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CONSIDERATIONS REGARDING THE ANTHROPIZED PEDOGENESIS IN THE CARPATO – DANUBIANO – PONTIC AREA.

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Key words: anthropized pedogenesis, carpato-danubiano-pontic area.

Abstract. If we start from the premise that geographical space can be considered a concrete space, coherent and changeable, then landscape - environment rapport becomes essential for understanding how the prehistoric humans were affected by natural conditions. In these conditions, we treat the environment as a multi-dimensional reality, which includes both natural environment and human creations, and the human being in a double hypostasis: as an environment component and as its beneficiary. The geographical space that became „a consumable good" for Neolithic communities will end by being anthropized, fact that attests a specific mentality of the respective populations about life. Moreover, human beings started to depend on environment, changing it in their own interests. From this perspective, the soil←factors reality had suffered the most. In the different stages of agriculture, different progresses were registered, and modifications also occurred in the soil and the environment in general.

According to V.V Docuceaev (1949), soil is a product of interaction in time of the climate, vegetation, parent rock and relief. In term of functional - genetical concept, the interaction between the specified factors and their dynamics determines a certain pedogenetical ambiance, which conditions the realization of a specific pedogenetical elementary process, thus ensuring pedogenetical diversity materialized in different classes, types and subtypes of soils. They also determine the geographical rules of distribution in space of the pedogenetical formations. In such an approach, the system soil ← factors is a self-regulator system at the geological time scale. Along with human involvement in the environmental components functionality, also time at its historical (social) scale gets involved.

The first changes are related to the first agricultural revolution (the years 12000 and 7000 Before Christ- BC) with the first steps in soil tillage, by a simple operation of „scratching" in order to improve conditions for seed germination. The

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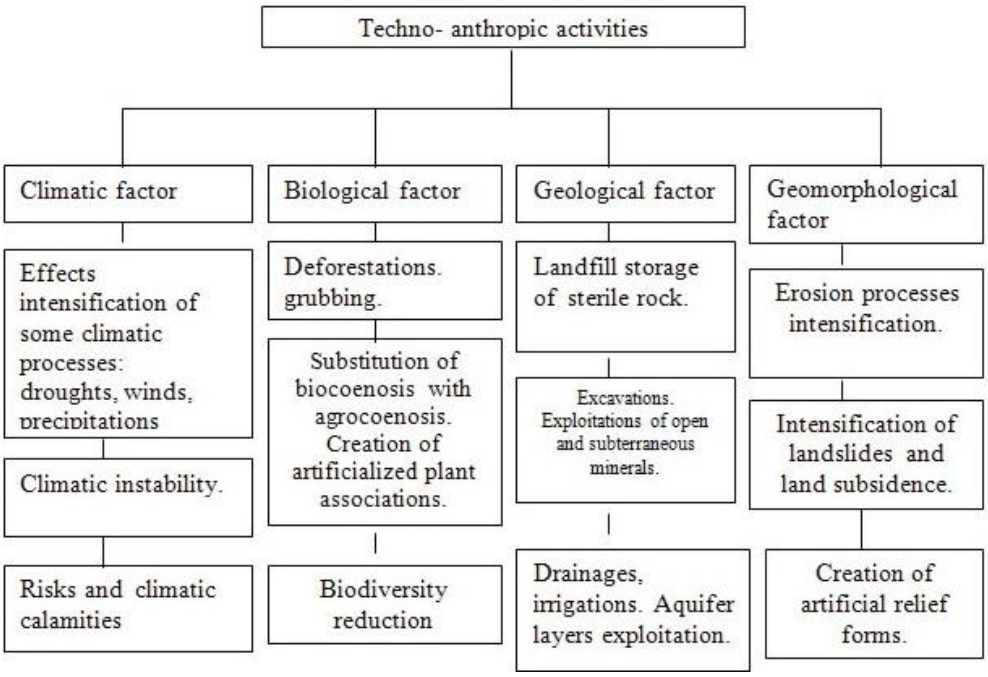
first „plows" hauled by human being force appeared 7000 years BC, when soil tillage was as a necessity in order to achieve an adequate life environment for the seeds and efficient fight against weeds. Namely, this superficial soil tillage was probably the most important rupture of the trophic chain from the natural ecological system.

Tab. 1 - Techno- anthropic implications within pedogenetical factors

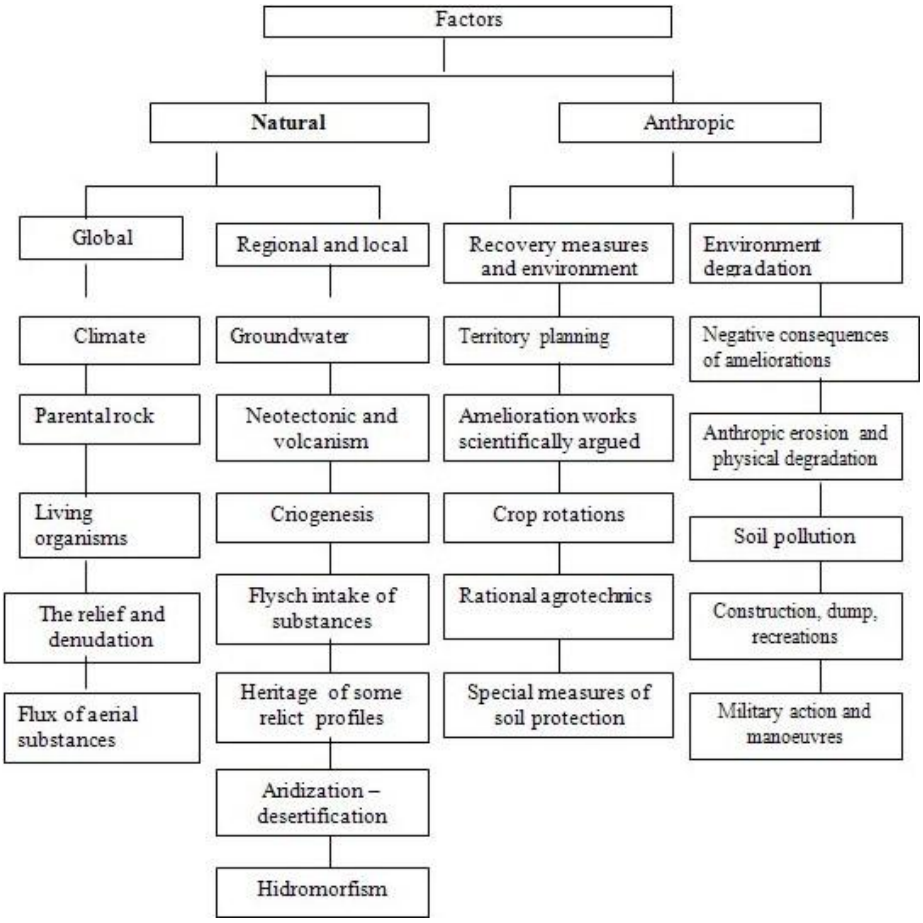


Along with human society development, people have succeeded to transform continuously and increasingly the pedogenetical ambiance, intervening with the help of science and technologies on the vegetation and also on the relief (especially microrelief), on groundwater and surface waters, on climate (especially on the local climate). Therefore, these interventions have influenced the morpho-dynamics of the local processes through grubbing, construction of human settlements, roads and The other component of the system soil←factors – the SOIL also suffers important modifications.

As a result of anthropic implication, modifications of the pedogenesis process occurred: agricultural crops have replaced the steppe meadows; the soil is

intensely processed mechanically; drainage works and irrigations are executed; mineral and organic fertilizers, amendments are introduced (tab. 3,4).

Tab.2 - Evolution factors and natural-anthropic dynamics of the soils



All these lead to: diminishing of the bioacumulative process; intensification of the compounds laundering; increase the danger of salinization and solonetization processes; extension of some areas temporarily affected by humidity; increase of chemical pollution etc. (tab. 5).

From the above table, we can notice that the polluting impact of the sources is different. In the case of sources with agricultural origins, the impact is preponderantly small. But, in the same time, it falls on all over the surface of the

Tab. 3 - Phylum of agrotechnical implications

Identification criteria (evaluation)	Involved elements
Number of works; passes on the field	minimal medium high
Time of processing works	early optimal late
Depth of processing works	superficial usual deep bottomless
Implications on the traits: physical hydrophysical pedogenetical regimes	Mobilization and water accessibility. Soil climate dynamics.

Tab. 4 - Implications phylum of crop plants

Identification criteria (evaluation)	Involved elements
Humidity consuming Implications on the thermal regime	Sowing: dense rare mixed high low
Duration of vegetation period	short moderate long
Nutritive elements consumption	very demanding moderately demanding slightly demanding
Implications on the substances redistribution (anti-erosional protection)	Dense sowing Hoeing technical multi-annual plantations
Work necessities	cleaning deep plowing usual plowing deep refining
Implication on physical traits	Dense sowing Hoeing Technical cultures Multi-annual plantations

Tab. 5 - Pollution sources of the agricultural soil in the Carpato- Danubiano – Pontic area

Origin of pollution source.	Type of pollution source.	Substances with polluting impact.					Impact assessment
		Radioactive substances.	Pesticides	Heavy metals	Ballast substances	Other substances	
Agricultural	Fertilization	− +	−	+	+	+	Low
	Plant protection	−	−	+	−	−	Low
	Irrigation	−	+?	+?	+	+	Low
	Zootechnics	−	−	+?	+	+	Low
Industrial	Energy production based on fossil fuel	−	−	+	++	++	Moderate local
	Manufacturing industry	−	−	−	++	++	Moderate local
	Transport	−	−	+	+	+	Moderate
	Cast mining	−	−	+−	++	++	Moderate local
	Transboundary	+?	−	+	+	+	Low
Domestic	Waste storage ramps	+?	+?	+	++	++	Moderate local
	Unauthorized dumps	+?	+?	+	++	++	Moderate local
	Mud from cleaning stations	+?	+?	++	++	++	Moderate – strong local

Tab. 6 - The quantity of mineral fertilizers used in agriculture in R. Moldova *(recalculated to 100 % nutritive substances, thousand tones)(Burlacu,2000)*

Mineral fertilizers	Years					
	1965	1970	1975	1989	1985	1990
Total	61	118	205	317	410	226
Nitrogenous	21	54	91	119	161	85
Phosphatic	26	42	66	100	126	106
Potassic	13	22	48	98	123	35

region. Moreover, the agricultural impact is constant and permanently increasing. The quantity of mineral fertilizers, for example, from the ′60s to the ′90s increased more that 5 times (Table 6).

Researches in this field have highlighted that together with mineral fertilizers, some quantities of heavy metals are transported in the soil (Table 7).

Thereby, it constitutes an anthropizated pedogenetical ambiance: the result of human activity interference with the natural environment, the latter keeping some

initial characteristics. Human activity bivalence manifests in two antagonistic directions: destruction of some elements of the natural environment, but also creation of a new environment. It arises thereby a third dimension of the environment, namely the social environment, specific for every society.

Tab. 7. Medium content of heavy metals in mineral fertilizers.

Fertilizers	The content of heavy metal, mg/kg									
	Cd	Pb	Ni	Zn	Cu	Mn	Hg	As	Cr	Co
Potassic	0, 3	8,0	14,0	23,0	16,0	10,1	-	1,4	5,7	1,5
Nitrogenous	0, 3	0,2	19,0	30,0	26,0	76,0	-	2,5	42,0	1, 3
Phosphatic	1,4	13,0	2,0	49,0	33,0	-	0,06	-	46,0	-
Complex	30,0	7,5	18,0	59,0	39,0	194,0	-	3,0	116,0	36,0

Therefore, anthropical pedogenetical ambiance implies 4 basic components:

1. natural environment – composed of primary components or abiotic (lithosphere, hydrosphere, atmosphere), biotic (plants and living creatures) and pedosphere.

2. anthropizated environment – includes the space influenced or partially modified by humans: agricultural fields, touristic routes, anthropic lakes etc.

3. anthropic environment represented by the systems created through an almost total change of the natural environment: human settlements, tourist stations, amusement parks etc.

4. social environment – which has a sociocultural and psychological sense.

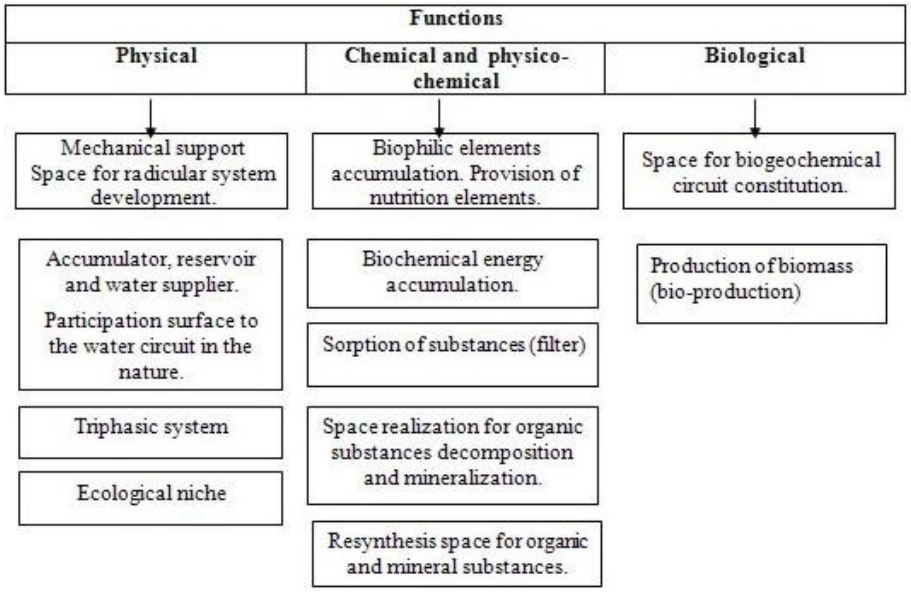
Within such a pedogenetical ambiance, the pedogenetical functional framework, materialized in pedogenetical regimes, suffers significant changes. The evaluations based on suction curve bring us to the conclusion that the hydrological regime develops in the sense of xerophytisation and it is characterized by:

- reduced water reserves at the beginning of vegetation, as a result of permeability reduction and water capacity reduction, as also hydraulic conductivity;
- more intensive water consumption within warm periods as a result of superficial leakage increase and physical evaporation;
- lower moistening and percolation depth;
- a more contrast humidity regime;
- reduction of pedogenetical active water reserves and increase of the inactive reserves;

The mentioned effects are caused by soil compaction, structure degradation and pore space modification. Therefore, pedogenetical implications are: reduction of the chemical and biochemical processes intensity and their share within

pedogenesis and increases the share of mechanical processes; disturbance of the unidirectional dynamics of the elementary processes in circadian, seasonal and multi-annual regime.

Tab. 8 - Soil function which suffers modifications within anthropic pedogenesis



Tab. 9 - Evolution processes under conditions of anthropic pedogenesis

Natural			Agrogen (pedomorphic)			Degradational	
Bioclimatic (conservation)	Self evolutional. (processes-regime)	Functional (reproduction)	Morpho-turbational	Turbational - regime	Functional – turbational	Abraded	Destructive
Humus formation and accumulation. Structuring. Carbonates migration.	Eluviation Levigation Debasification Clayzation Substances differentiation. Haploidization.	Organic substances decomposition and synthesis. Mineral substances decomposition and synthesis. Biological accumulation of substances.	Stratification Compaction Destructuring Slitization	Crusting Slitization Aridization Pore space degradation. Hydromorphyzation	Dehumification Exhaustion Fatigue Biodegradation.	Erosion Deflation	Landslides Flooding Soil binding with pedolit.

The hydrothermal regime evolves in the direction of a more pronounced instability and a high vulnerability to the climatic conditions. In the natural regime, the soils go through complicated adaptation mechanisms which attenuate the

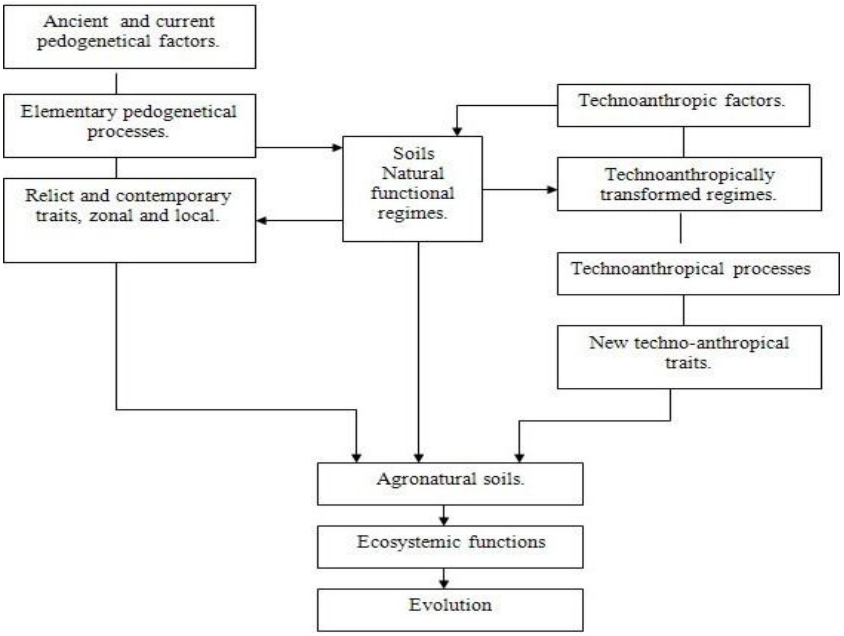
fluctuations of the climatic conditions. Within agricultural soils, this mechanism significantly decreases.

Thermal regime evolves in the direction of basic parameters increase: sum $t^0>10^0C$, the depth of their penetration within soil profile, their maintenance duration on different depths. The specified modifications determine the intensification of the organic remnants mineralization processes and of the humus.

Aeration and aerohydric regime evolves towards the mineralization processes intensification.

Redox regime evolves towards the oxidation processes intensification**.**

Tab. 10 - Principial scheme of the anthropic pedogenesis



The specified modification implies a new phase in the soil evolution of the Carpato-Danubiano-Pontic area (tab. 9, tab. 10).

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