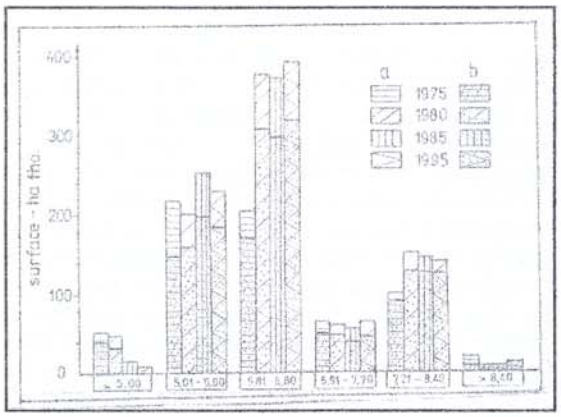
Another cause of the humic lack of balance typical for south west of Romania is represented by concentration of the zootechnical complexes in restrictive areas. Their industrialisation and giantisation contributed to huge accumulations of organic materials in certain zones and depriving others of them. The process has been giong on exactly as it shoul not. The zootechnical complexes grew in surface and effectives every year in the fertile zone of the district on chernozems and diminished or disappeared almost entirely in the zone of the lesivated, podzolite, naturally lacking in organical mather. Near the fact that the latter zones were losing the organical mater so useful for the soils here, the lands around the large complexes of industrial type were suffering of an excedent that in time became a poluting agent. Recently one of the great problems of south-western part of Romania agriculture regarding the protection of the environment is quite the deversation in the zone of the industrial complexes of huge, of the residues of zootechny. Their spreading in neighbouring zones is risky. They contain near fertilising elements some contents of harmful salts mostly natrium and salts we find natively or secondarily also in the neighbouring soils. Their transportation to the organic matter deficitary zones is costly and economically unprofitable. Te lack of fuel and labour force of the former agricultural production entreprinses of state and cooperatist have lead as well as there where still producing some amounts of manure, to their inability of being administered. They were and still are stored, in excess, around the ex-zootechnical sectors, in empty spaces, pitsamplifyng the pollution phenomenon especially by infesting the phreatic water with Nitrat, Amonia and unspecific microorganism.

Another cause of the humic desequilibrium especially for the accidentate zones is represented for areal and linear errosion. On the base of the map of land declivity there is appreciated for south-western of Romania the existance of 461,311 hectars (38.3%) of agricultural soils placed on slopes of 10% inclination and over 233,500 hectars of erroded soils. On these lands the soil and humus loses reach values of over 160 t/ha/year i.e. 3.8 t/ha/year for the piedmountain zone strongly accidentated. The authors underline that, during the years there were lost by areal errosion over 8.5 milion tones of humus and by depths erosion some 1.65 millions more, the total of the humus loses by this date being round 10.14 million tones.

Although on agricultural lands there were placed year after year nitrogen fertilizers yet the contents were insignificant comparing to the crops obtained. At the present levelof the state of nitrogen suply of the soils in south-western Romania the crops and corn production were also obtained on the base of some important yearly consume of natrium from soil reserve, consume that autran the rhythm of remarking and stoking of the element by pedogenetical

processes. The high proportion (over 75%) of soil with a weak and medium nitrogen supply is still a problem for the new land owners. The price of the fertilizers is higer and the nitrogen "hunger" of the cultivated plants is more pregnant.

The nitrogen fertilisation that has been applied for 5 years if it had not lead sufficiently to the remake of the nitrogen reserve in the soil, it managed to create a iod desequilibrium in the weak moderate debasified soils. The applied limestonifocation that had been done until five years ago if it had not lead enough to the remaking of the nitrogen supply in the soil it handled to create a ion disbalance in the weakly - moderated debasified soils (fig. 4).



Legend: a-agricultural land; b. plowed land.
Figure 4. The reaction of the agricultural soils in the south-western part of Romania during 1975-1995.

The applied limestonification on a large enough scale had partially emproved this situation but it had contributed to the humic lack of balance already so fragile. For the new owners the two ways of fertilisation, organic or mineral with nitrogen as well as the limestonefication have to be carefully trought in order to bring the lands in their optimal state of nutritive balance.

Another main element, deficitary in the soil is the phosphorus. The industrial production of the phosphorus fertilisers is very expensive due to the import matter. By a summary analysis the state of phosphorus supply of the south-western part of Romania soil is not sufficient. The causes are multiple. One of them is the continuous handling of agricultural products. Therefore there are takenaway from the soil of the producing zones, important nutritive substances that are stored in restrictive spaces or are exported to other zones fact that is interrupting (opposite sene) the cycle of this element. The intensly exploited soils have lost in some zones 20-30 ppm phosphorus and the replacement with be done harder.

On the other hand a lot of scientists who have analised our state of soils ensurance with prime matters necesarry for the producing the fertilizers were drawing the attention that in the future the phosphorus problem can be more important than that of water, pollution or fuels.

References

Grincenco, A. M., Cesnek, G. I., (1970), Vlianie dlitelnoi selskohozeainstvennoi eksploatatii na dinamiku gumusa v moscinom cernozeome zapadnoi Lesosstepi USSR, Trudi Harcov, nr. 139, pg. 23-24.

Griselini, Fr., (1979), Versuch einer politischen und naturlichen Geschichte des temeswavere Banats in Briefen an Standespersonen und Gelehrte, I-II, Vienn.

Ianoş, Gh., Puşcă, I., Ţărău, D., Borya, I., (1994), Aprecieri asupra situaţiei actuale a solurilor din Banat ca urmare a lucrărilor de desecare-drenaj şi direcţii de ameliorare în viitor, Public S.N.R.S.S., nr. 28A, Bucureşti, pg. 134-147.

Ianoş, Gh., Goian, M., (1995), Solurile Banatului; evoluţie şi caracteristici agrochimice, Editura Mirton, Timişoara.

Vintilă, Irina, Chiriac, Aurelia, Băjescu, Irina, (1963), Date privind reserva de humus, azot şi fosfor ale solurilor cu folosinţă agricolă din sud-vestul României, An. I.C.P.A., vol. XXXI, pg. 101-124.