



RISK FACTORS INFLUENCING SOILS CULTIVATION IN AREA RĂDUCĂNENI, IAȘI

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ABSTRACT. - Risk factors influencing soils cultivation in area Răducăneni, Iași. Răducăneni land area composed of villages Răducăneni, Isaiia, Bazga, Bohotin and Roșu, which is 7958.00 ha, agricultural 6539.00 (3863.00 ha of arable land, pastures 956.00 ha, 298.00 ha of orchards, vii 582.00 ha), forest 1060.00 hectares, the remainder being unproductive land (196.00 ha) and 163.00 ha built. Răducăneni area is located in the Central Moldavian Plateau Continental temperate climate. It is dominated by cold winters and hot summers, with irregular winds, most common in north and north - west and east in winter and south - east, especially in spring, early summer with enough rain. The index of aridity (Iar), Martonne is 26.8 and the formula after Koppen climate - Dfbx. The hydrographic network of the area is dendritic type, with a strong asymmetry, being more numerous tributaries on the right. Always network density is reduced as a result of precipitation amount. Fluctuations in temperature, rainfall and other climatic factors over the years are very different in intensity and duration produces climate anomalies and risks. Soils in this area has the following limiting factors: salinization, soil level of load bearing, slope, surface and deep erosion, landslides, unevenness of land, excess moisture and phreatic surface inundability by outpouring coarse and fine texture. The interaction of climate risks and limiting factors of agricultural land requires a specific practice for this area.

Keywords: climatic anomaly, fluctuation, limiting factors, microregions

1. INTRODUCTION

Risk is considered a "phenomenon" that the action of outside normal limits is a way to get into danger, to have to face trouble or suffered a loss. He is a social class, economic, political or natural, whose origin is in the uncertainty that may or may not generate a loss because of hesitations and unconsciousness in the decision.

Study of climate risk analysis is small scale climatic characteristics of a natural region of limited size in correlation with the likelihood that these features may cause damage.

This is where local and geomorphological features, able to alter energy balance and air circulation such as topography, vegetation cover and the nature of the underlying surface.

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A climatic anomaly corresponds to the occurrence of deviations from the average values of air temperature deviations to persist for at least three weeks of record rainfall and nature of risk (Mihăilescu C).

Climate risk is considered the “phenomenon” that the action of outside normal limits, according to the bioclimatic requirements of crops, forest species or farm animal in a certain stage of life, causing violent destruction or progressive, resulting in final loss “partial or total biological capacity” (Murărescu O).

The study noted his plan to move the probability of climatic risk factor (floods, torrential rains, early or late frosts, hail and drought) in the Science and setting Răducăneni-limiting factor in crop production.

That is ultimately to have it conclusions relating to the development of specific and agriculture by reducing negative effects of these phenomena according to the laws in force (Order 638/MAI and 420/MMGA) .

2. TEMPORAL ANALYSIS

Climate is the most dynamic of all the components directly involved in the emergence of risks in the river Răducăneni.

Răducăneni area is located in temperate climates of Central Moldavian Plateau Continental, cold winters and hot summers, with irregular winds, most common in north and north - west and east in winter and south - east, especially in spring, with rain early enough summer (Pricop Iulian).

The index of aridity „Martonne” is 26.8 and the formula after Koppen climate - Dfbx.

Average annual air temperature decreases with increasing altitude is 9.5°C in the area with altitudes below 200 m and about 9.0°C at altitudes above 200 m, particularly in the west and north of the territory.

Depending on the phase during which vegetation acts these risks are specific to each culture: for trees, vines, perennials and crops sown in autumn - all year round, annual plants sown in spring - around the period from sowing to harvesting.

Table 1. Absolute maximum and minimum temperatures (Husi, 1896-2008)

Month	I	II	III	X	X	XII	Annual
Absolute maximum	16.0	18.7	27.9	33.5	29.0	18.8	40.2
Absolute minimum	-28.4	-29.1	-19.3	-17.6	-26.1	-29.1	-29.1
Amplitude	44.1	47.8	47.2	51.1	55.1	47.9	69.3

Tabelul 2. Temperaturi maxime și minime absolute (Husi, 1896-2008)

Month	IV	V	VI	VII	VIII	IX	Annual
Absolute maximum	31.5	35.6	39.2	40.2	39.0	35.5	40.2
Absolute minimum	-7.8	-3.4	4.0	6.7	-1.6	-14.5	-29.1
Amplitude	39.3	39.0	35.2	33.5	40.6	50.0	69.3



Absolute average temperatures over the period 1896-1988 is between 16.0°C (January) and 40.2°C (July), and lows average absolute values of -29.1°C (December) to 6.7°C (July). Monthly average amplitude varies within 33.5°C (July) - 55.1°C (September) and the annual average of this indicator being 69.3°C (Table 1, 2).

Temperatures below 0°C recorded in September and extends until the last decade of May. Days of frost, the subsistence minimum temperature less than or equal to 0°C are the number of 115.4. The days of summer daytime maximum air temperature greater than or equal to 25°C are on average 70.

Thermal thresholds of sensitivity to vegetation varies so for very large fruit trees in temperate regions - continental buds can withstand winter temperatures of -20°C or -30°C when most annual crops temperatures below -1°C can be significant losses.

The average annual precipitation is 510.9 mm at Station Huși (Table 3, 4), but high land area, with altitudes above 300 m and covered by heavy forest, mean annual precipitation may exceed 600 mm.

Table 3. Rainfall during the rest of the plant (Huși resort, 1896-2008)

I	II	III	X	XI	XII	Annual
29.6	30.4	28.2	41.5	38.3	33.4	510.9
Precipitation maximum in 24 hours						
30.0	35.4	39.9	69.4	38.9	50.6	97.8
The number of days with precipitation > 1 mm						
8.2	8.5	7.9	6.9	8.2	8.6	96.3

Table 3. Rainfall plant during the vegetation period (Huși resort, 1896-2008)

Monthly mean precipitation						
IV	V	VI	VII	VIII	IX	Annual
42.7	54.0	74.7	64.1	47.6	38.5	510.9
Precipitation maximum in 24 hours						
53.7	67.4	60.6	97.8	88.2	67.0	97.8
The number of days with precipitation > 1 mm						
8.0	9.5	9.8	7.8	7.2	5.7	96.3

During the year, rainfall distribution is highly varied and unevenly distributed in quantity time, alternating dry and rainy periods.

Meteorological drought is frequent and characteristic area in the lower altitudes 175-200 m, where average annual rainfall not exceeding 500 mm and annual average temperature rises above 9°C.

In contrast to this situation, there are days with precipitation and very high so that one third and half of the amount of monthly rainfall can be recorded in a single day. The amount of rainfall in 24 hours was 123.6 mm in Huși.

The hydrographic network of the area is dendritic type, with a strong asymmetry, being more numerous tributaries on the right. Permanent network density is reduced as a result of prevailing power pluvio - nival.



Fluctuations in temperature, rainfall and other climatic factors over the years are very different in intensity and duration produces climate anomalies and risks.

3. SPATIAL ANALYSIS

Răducăneni Territory is located in temperate climates - the Continental Central Moldavian Plateau. The village is made up of villages Răducăneni, Isaiia, Bazga, Bohotin and Roșu, with a land fund for 7958.00 ha, 6539.00 ha of which agriculture (arable 3863.00 ha, 956.00 ha of pastures, orchards 298.00 ha , vine 582.00 ha), forest 1060.00 hectares, the remainder being unproductive land (196.00 ha) and built - 163.00 ha (Fig. 1).

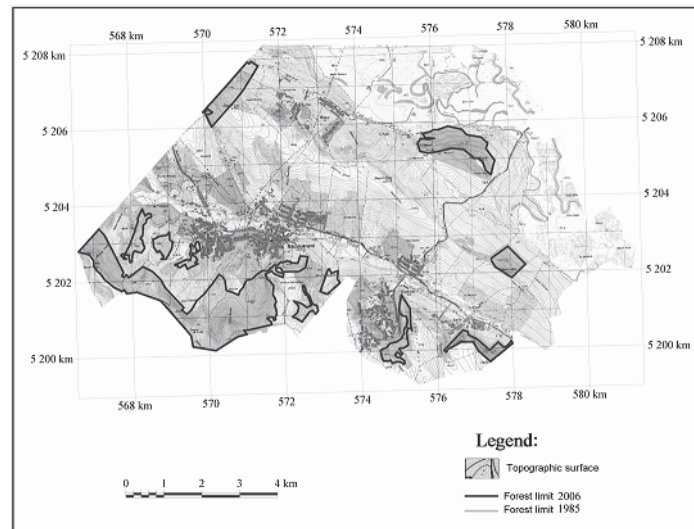


Fig.1. The land and forestry Răducăneni

From the climatic point of view, the territory belongs to three micro-regions: soil micro brown and gray clay, cool moist climates, in areas with moderate relief terrain (high area includes 300 - 400 m absolute altitude from the west, north and north - eastern territory); chernozem soil micro drafts, moderately warm climates, semi-humid, hilly areas with low relief (relief occupies the second stage located between 250-300 m and the plains of Prut and Jijia) micro alluvial soils, moderately warm climates, semi-humid in floodplain regions, represented mainly by broad plains of the river and Jijia.

Răducăneni in 1962 have a total surface area (St) 5211.20 40 ha, to 2133.00 of arable hectares and consisted of the following villages: Răducăneni, Bazga, Roșu and Trestiana.



Table 5. The evolution of surfaces by use in Răducăneni - Science (OSPA)

Code CF	Use categories	Nr. code categorie	S [ha]		P%		+/-	
			1962	1990	1962	1990	ha	%
A	Arable	A1	907,90	3896,00	-	-	-	-
		A2+ A3+ A4	1225,50	-				
		Total A	2133,40	3863,00	40,9	48,5	+1729,6	+7,6
F	Grassland	F1	612,80	840,00				
		Total F	612,80	840,00	11,8	10,6	+227,2	-1,2
p	Pasture	p1	699,40	956,00				
		Total p	699,40	956,00	13,4	12,0	+256,6	-1,4
L	Orchard	L1	196,18	298,00	-	-	-	-
		L2 plantation	28,90	-	-	-	-	-
		Total L	225,08	298,00	4,3	3,8	+72,92	-0,5
V	Vineyard	V1	383,22	582,00				
Agricultural area (Sag)		Total Sag	4053,90	6539,00	77,8	82,2	+2485,1	+4,4
Sff	Forests	Sff1	710,96	1060,00	-	-	-	-
		Sff2 plantation	105,40	-	-	-	-	-
		Total plantation	816,36	1060,00	15,7	13,3	+243,64	-2,4
Np	Unproductive	Np1	50,80	85,00	-	-	-	-
		water s.a.	6,23	111,00	-	-	-	-
		Total Np	57,03	196,00	1,1	2,5	+138,97	+1,4
I	Town	sc1	166,92	62,00	-	-	-	-
		sd	117,00	101,00	-	-	-	-
		Total I	283,92	163,00	5,4	2,0	-120,09	-3,4
Non-agricultural area (Sng)		Total Sng	1157,31	1419,00	22,2	17,8	+261,7	-4,4
The area mapped (SC)		Total SC	4159,30	6962,00	79,8	87,5	+2802,7	+7,7
Total area (St)		Total St	5211,21	7958,00	100,0	100,0	+2746,7	+52,7

Increasing land of Răducăneni about 2747 ha (27%) in 1990 compared to 1962 due to administrative territorial policies that occurred during this period (Table 5).

From the land agricultural area (Sag) of 6539.00 ha is a 82.2% share to 77.8% as it had in 1962, non-agricultural area (NGA) during this period decreased by 4.4%.

Arable land increased by 7.6% in 1990 to 3863.00 hectares in comparison with 1962 when it was 2133.40 ha.

Following operations in the field mapping and interpretation of soil physical and chemical analysis phase of the office, 57 units were determined by soil, soil 6 complex and a form of deep erosion (ravines).

4. THE ANALYSIS OF THE PHENOMENA AND ITS INTENSITY

Approximately 70% of the agricultural area of the village is affected by one or more factors degenerative soil.

Terrain with high relief energy, especially in the west, determined to conduct a high intensity slope geomorphic processes, plus a number of other contributing factors such as: surface lithology, consisting of easily eroded rocks ; slopes with gradients exceeding 10%, irregular distribution of rainfall, with



alternating rainy and dry with a greater frequency of heavy rains, high frequency of winds from the north and east, carrying moisture, along with the geological structure and gradient (slope), explains greater intensity of land degradation on the slopes oriented towards these areas, human intervention through deforestation, grubbing, agricultural technique.

Table 6. Action on the soil of the risk - Science Răducăneni

Nr. crt.	Risk Category	Action	Soil Unit	S (ha)	% din St
1.	Surface erosion 2562ha (36.82%)	poor	5,9, 56,57	371.5	5.34
		moderate	2,3, 10, 14, 18,22,	1498.0	21.53
		strong	4, 15, 23, 24, 51 52, 53	692.7	9.95
2.	Erosion depth	strong	on the right side of the valley Bohotin	51.0	0.74
3.	Landslides 1188 ha(17.06 %)	stabilized	59, 60,	562.0	8.08
		less stabilized	62,61,63	468.0	8.08
		active	raven and ogașe	157.0	2.26
4.	Compactness	moderate	1,6,7, 12,19,20	1937.0	27.84
5.	Excess moisture 2661 ha (37.25%)	excess moisture	33,36, 45, 54,59	699.0	10.00
		mixed (moisture + salty)	39, 40, 42, 43, 48, 49	1544.0	21.19
		flood	30, 31, 34, 35	418.0	6.00
		alkalinization and salinization	37,38, 29, 26,44, 41, 46, ,50	1170,36	14,71

The evaluation of characteristics of the soil, and relief and drainage elements, resulting a number of limiting factors (deficiencies) of land, which creates a series of restrictions on their agricultural use (Table 6).

Surface erosion occurs on slopes that exceed 5% slope on the predominantly southern and western slopes. Largest area is occupied by low and moderate erosion, while strong and excessive erosion associated with landslides.

Deep erosion has the highest density on the right side of the valley Bohotin, where practically all the tributaries of the ravines are home to hundreds of feet lengths and depths that can exceed 15 to 20 m (Fig. 3).



Fig.3. Erosion area Răducăneni (Pricop Iulian)



Landslides, slumps and soil flows affects the right side of the valley Bohotin with lengths of 1.5 - 2.5 km and different levels of 200-300 m. Slips are of disructiv - insecvent, the product from the top of the slope and gradually moving rendering materials located at the bottom.

Compactness and fine texture as the limiting factor is present on about 1937 ha (27.84% of land area).

Excess moisture is due to clay-loamy soil texture (50-56% clay) in the first 30 - 40 cm and clay-clay (less than 45% clay) deep.

Excess surface moisture occupies 2661 hectares, representing 37.25% of the area studied. The permanent exhibit, extended or temporary, such as groundwater, stagnant or flood. In that area, 699 ha - 10% with excess moisture, 1544 acres - 21.19% are mixed character (excess moisture plus salty), and 418 hectares - 6% are flooded.

Main source of lead to soil salinization and sodization river is Jijia. Jijia ions dissolved in water from existing salts Sarmatian sedimentary rocks and soil washing salt from upstream.

The analysis of deep water that they have a slightly alkaline reaction, and after the content of soluble salts are weakly to strongly brackish to salty water.

The analysis of the limiting factors resulting need for land reclamation works and modern agro-technical methods. Land improvement: regularization of rivers and dams, draining the wetlands, drainage areas with high groundwater level, anti-erosion facilities, amenities and facilities of ravines by landslides.

Work agropedoameliorative: amendment to phosphogyps (lands with high content of exchangeable sodium and soluble salts); raising the soil tamped deep (tamping the soil, compact or potential subsidence due to intensive mechanical ironing fine texture); subsoiling; surface drainage (by unsystematic drainage ditches and culverts and leveling operation); reed depression destruction (in areas removed from the influence of excess moisture); agrotechnics erosion works (plowing the contours, strip crops, cover crops, crop rotation protection); crops tolerant to excess humidity or salty; cultures protection against soil erosion; soil structure ameliorative crops; protective afforestation (inaccessible areas or heavily degraded areas with active landslides stabilized half); grassland.

By applying these measures and seeking work, on the one hand, avoiding the danger of exploitation of occurrence of damage, and on the other hand, the shift in the higher classes of suitability and land suitability.

5. CONCLUSIONS

Climate is the most dynamic of all the components directly involved in the emergence of risks in the river Răducăneni.



In terms of soil conditions, the territory belongs to three small areas: the area of brown and gray forest soil, chernozem soils and micro area with alluvial and colluvium soils.

The evaluation of characteristics of the soil, and relief and drainage elements, resulting a number of limiting factors (deficiencies) of land, which creates a series of restrictions on their agricultural use.

Climate risk, the network of hydrological and geological deposits Răducăneni-Iași territory phenomena may produce damaging agricultural crops.

The analysis of the limiting factors, the resulting need to improve their effects facilities and land reclamation works, using modern technological methods of cultivation of the land.

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