THE EVALUATION OF ECOLOGICAL AND PEDOLOGICAL RESOURCES FROM VINGA PLAIN FOR PROTECTION, CONSERVATION AND DURABLE UTILIZATION OF RURAL SPACE

EVALUAREA RESURSELOR ECOPEDOLOGICE DIN CÂMPIA VINGĂI ÎN SCOPUL PROTECȚIEI, CONSERVĂRII ŞI UTILIZĂRII DURABILE A SPAȚULUI RURAL

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Abstract: *The researches are inscribed on line of substantiation of technical proceedings for the elaboration of a standard criterions for a pedoclimatic character and elaboration of programs concerning soil protection, amelioration and productivity increasing, organization of cultivars and rural space. The treated problems are relegating to an surface of 132459 ha (70016 ha in Timiş county and 62443 ha in Arad County), belonging to cadastral territories situated in Vinga Plain or in the areas of low plain near this or near Lipova Hills : Variaş, Satchinez, Orţişoara, Maşloc, Sânandrei, Biled, Becicherecu Mic, Timişoara, Dumbrăviţa, Giarmata, Remetea Mare, Ghiroda (in Timiş County) and Secusigiu, Felnac, Şagu, Vinga, Arad, Fântânele, Zăbrani, Lipova (in Arad county). This paper, presents some aspects concerning the ecological and pedological resources specific of researched area, being succinct reproduced the physical and geographical characteristics, conclusive in the structure of soil layer.*

Rezumat: *Cercetările efectuate se înscriu pe linia fundamentării unor procedee tehnice în vederea elaborării unor criterii standard pentru zonarea pedoclimatică în scopul elaborării programelor privind protecţia, ameliorarea şi sporirea fertilităţii solurilor, organizarea asolamentelor şi a spaţiului rural. Problematica abordată se referă la o suprafaţă de132459 ha.(70016 ha. În jud. Timiş şi 62443 ha în jud. Arad), aparţinând unor teritorii cadastrale situate în Câmpia Vingăi şi la racordul acesteia la câmpia joasă sau la Dealurile Lipovei, respectiv : Variaş, Satchinez, Orţişoara, Maşloc, Sânnandrei, Biled, Becicherecu Mic, Timişoara, Dunbrăviţa, Giarmata, Remetea Mare, Ghiroda (jud. Timiş), Secusigiu, Felnac, Şagu, Vinga, Arad, Fântânele, Zăbrani , Lipova (jud. Arad). Lucrarea prezintă câteva aspecte referitoare la resursele ecopedologice specifice spaţiului cercetat fiind redate succint dar cuprinzător caracteristicile fizico-geografice deterinante în alcătuirea învelişului edafic.*

Key words: *biovariety, cooperation, cohesion, sustainability, monitoring*
Cuvinte cheie: *biodiversitat,cooperare, coeziune, sustenabilitate, monitoring*

INTRODUCTION

Being an important part of national wealth, natural resources are constituted by all the resources from nature: soil, water, air, flora, fauna and solar energy. In some technological, economical and social conditions, these resources are extracted from their natural places and transformed in goods that their use supposing their direct consumption.

The uses of these resources have to be practice in a complex, co-ordinated manner, for a simultaneous accomplish of many purposes harmonized with requirements referring environmental protection.

The applying of inappropriate and incomplete technologies can cause some irreversible changes of natural resources and modify their restoring character.

The factor who transform almost totally and irreversible the natural restored resources is the man.

Natural and anthropic induce resources management represents a modern manner in dealing with land fund and have the aim to maintain or increase soil fertility. Those would allow obtaining high quality alimentary products on long term.

Durable soil management in case of agricultural and forestall terrains, imply taking in to account information, energy, material exchange fluxes cycles between soil and the environment (atmosphere, water, flow courses, wildlife, land, vegetation).

Starting from these reasons, the authors try to present in this paper, in base of the dates extracted from scientifically researches themes and dates from OSPA Timisoara archives, some aspects regarding at the quality state of soils and the evolution of main factors that compete at his accomplishment.

MATERIALS AND METHODS

The treated problems are relegating to an surface of 132459 ha (70016 ha in Timiş county and 62443 ha in Arad County), belonging to cadastral territories situated in Vinga Plain or in the areas of low plain near this or near Lipova Hills : Variaş, Satchinez, Orțișoara, Maşloc, Sânandrei, Biled, Becicherecu Mic, Timişoara, Dumbrăvița, Giarmata, Remetea Mare, Ghiroda (in Timiş County) and Secusigiu, Felnac, Şagu, Vinga, Arad, Fântânele, Zăbrani, Lipova (in Arad county), only Secusigiu, Felnac, Zădăreni, Şagu, Vinga, Fântânele, Frumuşeni, Zăbrani (in Arad county) and Orțișoara, Dumbrăvița, Giarmata (in Timiş county) are totally situated in Vinga Plain, others occupaying surfaces between 7-86%, respectively: Dudeştii Noi 7,06 %, Becicherecu Mic 7,96%, Timişoara 21,80%, Variaş 24,22%, Biled 26,66%, Lipova 43,50%,Arad 53,71%, Remetea Mare 61,33%, Maşloc 63,46%, Ghiroda 63,88%, Sânandrei 67,36%,Satchinez 75,52%, Pişchia 85,96%.

The research upon the ecological conditions was made according to the Methodology of Elaborating Pedology Studies (vol. I, II, III) elaborated by ICPA Bucharest in 1987, completed with specific elements from the Romain System of Soil Taxonomy (SRTS – 2003).

RESULTS AND DISCUSSION

Owing to his position, the natural conditions (relief, soil, hydrology, vegetation) are specific to a high plain, where have formed and involved the main types of soils who mirrors, through their geo-bio-chemical and morphological appropriations, the main landscape characteristics that are decisive for growing and fruit-bearing of main cultivated plants.

This researched area of 132459 ha is a component of Vinga`s High Plain , component of Mureş`s Plain.

This is the oldest and more complex plain from the geographicaly point of view, and is situated at south of Mureş, at west of Lipova`s Plateau, at north of Bega-Timiş subsident area and at east of Giucoşin- Aranca subsident area. Vinga`s High Plain have formed through the divergent of glacis, intense influenced by a secondary hydrological system at 95-200 m altitude.

His relief is represented by a succession of high plains, almost flat, whose altitude is lower from east to west, separated by large valleys, deep enough, majority without permanent flow.

The sides of erosoin valley`s are pronounced inclined, because of litological structure, but they have a stable profile (landslide and collapse cases are rare).

The spaces between rivers are well individualised, very larges, from 1km at east to 5 km at west, with suspended plains aspect.

The forming of plains from investigated space is strongly connected to base level of Panonic Depression from Middle Danube area, to varied rivers that comes from mountains, thing that had determinate the evolution of two groups of plains: high plains (situated near hills) and low plains (situated near Tisa).

Major relief of Vinga`s plain represent the typically morphological piedmont from West Plain, we may observe some terrace-stage with gentle passing, generally without evident foreheads.

Vinga`s plain presents four altitudinal steps, situated in fan, made by Mureş river, in different stage, and local tectonically influence, especially by Luda-Bara hiden cone, who have produced, in east, an asymmetrical radial circular hydrography and a similar breaking up of the plain and formed to Lipova Plateau two convex plains.

Minor relief of Vinga`s plain is formed by valeys with flat ground, sometime with ditch aspect, especially towards Mureş, slidings from sides on Măgheruş valley, depressions in different forms who rarely overstep 0,50 ha.

The geological past of researched area is connected with the past of Banato-Crişana Plain, being one of the east part of the great basin of sedimentation called Panonic Depression. These depressions have submerged on the alignment of an old fault, orientated from north to south, others to west and few to the Charpatians, starting with the Badenian Era, with an maxim in Panonian Era.

These fragmentations have created areas of minimal resistance and the tossing of faulted blocks, magnified by tectonically events, have determined the advance or retreat of marine domain (Thetys) or lakes domain (Panonic).

The orogenetical Carpathian phases have different influenced the movement of crystalline blocks from underground of the plain, periodically creating areas with tendency of dipping or inverse. The crystalline blocks from east, generally more raised, are finding at 100 m (980m at Găvojdia, in west and south-west descend to 200 m , Giulvăz-Foeni (Posea 1997).

In exchange, the penetration of marine wathers (Thetys Sea) on the passages betwen blocks has favoured accumulation of sediments on different depth (1000-2000 m).

Though is delimited by actual flow of Mureş river, the researched area belong to hydrographical basin Bega, under basin Berecsău.

The running water regime is submissive to variation of level relative big. In the superior flow, the climatic and relief conditions transmit to hydrographical system a raised density and a increased flow, comparing with middle and inferior basin, were, to the flowing slope very small, frequent exist tendency of divagation.

Depending on the place of spring in the researched area, there are two types of running water:

- alochthonous: Mureşul, Bega, şi Beregsăul
- autochthonous: Măgheruşul, Matca, Apa Mare, Ierul, Galaţca şi Aranca

Climatic properties of Vinga`s Plain are determined by his geographical position, with an certain circulation of different types of air mass, circulation determined either action centres from dynamic origin or thermal actions and seasonal centres.

For the characterisation of climatic conditions we have use the dates from two meteorology stations from INMH Bucharest network (Timişoara and Arad) situated at 60 km between them, also dates from SC-DA Lovrin meteorology station.

Because of cyclones activities and humid air invasion from west, south-west and north-west, in high plains from the west area of Romania the precipitations are quantitatively bigger than others part of the country (table 3), exception made by north-west part of the plain.

The smallest values of multiannualy precipitations (500-600 mm) are recorded in the

west part of Vinga`s Plain, at the connection with low plains, respectively Galaţca Plain. Also, an singularity of Vinga`s Plain is signalized in central and west part of plain, where have been recorded the smallest multiannualy precipitation values, by 405,1 mm (1999-2000 at Arad) respectively 412.5mm (1999-2000 at Timişoara).

Wind conditions in south-west part of Romania is defined by development of baric systems who interfere above Europe at 45^0 north latitude (Azores, Siberian, Scandinavian anticyclone and Mediterranean, islandish cyclone).

From phito-geografical point of view, the flora of researched area belongs to "province daco-ilirica" region, the "Plain of Banat" district (BORZA 1943, BAŞCOIU 1965).

In this context it is necessary to distinguish the importance of wooden species like: *Quercus cerris, Quercus fornitto, Quercus pubescens, Tillia tomentosa, Fraxinus ornus, Cornus mas*, species that are associated in complex and protect a great number of thermophile grassy species (COSTE, 2003).

As a result of geographical position, at the interference of low plains and hills, in the old delta of Mureş, the studied territory present various geological and phisical-geographical conditions, matter that have condition the forming of a complex cover of soils.

Hereby, the soils from researched area have formed in the conditions of an temperate moderate continental climate, with ocean and Mediterranean influences, on an relief formed by broad and ripple lowlands, with deep erosion valleys, with steep slopes, with underground water under 5 m deep and porous, carbonated rocks.

So, in tight correlation with the variety of geomorphological factors that cause the existence of a diverse types of relief units, of geological factors that have guide to a diversity of materials (even for a reduced territory, of 132459 ha) and of climatic or hydrological factors, with antrophical interventions, have result a varied population of soils with specific characteristics (related or totally different) in permanent evolution.

According with Romanian Taxonomic System of Soils (SRTS 2003) and WRB for SR 1998, in researched area have been identified 8 classes, 12 types, 40 undertypes, 153 varieties and other units, which are different through their properties, their productive capacity and measures for maintenance and increase their fertility. So, the map of soils includes types and under types of soil, on a surface of 132459 ha, that represents 100% of researched area:

- Fluviosols (mollic, gleyed, salic,sodic), represented by 16 TEO (1-16), on a surface of 6141,15 ha, 4,36%,
- Chernozems (gleyed, salic,sodic, vertic), represented by 13 TEO (17-29), on a surface of 49047,53 ha, 34,76%,
- Phaeozems (gleyed, salic,sodic, vertic), represented by 10 TEO (30-39), on a surface of 11985,71ha, 8,49%,
- Eutric Cambisols (mollic, gleyed, salic, vertic,sodic), represented by 26 TEO (40-65), on a surface of 9469,52 ha, 6,72%,
- Haplic Luvosol Chromic (mollic, gleyed, salic, vertic,sodic), represented by 42 TEO (66-107), on a surface of 45572,45 ha, 32,19%,
- Pelosols (gleyed, salic, sodic), represented by 7 TEO (108-114), on a surface of 3367,88 ha, 2,39%,
- Vertosols (gleyed, salic,sodic), represented by 7 TEO (115-121), on a surface of 4953,00 ha, 3,51%,
- Gleysols (mollic, pelic, sodic, salic), represented by 14 TEO (122-135), on a surface of 4138,15 ha, 2,93%,
- Stagnic Luvisol (gleyed, salic, sodic, vertic), represented by 4 TEO (136-139), on a surface of 821,52 ha, 0,58%,

- Solonetz (mollic, gleyed), represented by 3 TEO (140-142), on a surface of 336,14 ha, 0,24%,
- Erodosols (mollic, gleyed, salic, vertic,sodic), represented by 9 TEO (143-151), on a surface of 4817,21 ha, 3,41%,
- Anthrosols (pelic, salic, sodic), represented by 2 TEO (152-153), on a surface of 598,74 ha, 0,42%.

Each of 153 identified terrain units (TEO) have been characterized according to the Methodology of Elaborating Pedology Studies, using 23 bonitation indicatory, indicatory that represents characters and important, more significant, more precise appropriation, who is founded in pedological studies, worked out after 1987 by territorial OSPA, under metological guidance of ICPA Bucharest.

This desideratum impose an knowledge, in details, of ecological offer, generic definite like all natural factors from varied structural complexity necessary for development genesis of a living and lifeless systems, through realisation of an harmonious equilibrium between soil improvement and plants improvement.

Confronted by these, having in view the relief particularities and the main physical and chemically properties of soils, generated by pedo-genesis process, it was determined, from agricultural land of researched area of 132459 ha, more deteriorated lands.

Table 1

Structure of deteriorated lands

	ha	%
Surface erosion (moderate-excessive)	13584,50	10,26
Soil Compact	101722,80	76,80
Surface Humidity Excess	44432,70	33,54
Depth Humidity Excess	12288,24	9,28
Acidified soils (weak and moderate acid)	105154,00	79,39
Middle texture	35802,50	27,03
Fine texture	96656,50	72,97
Humus reserve in first 50 cm	55087,10	41,59

Over this restrictive elements that affect productivity potential of soil cover, it impose from case to case, measures for the correction of acid reaction of soil trough periodic calcium amendments or alkaline reaction through acid amendment, the improvement of plant nutrition through ameliorative fertilization, the elimination of water excess through prevent and fighting of humidity excess workings (canals, ditches, drains), the prevent and fighting of soil erosion by earth walls, side drains.

CONCLUSIONS

In economical and strategical equation of the country, the evaluation of cadastral resources represent an important constant, in base of which is guaranteed the right of property over the immobile goods and determined the patrimony value of these, action that justify the necessity and present of the investigation, bonitation and evaluation of lands.

Also, the necessity of the investigation, bonitation and evaluation of lands result from fact that the land, besides his characteristics of historical and natural solid, is the most important way to produce in agriculture and forestry and a good who makes the object of properties and implicit, object of change on market, with a utilization value.

The systematic pedological and agrochemical mapping carried out by the Pedological and Agrochemical institutes from our country offers valuable data concerning the evolution of the quality status of the soils, the differentiated establishing and application of culture technologies, the bonification of the land, the favoured cultures, the land works, the ameliorative technologies, the organisation and systematisation of the territory.

The evaluation and evolution of lands quality is necessary for establishment of the proper technologies in order to assure an ecological equilibrium and which are grounded on the long experiments results with fertilizers, amendments and crop-rotations.

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