

PREMISES FOR AGRICULTURAL DEVELOPMENT IN THE ZĂBALA RIVER BASIN¹

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ABSTRACT – The most important right bank tributary of the Putna River in the Land of Vrancea, the Zăbala River, springs from the main orographic node of the Vrancea Mountains and crosses the mountain area to create, at the contact between the mountains and the Sub-Carpathian region, a depression area which represented the habitational and economic support for the formation of the Land of Vrancea. One of the main economic activities developed within the Zăbala River basin is agriculture, a traditional occupation and at the same time a possible basis for a sustainable development. In the current paper, we have made an analysis of the main parameters which influence the practice of agriculture, as well as of the possibilities for the development of other agricultural activities depending on the characteristics of the available land fund, on the technological facilities and on the existing human resource by taking into consideration the structure and characteristics of the two current branches of the primary sector of activity.

Keywords: agriculture, pastoral activities, Zăbala river basin

INTRODUCTION

The region under analysis is located at the outer side of the Carpathian Curvature, the Zăbala River draining the southern part of the Vrancea Depression, being at the same time the main tributary of the Putna River. This is an archaic region with a continuous population, whose inhabitants benefited by special civil rights and freedom in the course of time (even until modern times) in comparison with their neighbours from other regions such as Transylvania, Moldova or Walachia. The type of condominium/joint property (*devălmașă*), along with the social and administrative organization in communities (*obști*), influenced in the course of time the development of economic activities, especially the agricultural ones. The reduced extension of arable areas and the variety and quality of the mountain grasslands favoured the development of pastoral activities. Additionally, the crossing of this area by one of the main transhumance routes of the Transylvanian shepherds towards the grazing areas from the Danube River Valley or from the Siret Corridor facilitated the economic and cultural inter-regional exchanges.

For the analysis of the physical-geographical component, we have used different databases and coverage (DEM Romania 50m, Corine Land Cover 2006), as well as data obtained from INM (National Institute of Meteorology) and from the “Romanian Waters”- SGA Vrancea. We have also used data regarding the structure and type of land use, supplied by OCPI (National Agency for Cadastre and Land Registration) Vrancea. The data regarding the population of the region were provided by the Regional Department of Statistics Vrancea, while the data regarding the number of

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animals, type of crops, and animal and vegetal delivery were provided by the DADR (Department for Agriculture and Rural Development) Vrancea. Most of the information used in the analysis is dated 1 July 2009. Other is dated 1 January 2010.

THE NATURAL FACTORS THAT INFLUENCE THE DEVELOPMENT OF AGRICULTURE

The material basis for the human existence and for all the other activities developed by the human society is represented by the relief. In regard to the development of agriculture, the relief represents an extremely important factor, its action being both indirect, by means of its influence exerted on other physical-geographical elements of a region, and direct, by means of its diverse characteristics (altitude, degree of fragmentation, aspect, slopes) which determine the extent of the agricultural territories and the type of land use.

The relief of the analyzed territorial unit is mainly mountainous. It is developed on a vertical deviation of approximately 1450 m, only half of the surface of the Zăbala River being located above 1000 m and about two thirds being located at over 800 m altitude. In the given conditions, the arable lands cover small areas, the mountain area becoming a basis for supporting pastoral activities.

The fragmentation of the relief presents high values in the mountain area, reaching depths of 200-350 m/sq km and densities of 4.5 km/sq km at the springs of the Zăbala and the Năruja rivers. On the other side, the southern part of the Vrancea Depression, namely the Năruja and Nereju depression basins, is most favourable for the development of crops, as a consequence of the much reduced values of the relief fragmentation.

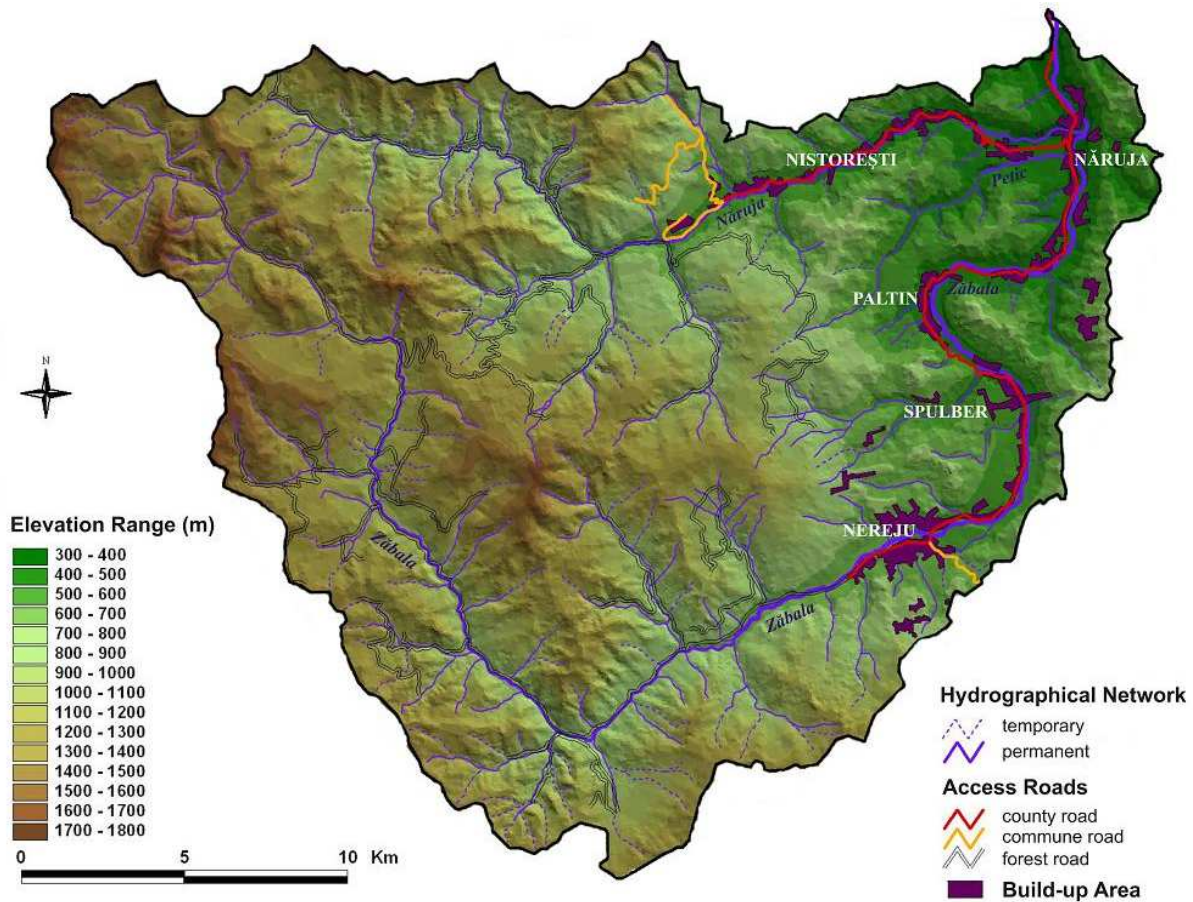


Figure 1. Zăbala River Basin

PREMISES FOR AGRICULTURAL DEVELOPMENT IN THE ZĂBALA RIVER BASIN

The versants in the Zăbala River Basin, whose characteristics are in interdependence with the fragmentation of the relief, influence the development of the agricultural activities especially in terms of shape, slopes, and aspect. The mountain area presents steep slopes which do not allow any agricultural activities. The same situation is present in the case of the Sub-Carpathian slopes on the right bank of the Zăbala Valley, which possess a relatively short and convex profile, intensely declivitous, the riverbed being often present at the base of these slopes. The profile of the versants becomes concave towards its lower parts and less declivitous only here and there, allowing the development of terraces and permitting the lands to be included in the agricultural circuit.

The lowest declivities (0-2°, 2-5°) are found on the bottom of the depression basin, on the terraces and on the crests, the restraints in the practice of agricultural activities being imposed in the nearness of the major waterbeds (as a result of the increased risks of flooding) or on the crests at high altitudes. The slopes with declivities between 5-15° are well represented at the contact between the mountains and the Vrancea Depression, being therefore included in the agricultural circuit. Still, we have to take into consideration that “at a declivity of 8°, the productivity of the field engines drops with 13-15% in comparison with the lowlands, while the consumption of engine fuel increases with 12%” (Raboca N., 1994, p.7), their agricultural efficiency being therefore much lower.

As regards the importance of slope aspect for the cultivation of crops, the slopes with southern and south-eastern exposure are more important due to the fact that the quantity of solar energy is much higher and it influences the spreading of crops over the altitudinal limits of certain plant species (in the case of the analyzed territorial unit).

After the exit from the mountain areas and the entrance in the depression area, the course of the Zăbala River is strongly diverted towards the left bank, flowing south-south-westwards – north-north-eastwards because of the contact with the Vrancea Sub-Carpathians. This situation has generated an asymmetric profile of the Zăbala River Basin, with the right slope short and abrupt and with the presence on the left side of numerous levels of terraces. As regards their territorial extension, the sector comprised between Nereju and Paltin localities and the one comprised between the confluences of the Năruja River with the Zăbala River are the most significant. In terms of habitation and agricultural land use, these areas represent the most valuable lands within the analyzed region.

Landslides represent an impediment in the territorial development of the crops. They are generated by the morphology of the versants, by the characteristics of the soils and of the substratum, by the tectonic and seismic instability of the region, by the extreme hydrographical and climatic phenomena, as well as by the human activities (deforestation and overgrazing). Along with the mud flows, present especially on the right slope of the Zăbala valley, landslides can affect not only the lands included in the agricultural circuit, but also the transport infrastructure and localities.

One of the factors with a great impact upon the development of agriculture is represented by the climate, which, by means of temperature, quantity of light required for photosynthesis, humidity and precipitations, influences the biological cycles of the vegetal organisms, either in the case of crops or of the natural vegetation, as primary source for animal nourishment.

In the depression area of the analyzed region, the average annual temperature is 8.5°C, with an average temperature in the warmer season of 19°C and with precipitations varying in the range of 650 mm (values obtained by the extrapolation of the meteorological data from the Tulnici Meteorological Station). From this point of view, there are favourable conditions for the development of crops. In regard to the mountain area, the climatic parameters recorded at Lăcăuți Weather Station (the average annual temperature is 1.2°C, the maximum average temperature is 10.2°C, the average number of days with frost is 192, while the annual average precipitations have values of 1018.5 mm) recommend it for the development of the summer grazing.

The soils with the largest extent in the Zăbala River Basin (approximately 65%) belong to the class of Cambisols. The mountain relief allowed the development of the Dystricambosols, which at higher altitudes are replaced by the class of Spodosols (Prepodzols and Podzols), while at lower altitudes the Eutricambosols are present in association with the class of Luvisols (Preluvosols) and Protisols (Aluviosols). Cambisols have a thin layer of humus, constantly renewed as a consequence of the fact that “the biological process is active, hence a relative rapid humification and mineralization of

the vegetal residue at the surface of the soil cover is taking place” (Florea N., Buza M., 2004, p. 238). They are used mainly for grasslands and forests, but, at the same time, at lower altitudes and moderate slopes they can support orchards or potato or maize crops. Preluvosols have an increased fertility while Aluviosols can be used for the cultivation of vegetables. However, due to the fact that they are spread mainly in the floodplains, they are easily affected by floods.

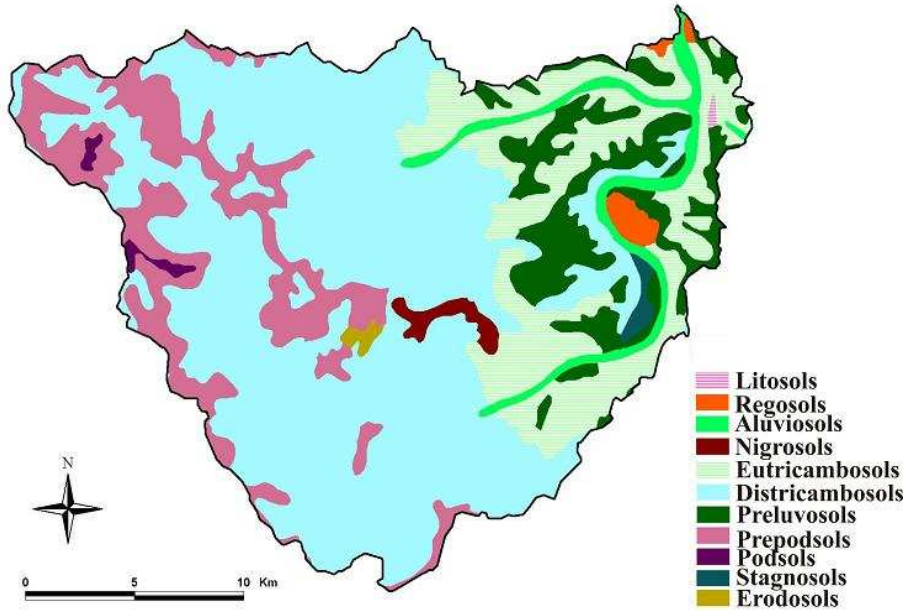


Figure 2. Zăbala River Basin. Soil map

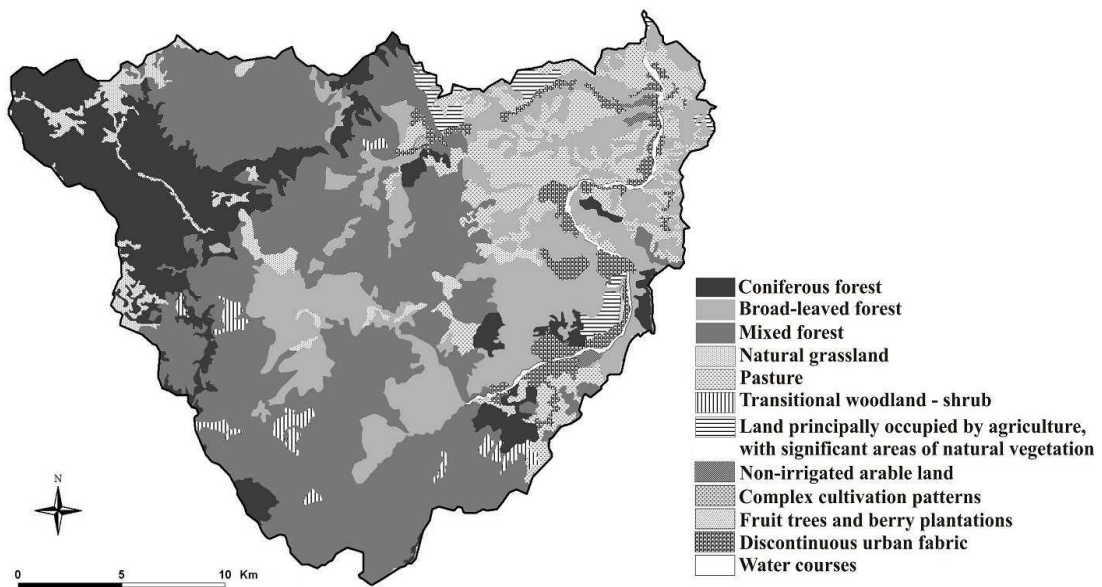


Figure 3. Zăbala River Basin. Land use map
(Source: Corine Land Cover, 2006)

PREMISES FOR AGRICULTURAL DEVELOPMENT IN THE ZĂBALA RIVER BASIN

The natural vegetation influences the development of the agriculture “by means of limiting the expansion of the cultivated surfaces, as well as by means of the fact that, a part of the natural vegetation (the grasslands and the hayfields) represents itself an integrated resource of the agrarian production” (Raboca N., 1994, p. 14). The role of forest is not only restrictive in relation to the expansion of the cultivated surfaces, but it can also be beneficial for the crops, in terms of protection from several climatic parameters (such as winds and snowfall), as well as in terms of retaining and gradually releasing the humidity reserves found in soils.

THE SOCIAL AND ECONOMIC FACTORS WHICH INFLUENCE THE DEVELOPMENT OF AGRICULTURE

The presence of population in the Vrancea Depression since the Neolithic Age is proved by the Bârsești archaeological findings. Even though the site is not located within the analyzed territory, the distance which separates it from the Zăbala river basin is only 5 km, situation which qualifies us to say that the Zăbala River Basin is an anciently inhabited region. The resilience of the demographic system was greatly assured by the adaptation of the economic activities to the physical-geographical conditions. In addition, the configuration of the Vrancea Depression as a natural fortress and the spatial expansion of the forestry formations represented an additional point to meeting all the conditions for a continuous habitation of the area. In Vrancea, as in all the Romanian Carpathians, “the mountain civilization... integrates material and spiritual, diverse and complex values and defines, by means of the reached phase, the duration, the amplex and the type of the inter-relations established between the man and the place” (Cocean P., 2005, p. 85). In this regard, the lyrical genius of the *Miorița* ballade, strongly affined to the space belonging to the Land of Vrancea, can be compared only with the architectural greatness of the wooden churches in the Maramureș region.

As a factor for the development of agriculture, the human society generates a complex problematic (Debié F., 1998, p. 258), which can be approached by means of a diverse methodology.

Thus, the adaptation of the rural habitat to the environmental conditions can be analyzed using methods borrowed from ecology; the genesis of the rural landscape was dependent on the morphology of the relief and on the settlement system, which influenced the agrarian structures. An important role was played by the culture of the people living in the region, their traditions, and the techniques, which, by means of temporal development, imprinted more and more conspicuously the modification of the agrarian territory.

Table 1. *Population. Number and rates*

Commune	Population – 1 January 2010			2009		
	Male	Female	Total	Birth rate (‰)	Death rate (‰)	Migration gain
Năruja	971	933	1904	11.5	16.2	-12
Nereju	2360	2095	4455	12.7	8.9	-42
Nistorești	1123	1076	2199	9.5	14.1	-21
Paltin	1099	1068	2167	10.6	8.7	-43
Spulber	715	706	1421	17.6	7.7	-2
Total	6268	5878	12146	12.38	11.12	-120

(Source: DJS Vrancea, calculated data)

Among the most important demographical parameters, the total number of the population in the analyzed region is to be mentioned, which was of 12,146 inhabitants on 1 July 2009. Reporting this number to the entire surface of the river basin, an average density of 22.45 inhabitants per sq km was obtained. A parameter of greater significance for our study is represented by agricultural density, estimated as a ratio between the number of inhabitants and the land unit used for agricultural purposes. Its values reach a regional average of 99.38 inhabitants/sq km. The average value of life expectancy (a parameter with an increased degree of reflecting the life standard, the state of health of the population

and the quality of the sanitarian and social systems) is 73.39 years, much higher in the case of the feminine population (78.26 years) in comparison with the masculine population (69.12 years).

Within the entire analyzed region the natural increase in the population recorded positive values, representing therefore an argument for the sustainable development of the region. Contrary to this situation, the migratory balance is negative as a result of the external migration of the population.

From an occupational point of view, an overwhelming percentage of the active population is enrolled in the agrarian sector. Frequently the persons employed in the forest exploitation activities or in the tertiary sectors are involved in agricultural activities as well.

The settlement system within the analyzed territory presents a dual dispersion. On the one hand, linear-type villages developed along the main valleys, the majority of them spreading in the course of time, becoming interconnected by a relatively well represented transportation network. Within this type of villages, the agricultural lands within the built-up areas are represented especially by gardens of vegetables and small patches of arable land. Towards the external part of villages, larger, more extent areas of arable lands are present, as well as grasslands and hayfields.

Another type of settlements includes the scattered villages. These are villages distanced from the centre of the commune, and placed at the mountain feet or at the feet of the Sub-Carpathian hills, where the dwellings are placed at a distance from one another, being surrounded by agricultural lands.

As a peculiarity of the habitation and of the type of agricultural land use, we have to mention the presence of the seasonal dwellings called “*târle*”. Their role in influencing the agricultural activities is well described by N. Al. Rădulescu: “The <*târle*> are found in large number, scattered all over the territory of the Land of Vrancea as a result of the type of property – the condominium/devălmășia – and of the rough relief forms, which do not easily allow the transport of the hay into the village. Hence the need of building, on the place of mowing, a chamber surrounded by a fence which is used to deposit the hay which will be consumed by sheep and cattle during wintertime” (Rădulescu N. Al., 2005, p. 128).

Another type of seasonal dwelling, determined by the pastoral characteristics of the region, is the sheepfold. Within the analyzed territory, sheepfolds occupy the mountain grasslands with plants characterized by increased quantity of nutrients, necessary for the sheep flocks.

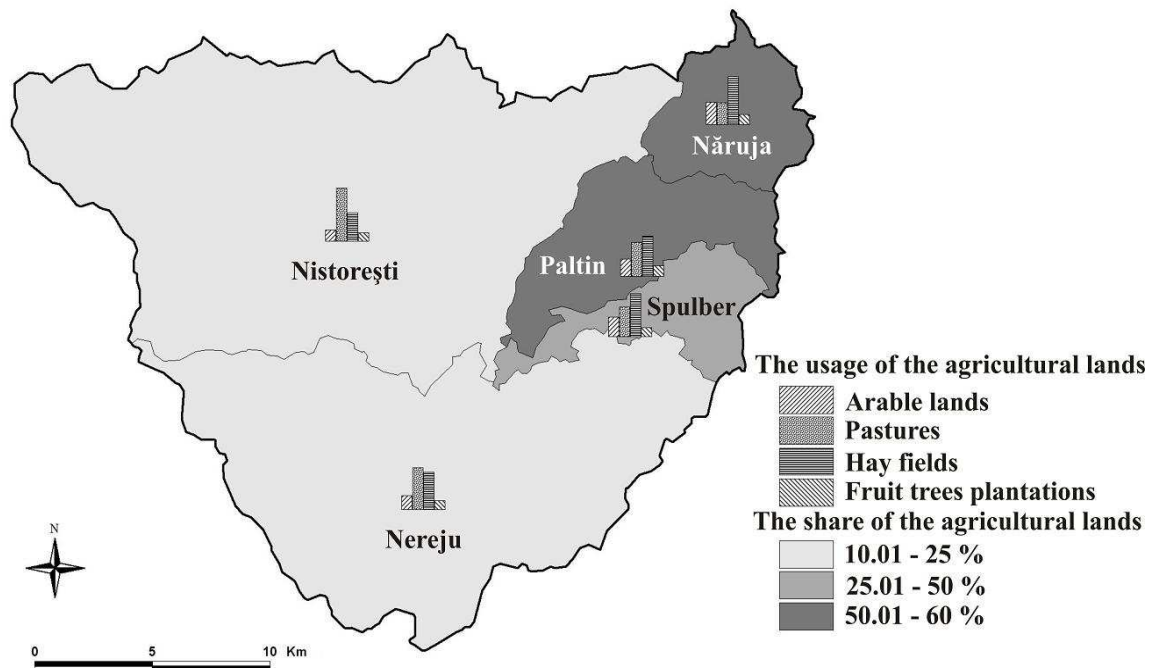


Figure 4. Zăbala River Basin. Usage and share of the agricultural land

PREMISES FOR AGRICULTURAL DEVELOPMENT IN THE ZĂBALA RIVER BASIN

As regards the structure of the land fund, major discrepancies can be observed between the two communes which occupy the mountain area (Nistorești and Nereju) and those three located mainly in the depression area. In the case of the first two communes, the agricultural land represents less than a quarter of the total surface of the commune, due to the fact that these two communes are covered by large forested areas. As opposed to the information revealed by the official data, we contend that the numerous surfaces included in the statistical data as forestry formations can and are being used as mountain grasslands during summertime.

In the case of the communes of Năruja, Paltin, and Spulber, approximately half of their territory is included in the agricultural circuit.

Within the entire region, grasslands and hayfields have the largest expansion, a situation reflected by the pastoral characteristics of Vrancea. Instead, the surfaces occupied by arable lands and orchards have a reduced extension.

Regarding the technological parameters of the agricultural development within the Zăbala River Basin, the mechanization is found in a less evolved phase. And it is not about the economic individual or communal potency, but about the conformation of the agrarian surfaces that are not so favourable for the mechanized activities.

SEVERAL QUANTITATIVE DATA

As mentioned in the introductory part of this study, the Zăbala River Basin is an archaic region with pastoral activities. "Transhumance represented the optimum framework for the development of social relationships, both between the localities composing the regions, and within and outside these regions" (Mureșan Al., Pop Ana-Maria, 2010, p. 73) due to the fact that one of the main migration routes of the Transylvanian shepherds was crossing the analyzed region. Nowadays, the only pastoral "migrations" are the seasonal ones, which imply the movement of flocks to the mountain in the spring and their descent to spend the winter within their villages of origin.

The number of farm animals recorded a growth in the last 10 years. As a result, an approximate number of 4200 cattle were recorded within the analyzed territory, as well as 2500 swine, 29000 birds, and 17500 sheep, out of which 4650 within the Nereju commune. The annual animal production of the entire region reaches 900 tons of meat, 77453 hl of milk, 41.5 tons of wool and almost 4 million eggs.

The vegetal production is relatively significant in terms of quantity, almost 800 tons of maize, 700 tons of potatoes and 500 tons of vegetables being harvested annually.

Regarding the surfaces occupied by different crops, the dominance of maize can be observed, which occupies 52% of the entire arable surface. It is followed by the surfaces occupied by potatoes (23%), wheat (17%), vegetables and fodder plants (4% each).

CONCLUSIONS

The development perspectives of the agricultural activities within the analyzed territory depend on the macro-economic context in Romania, but also on the local conditions. The increased potential of the natural grasslands and the existing infrastructure (which require improvements) can become an attractive factor for the possible investments in animal husbandry. The increase in the total number of animals, doubled with the introduction of certain breeds with increased productivity can revitalize the economy of the region.

The human component represents a favourable element for the development of the agricultural activities not only as a result of its structure, but also in terms of individual education level and potential of specialization.

As regards the cultivation of crops, the agricultural lands are found mainly on the terraces and on the less steep slopes, while the climate is favourable for the cultivation of maize and potatoes. The land improvement activities and the embankments can create new agricultural surfaces, with an increased productivity within the region. In this case, we have to mention also the risk induced by the seismic activity which can affect the stability of certain works.

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