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ASSESSMENT OF LAND USE AND CHARACTERISTICS OF RELIEF VALORIZATION MORPHOMETRIC AGRICULTURE NORTH-EAST MONTENEGRO

Goran RAJOVIĆ *
Vojvode Stepe 252/18, Belgrade, Serbia,
e-mail: dk.goranrajovic@gmail.com

Abstract: The paper discusses the utilization of land assessment and evaluation of the morphometric characteristics of relief for agriculture northeast of Montenegro, the example of the municipality of Berane, Plav and Andrijevica. Applying the method of alternate divisors in the system of 6/6, we found the following direction of land utilization PP3 S3 which testifies the balance of agricultural areas and forests and forest land. Summary of morphometric assessment of conditions in relation to agricultural production carried out during the process of indexing. Analysis of the morphometric characteristics of the relief enabled us to extract of hypsometric zones with certain privileges or restrictions for agricultural development. The goal of future agricultural development northeast of Montenegro must be purposeful and rational use of land resources

Key words: Montenegro, land, valorization, hypsometry, slope, exposure, sustainable development.

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INTRODUCTION

Great number of theorists dealt the issue of structural changes in agriculture, especially from the beginning of last century. Dealing with an analysis of status and trends of overall social and economic relations, in the same time they analyzed the processes that existed and were taking place in agriculture. They observed this complex socio-economic relation from several aspects, either directly or in the analysis framework of overall socio-economic trends. Taking into consideration these studies, we based our theoretical setting as starting point in goal defining and studying of the changes made in agriculture of the discussed area. For a successful analysis of state, directions and changes intensity in the structure of agriculture it is necessary to consider the impact of factors that act on it. Among them are certainly the most important assessment of land utilization and evaluation of the morphometric characteristics of relief. The main methodological approach used in this paper makes the geographic (spatial) method and includes the municipalities of northeastern Montenegro Berane, Andrijevica and Plav. Application of the method of alternating splitter in the system 6/6 (Kostrowicki, 1969) was necessary to extract the directions of land utilization. This method of Serbian literature, geography, developed a Jaćimović (1985). The process of evaluation of the morphometric characteristics of the relief we chose a method of

* Correspondening Authors

scoring, which applied Jaschke (1979). Mapping method used, as in the analysis of morphometric characteristics of relief, and for the final presentation of the results obtained with the use of topographic maps of 1:100 000 (Military Geographical Institute, 1986). Throughout the entire work is applied and the method of integrity, which has enabled us to identify, define and evaluate possible benefits and limitations of agricultural development in this part of north-eastern Montenegro, as well as to find a rational and efficient solutions in the development of agriculture.

Analysis of the morphometric characteristics of the relief show that agriculture, northeast of Montenegro does not comply with all available natural conditions. In this regard, we did try, through the analysis of morphometric characteristics and detection of morphometric conditions, to single out three zones that differ mutually according to the convenience level of natural conditions for agricultural development. Accepting such a criterion, the need was imposed to us to point out the concept of sustainable development instead of concluding discussions. Road to ecological reasonable society is our essential need, but also an obligation.

LAND UTILIZATION

One of the most important components of natural resources of the area discussed is its land area. In order to be able to study the agrocomplex of this part of northeastern Montenegro, first we must give a review and directions of the land in general, i.e. relations among agricultural, forest and infertile land. Of the total discussed area (148,599 ha) agricultural land included 67,379 ha or 45.34 %, forests 62,432 ha or 42.01 % and fruitless land 18,788 ha or 12.65 %. The presented data for forest and fruitless land must be taken only tentatively (although these are official statistics and cadastral data), since certain changes occurred in these areas which have not been registered yet in the official statistics.

In order to look more efectively into a land fund of the discussed area, we approached to separation of the utilization directions of total land fund, which has both scientific and practical importance. In getting of land utilization evaluation, we used the procedure that applied Kostrowicki (1979). By application of the method of alternating divisors in the system 6/6, we found the following direction of land utilization PP3 S3 which testifies about the balance of agricultural lands and forests and forest land[1].

So, based on the obtained direction of land utilization of the discussed area, we can predict future process that will be developed in terms of significant changes of forest areas, namely the part of forest areas that is not overgrown can be transformed into agricultural areas through the land-reclamation procedures. Also, in parallel with the process of agricultural areas intensification, it could be expected an improvement of the existing structure of land utilization. Let us point out, in order to ensure forest management in an environmentally sound, socially stable and economically sustainable way, certainly the special attention deserves the introduction of FSC standards. By implementation and development of FSC standards a more responsible approach of forest management is expected from all entities participating in the process, as well as easier access to international markets.

Table 1. Agricultural lands according to categories of utilization in 1964 and 2005
(Data source: Statistical Office of Montenegro, Census of Agriculture (of appropriate year)

YEAR	1964		2005	
Category of land	ha	%	ha	%
Agricultural lands	70.478	100	67.379	100
Arable lands and gardens	8.440	11,98	6.722	9,98
Orchards	1.826	2,59	2.334	3,46
Meadows	19.926	28,27	20.502	30,43
Pastures	40.286	57,16	37.821	56,13

[1] Variables and thier symbols usable in the formula: PP- agricultural land, W- forest and forest land, N-fruitless land)

One of basic conditions for agricultural development is a distribution of certain categories of land use that environmentally can was best seen from the direction of agricultural land utilization. In a structure of agricultural land of the discussed area within the period 1964 - 2005, a way of utilization changed into direction of arable land, gardens and pastures shrinking.

Contrary to that, orchards and meadows areas were increased. Arable lands in the period were reduced from 8 440 ha in the year 1964 to 6 722 ha in the year 2005, i.e. 1718 ha. Orchard areas were increased in the same period from 1826 ha to 2334 ha or 518 ha. Meadow areas were increased from 19,926 ha to 20,502 ha or 2023 ha.

Pasture areas in the period 1964 - 2005 decreased to 576 ha. Bearing in mind the condition of livestock and degradation degree of pastures, it is logical to expect further decline in this category of land. According to data from table 1 - in the agricultural land structure in 2005 arable areas covered 9.98 %, orchards 3.46 %, meadows 30.43 %, pastures 56.13 %. Thus, a large percentage of meadows and pastures in the overall structure of agricultural land indicate the highland character of the discussed area.

To get an adequate picture of the structure of agricultural land in this part of northeastern Montenegro, we also applied here the method of alternating divisors and determined the next course[2].

P4L2 predominantly are grazing direction of agricultural land utilization with a larger share of meadows. Appreciating the fact that the entire area of northeastern part of Montenegro is almost "in hilly or mountainous land, it is understandable that in this territory, during the differentiation directions of agricultural land utilization, we have not found arable directions, which is certainly primarily a reflection of the relief energy, and also a reflection of the extensive character of agricultural land utilization, which is illustrated by the presence of very large meadows and pastures areas“ (Todorović, 1985).

Table 2. Utilization of the agricultural land in 2005
(Data source: Statistical Office of Montenegro, Census of Agriculture (of appropriate year)

Land categories and cultures	ha	%		
		Participation in a group	Arable lands and gardens	Agricultural land
I. Arable lands and gardens	6.722		100	9,97
A. Grains	1.127	100	16,67	1,67
Corn	930	82,52	13,84	1,38
Wheat	153	13,56	2,28	0,22
Rye	17	1,52	0,25	0,02
Barley	27	2,40	0,40	0,04
B. Vegetable crops	2.680	100	39,89	3,97
Potato	2.010	75,00	29,90	2,98
Beans	138	5,15	2,05	0,20
Other vegetables	532	19,85	7,91	0,79
V. Cattle fodder	2.036	100	30,25	3,02
Lucerne	319	15,66	4,75	0,47
Other cattle fodder	1.717	84,34	25,54	2,54
G. Uncultivated land	879	100	13,08	1,30
II. Orchards	2.334	100		3,46
III. Meadows	20.502	100		30,43
IV. Pastures	37.821	100		56,13
TOTAL	67.379			100

How such an utilization of agricultural land is reflected on agriculture, best can be seen in table 2. Namely, the total area under grain is 1127 ha, which represents 16.67 % of the total arable area or 1.67 % of the total agricultural area. For corn is used up 930 ha or 82.52 %, wheat 153 ha

[2] Variables and thier symbols usable in the formula: O - arable land, V - fruit, L - meadows, P - pastures

or 13.56 %, rye 17 ha or 1.52 % and barley 27 ha or 2.40 % of total grain land. Vegetable crops are grown on an area of 2680 ha, representing 39.89 % of the arable land and gardens, or 3.97 % of the total agricultural land. The potatoe is of the utmost importance of vegetable crops. It is sown on the area of 2.010 ha or 75.00 % of the total area under vegetable crops. Other vegetables follow (onions, green beans, cabbage, carrot, cucumber ...) on 532 ha or 19.85 %, and beans on 138 ha or 5.15 % of the total area under vegetable crops. Cattle fodder accounts 30.25 % of the arable lands or 3.02 % of total agricultural land of the discussed area. Under lucerne has been sown 319 ha or 15.66 %, and other cattle fodder (clover, a mixture of grass and legumes, corn for fodder ...) has occupied 1717 ha or 84.34 % of the total area under cattle fodder.

The results of agricultural land utilization in the year 2005 indicate the following:

- First, on the territory of the discussed area, an insufficient attention has been paid to problems of agricultural development, and it appears that this economic activity is still traditionally conceptualized;
- Second, the total sown area is not in the function of agriculture development. By greater appreciation of agriculture as a primary activity, comparative advantages can be realized in this part of northeastern Montenegro;
- Third, the most important and most urgent measure would be farmers directing to transform various type of production into a specific specialized type of production.

Table 3. Sowing structure of arable lands in the years 1964 and 2005
(Data source: Statistical Office of Montenegro, Census of Agriculture (of appropriate year)

YEAR	1964.		2005.	
Category of utilization	ha	%	ha	%
Arable lands and gardens	8.440	100	6.722	100
Grains	6.350	75,24	1.127	16,77
Industrial crops	26	0,31	-	-
Vegetable crops	1.305	15,46	2.680	39,87
Livestock fodder crops	759	8,99	2.036	30,29
Uncultivated arable lands	-	-	879	13,08

Along with the arable areas reducing it comes to the change in a structure of its utilization. In the structure of arable land utilization in the period 1964 - 2005, positive changes into direction of a progressive increase of the areas under vegetable and livestock fodder crops are perceptible. Namely, the sown area under vegetable crops increased from 1305 ha or 15.46 % in 1964 to 2680 ha or 39.87 %, while for livestock fodder crops we record the increase of sown areas from 759 ha or 8.99 % to 2036 ha or 30.29 %.

Negative changes in the structure of utilization are contained in the fact that areas under wheat have been reducing from 6350 ha or 75.24 % in 1964 to 1127 ha or 16.77 % in 2005. In the same period the areas under industrial crops were abolished, while statistics did not record the areas of uncultivated lands in 1964 but found that they were 879 ha in 2005.

Thus, in addition to environmental conditions, demographic trends, inability to use modern machinery, irrigation, tradition etc. influenced formation of the structure of arable land utilization. However, it does not significantly change a final evaluation on arable lands utilization on the discussed area. By the method of alternate divisors, we separated the following direction of arable land utilization. It is[3]:

P03Sk2 Ž1 is direction with a balanced share of vegetable crops, greater participation of livestock fodder crops and participation of grain crops. “Thus derived direction is a typical reflection of poorly developed agriculture, where the all produce everything and where land areas are not used rationally“ (Todorović, 1985).

[3] variables and thier symbols usable in the formula: Ž- grains, I- industrial plants, Po- vegetable crops, Sk- fodder for livestock

ASSESSMENT OF MORPHOMETRIC CONDITIONS RELIEF

The geographical basis of agriculture northeastern of Montenegro, the example of the municipality of Berane, Andrijevica and Plav questions are numerous and complex economic problems. In such a complex situation, the responsibility of geographic science to society are increasing and are expected to be solutions of the current agricultural problems. The agri-geographical analysis is not always easy to distinguish as the missed opportunities with limited participation objectively present conditions (mountain character of the area), and how much they have to rewrite the lack or inadequacy of economic organization and incomplete information. Without going deeper into theoretical considerations, it is necessary at this point, before morphometric analysis of relief of conditions for agricultural development, provide a description of the economic and transportation routes in the northeastern of Montenegro, for example the municipality of Berane, Andrijevica and Plav.

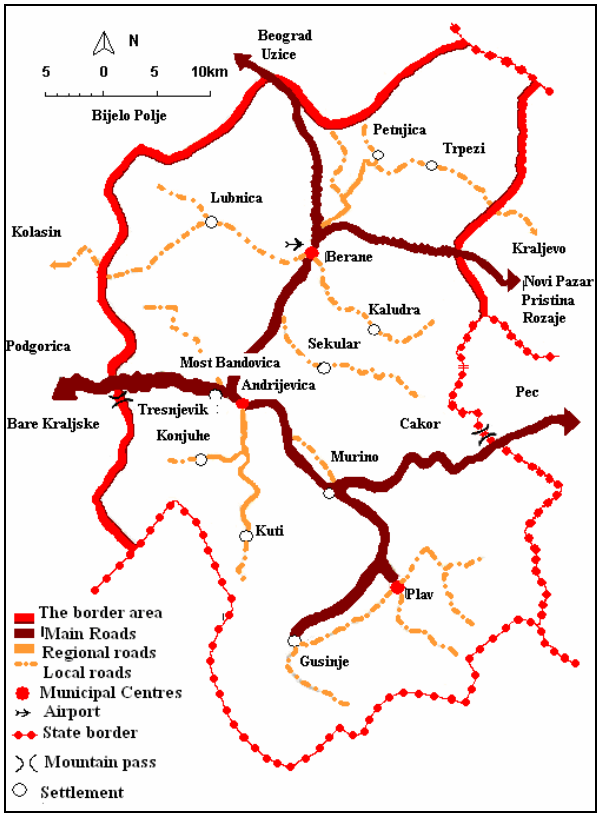

Figure 1. Economic and transportation routes in the northeastern of Montenegro, for example the municipality of Berane, Andrijevica and Plav
(Data source: Rajović, 2010. p.24)

If we look carefully at the map of the considered space in which they depicted the economic and transportation routes (figure 1), we will be clear that in this part of north-eastern Montenegro, lack of territorial untegracije roads, lines of gravity and blood circulation .... that are important for accessibility to major economic markets (Rajović, 2010). The Society's programs of transportation development are not respected morphometric specific conditions of relief, because they could not give satisfactory results. Agricultural pictures northeastern of Montenegro, the example of the municipality of Berane, Andrijevica and Plav will be further monitored through the assessment of exposure conditions morphometric relief for agricultural development.

In the process of morphometric characteristics evaluation we chose a method of scoring. Each characteristic been assessed on the scale of 1 - 5 with descriptive ratings: adverse, bad, good, very good and excellent. In ratings reduction of certain morphometric characteristics to the evaluation of morphometric conditions for agriculture, we used the procedure applied by Jaschke (1976).

Value rating of hypsometric and exposure in relation to agricultural production is associated with the modifying of temperature characteristics. In addition, it is generally valid relation that at a height temperature characteristics deteriorate, while with exposures applies relation that the more quality areas are those which are sunlit for a longer period.

From the aspect of agricultural production, a valueable scale of hypsometric structure could be evaluated as follows:

- to 800 m above sea - excellent (5);
- 800 - 900 m above sea - very good (4);
- 900 - 1000 m above sea - good (3);
- 1000 - 1100 m above sea - bad (2);
- over 1,100 m above sea - adverse (1) (figure 2).

Owing to a vertical development of the relief on the discussed area, hypsometric may have the character of limiting factor for agricultural production. Therefore at its vvaluable assess the key issue is related to determination of the upper threshold of rational agricultural production.

That height threshold is essentially determined by the deterioration of temperature conditions (Rajovic, 2007). Apropos that, these analyses will folow. At this point we can roughly take that the upper threshold of rational agricultural production is approximately about 1100 m.

From the aspect of agricultural production the exposures value scale could be evaluated as follows:

- South exposure - excellent (5);
- Western exposure - very good (4);
- East exposure - good (3);
- Northern Exposure - bad (2).

It is conspicuous that there are no adverse exposures and therefore we can not consider them as the limiting in regard to agricultural production. However, for a valuable assessment of exposures, more exact indicators in the literature could be found. They are primarily related to parallel sunny-shady exposures. J. I. Čirikov's results of experimental observations show that differences in the sums of direct insolation between the parallel exposures are more pronounced if slope is greater. In addition, they are more pronounced during the spring and autumn months, and in the summer they are rather equalized (Čirikov, 1979).

Table 4. Relation of average daily sums of direct insolation on the northern and southern exposures at different slopes in regard to the sum on a horizontal surface (1,2 col/cm^2 pa 50° SGŠ)
(Data source: Čirikov I.J., 1979.)

SLOPE	EXPOSURE	III	IV	V	VI	VII	VIII	IX
10°	North	0,75	0,86	0,91	0,94	0,93	0,9	0,8
	South	1,22	1,11	1,04	1,01	1,02	1,07	1,14
20°	North	0,48	0,7	0,83	0,87	0,85	0,76	0,6
	South	1,38	1,18	1,07	1,02	1,04	1,12	1,28

Differences in the sums of direct radiation between the paralell exposures (north-south) are more pronounced with slope increasing (table 4). At the same slope sides, differences in temperature between the sunny and shady slopes of ground layer's air can reach 6 - 7 °C, and at a depth of 1 cm in the soil even to 7 ºC (Volf & Dimitrovskij, 1981).

Therefore, sunny slopes are heating more quickly, snow on them melts quickly and evaporation is more intensive. For these reasons, spring tillage, sowing and ripping of fruits is earlier on the southern exposures than in the northern ones. Also, for the development of

agricultural crops the western and eastern exposures provide more favorable conditions than the northern exposure does.

From the aspect of agricultural production, slope value scale could be evaluated as follows:

- slope of 1 - 3 ^{o} = excellent (5);
- to 1 ^{o} = very good (4) ;
- 4 -7 ^{o} = good (3);
- 8 -15 ^{o} = bad (2);
- over 16 ^{o} = negative (1) (figure 3).

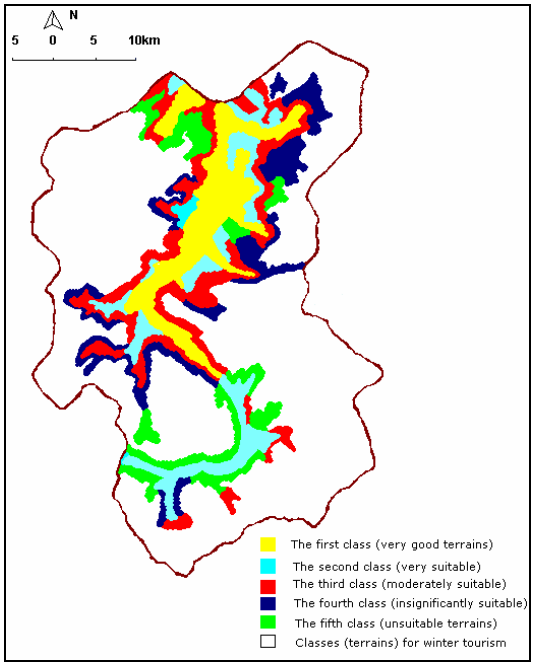

Figure 2. The classes of general suitabilities of morphometric characteristics for agricultural production in northeastern Montenegro, on the example of the municipalities of Berane, Andrijevica and Plav

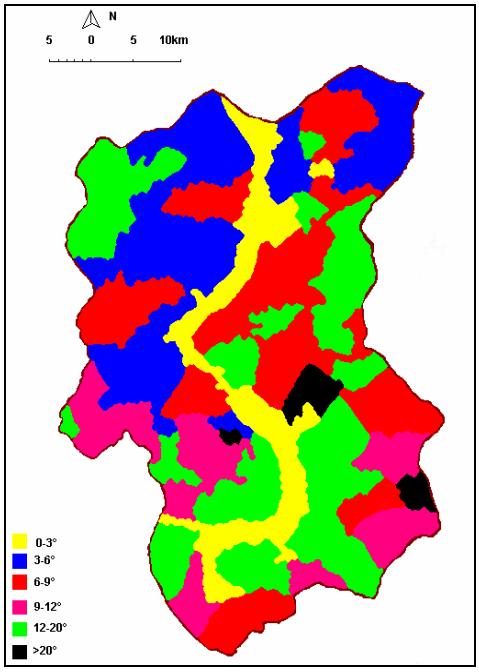

Figure 3. The structure of slopes in northeastern Montenegro, on the example of the municipalities of Berane, Andrijevica and Plav

Slope of topographice area directly affects agricultural production in such a way that with the slopes increase during agricultural works, work effects decrease but expenditure of funds increase. Also, it directly affects the choice of cultures to be grown on a particular slope. Slopes of 0 ° - 3 ° are considered to be most suitable for intensive utilization, in addition that slopes which are evaluated as optimal are those of 1 ° - 2 °, while on the slope to 1 ° a kind of ground waterish ness may occur. On the slopes from 3 ° - 7 ° it is possible to perform all field work and cultivation of all cultures, but because of protection from erosion it requires contour cultivation and planting. On the slopes from 7° - 15° it is necessary to use extensive anti-erosion measures, grass planting or land terracing.

Although it is possible to use mechanization on them, they are marginal for husbandry, i.e. They are more suitable for fruit growing. Slopes over 15° are unsuitable for agricultural utilization. In rational utilization of natural resources, agriculture gives way to forests on these slopes (Mihalić, 1967). However, on the area discussed in recent past, arable lands have been used on the slopes greater than 15°. They have been abandoned recently or converted into meadows, orchards and the like.

Table 5. Indexing and classification of appraisal ratings of: slopes (A), hypsometry (B) and exposures (C) in relation to agricultural production

ABC	ABC	ABC	ABC	ABC	Class of suitability
112	212	312	41-	51-	V
113	213	313			
114	214	314			IV
115	215	315			
122	222	322	42-	52-	
123	223	323			
124	224	324			
125	225	325			
132	232	332	43-	53-	II
133	233	333			
134	234	334	III		
135	235	335			
142	242	342	44-	54-	I
143	243	343			III
144	244	344			
145	245	345			II
152	252	352	45-	55-	I
153	253	353			III
154	254	354			
155	255	355			II

Conclusive evaluation of morphometric characteristics in relation to the agricultural production is carried out by indexing process. Abstracted value classas are shown in table 5. The starting point of conclusive evaluation is the previously determined evaluation of slopes (A), hypsometry (B) and exposure (C). By ratings reduction of mentioned characteristics, a unique ratings index is obtained. In table 5 all possible combinations of ratings reduction are given. Classes of suitability in relation to agricultural production are ranging from I (very suitable terrains), II (very suitable), III (moderately suitable) IV (insignificantly suitable) and V (unsuitable terrains).

ANALYSIS OF MORPHOMETRIC SHARACTERISTICS RELIEF

The morphometric characteristics of relief are important for an evaluation of its practical role, especially when we talk about developed relief like it is in the discussed area. Analysis of the morphometric characteristics was performed using a topographic map 1:100 000 (Military Institute, 1986). Altitudinal ranges were grouped into three hypsometric zones (Rajović, 2005).

Lower hypsometric zone - includes altitudinal range of 645 m above sea (bottom of Berane basin) to 1100 m above sea, which can roughly be taken as the upper threshold of rational agricultural production. Within this zone, we can abstract the spatial units of lower hierarchy rank. It is the sub-region of alluvial rivers' plains, river terraces, lake sediments of Berane, Andrijevica and Polimlje valley which has the best natural conditions for agricultural development. Since that this sub-region is dominated by excellent hypsometric, slopes of 3° and non-exposed areas, this spatial unit has the best morphometric conditions for intensive agricultural production. Also, the alluvial plains of rivers are connected to the fluvial soils which are, from the production aspect, the most important for possible cultivation of most crops. On the river terraces there are dominant soil types of different production values.

They appear as loams, meadow chernozems, pseudogley and amphigley. The sub-region which includes the valley of Plav and Gusinje is characterized by slopes of 0 ° - 3 °, non-exposed exposures, altitudinal range to 948 m above sea.

Because of the altitudinal range, this sub-region has the II class of convenience for development of agriculture. The dominant soil type is fluvisol, in places present - district camisole, euritic camisole, podsol, planosol. Different varieties of meadow chernozems allow fruit and vegetable production.

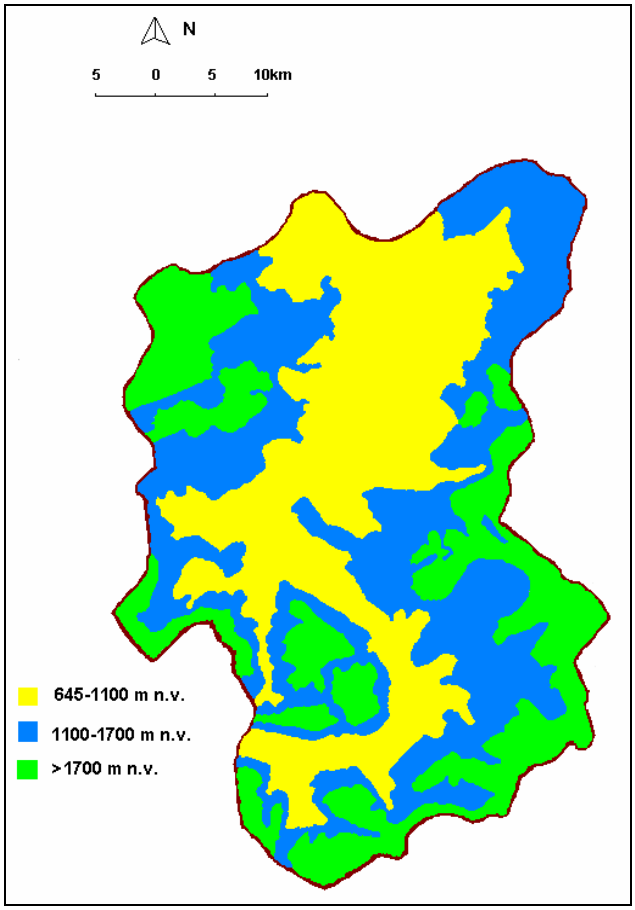

Figure 4. Altitudinal zones of northeast Montenegro, on the example of the municipalities of Berane, Andrijevica and Plav

The sub-region which includes areas of low-mountain relief and low areas of average-mountainous relief to 1100 m above sea has the third class of suitability for development of agricultural production (due to the altitudinal range, negative northern exposures and soils with moderate and steep slope (6 ° - 9 °)). Greater depth of pedeologic cover (luvisol, loam, euritic cambisol, district cambisol, as well as presence of rendzina) makes this special entity relatively suitable for agricultural production. The soil is suitable for the production of various agricultural plants, orchards, while 1000 m above sea is mostly forest land (fir-beech forests, oak forests and forests of black and white pine), pastures and meadows.

Middle hypsometric zone - includes altitudinal range of 1100 m to 1700 m above sea. From the standpoint of agriculture development, this zone we can define as moderately suitable. It is characterized by sharp forms of relief with a slope of 12 ° to 20 °. This zone has a thinned pedeologic cover, with the dominant soil: rendzina, podsol, calkocambisol, calkomenasol, rankers and in places - district cambisol, which indicates that this spatial entity is mainly under grass and forest vegetation (forests of pine, spruce, beech, oak, fir).

This zone is suitable for livestock development. Higher hypsometric zone - includes high mountain range more than 1700 m above sea. This zone is unsuitable for development of agriculture as the relief conditions are deteriorated. In slopes structure, the slopes over 18° and over 20° are

dominating. This spatial entity is under forest vegetation and mountain pastures with blueberry and juniper. It is particularly suitable for touristy valorization.

INSTEAD OF CONCLUSION

"To learn from nature, but not attempt to master the nature or manipulate it" (Fritjof, 2002). In view of C. Fritjof's statement, we want to stress that sustainable development of agriculture in this paper is not its own purpose, but it is in a whole and organically linked to the theme content, subordinated functionally to the proclaimed goal.

Therefore, sustainable development of agriculture in this part of northeastern Montenegro basically can be viewed through the four basic parameters which necessarily and appropriately may be combined:

- resources that are renewable on the discussed area may be used as much as their regeneration rate allows;
- from material and functional viewpoint, sources of raw materials which are threatened by destruction in this part of northeastern Montenegro, may be only used in agriculture if it is possible to replace them with raw materials that are renewable and if their use guarantees a higher productivity;
- environmental pollution should not exceed the level and capacities of degradability of harmful substances which can offer major environmental media - water, air and land;
- there must be time equivalence between the time of complementary feeding and damage of the land from one side, and natural weather processes of land renewal on the other (Meyer, 2002).

Such imperative of the sustainable development of agriculture has a strong environmental dimension. However, the economic component requires special attention because for the sustainable development it is very important the connection and regulation of economic interests. Economic profit, which today is achieved in a very short period, but at the expense of the environment, cannot be tolerated on the further road of sustainable agricultural development of the discussed area.

Thus we confirm clearly formulated opinion of Vasovic and Biočanin (2007): "The current generations need to plan and create an appropriate quality of the environment for themselves, but this right also must retain future generations. In accordance with the concept of sustainable development, a work culture based on humane principles of ecological-ecumenical and social efficiency is expected. Road to ecological reasonable society is our essential need, but also an obligation".

Of course, no matter how much land potentials of this part of northeastern Montenegro are big; they are not unlimited and inexhaustible. Therefore, their utilization must be planned and rational. It is therefore necessary to determine the agricultural resource potential of the discussed area, to determine the ability of its reproduction and the possibility of productivity increasing of certain land resources, which is a precondition for the rational utilization of environment and its protection.

If we apply above mentioned parameters to the agricultural policy of this part of northeastern Montenegro, we will come to the conclusion that a sustainable agricultural policy must be shaped to enable agriculture:

- being marked in the economic sense by entrepreneurial trade, i.e. not to depend on subsidies, and therefore being competitive. The employed in agriculture do not realize their incomes only by production of healthy food, by its further processing and placing on the market, but also by including other options for profit in their work such as the tourism sector, domestic work, providing into the existing residence the newly created agricultural capacities of „eco"dimension with the manufacturing orientation principles of „organic food". In addition, there are opportunities of part-time earnings by the EU regions which support the protection of nature and environment.
- when it comes to the environmental dimension, natural soil resources should be used so as to prevent long-term negative impact on them. This actually means to use fertilizers, pesticides and herbicides in the minimum extent so as not to pollute surrounding land regions. With such attitude agricultural land is supposed to be preserved as well as nature and genetic potential of plant and animal species (Meyer, 2002).

In what way set in motion, develop and transform into reality the idea in any of the previous findings of sustainable agricultural policy, or much better - a combination thereof, to thereby achieve all effects of the sustainable development, and how in a proper way use the agricultural land of the discussed area? Concretely in this part of northeastern Montenegro, the developmental components of sustainable agricultural development are reflected through:

- favorable climatic conditions which conduce to growing vegetables, fruit and other intensive crops and relatively price-competitive livestock production;
- environmental production factors preservation (land, water and air) from pollution which significantly allows to the discussed area to promote modern organic farming;
- extensive unused arable land and areas where is possible a significant increase of production per area unit, without compromising other resources;
- availability of local market and significant high touristy demand contribute that numerous and specific products (milk, meat, potatoes) have potentially good customer demand in the market (Gulan, 2006).

Therefore, in the period ahead it is necessary to devote special attention to the preservation of agricultural land and increase its fertility in this part of northeast Montenegro. The rational resources land utilization of the area must be in focus of economic policy.

That is, each pitch and each hectare of arable land must have its place in the economic and physical plan. A stable and highly efficient agricultural production involves the use of scientifically based methods in the exploitation process of land and its protection. Only on the basis of accurate inventory of existing land resources and rational territorial organization of agro-industrial complex, it is possible to provide a safe and quality food for residents and create an agricultural surplus.

Today we certainly have the knowledge and means that are able to make land more fruitful than it was created by nature (Rakićević, 1989). The key to the successful solving of sustainable agricultural development is always in the economic measures that support its production.

Today, the current economic model of “free market” based on the assumption that the market will solve that automatically, without intervention of the state, i.e. by itself, through the law of supply and demand. However, “sustainable development achieving ... can not be left to the market - a role of the state is inevitable” (Comon, 2005).

REFERENCES

Čirikov J. (1979), *Agrometeorology*. Leningrad, “Akademičeskiй knigi”, pp:39-42,

Comon M. (2005), *Ecological Economics - An Introduction.* Cambridge. University Press, pp: 8-9;

Fritjof C. (2002), *Verborgene Zusammenhänge. Vernetzt denken und handeln* - in Wirtschaft. Bernu.a. Politik. Wissenschaft und Gesellschaft, pp. 248-249;

Gulan B. (2008), *Agriculture of Montenegro: a market for population of 620,000*. Available through: http://www.agropress.org. (23.10 2010);

Jaćimović B. (1985), *Developpement, directions et methods de la geographie agraire.Belgrade,* Ehtrait d Editions speciales du Departement de geographie et de planification de l espace,Vol 3, p.107-118.

Jaschke D. (1976), *Das australische Nordtitorium – Potentical*. Nut zung, Inwertsetrbarkeit seiner naturlichen ressgurcen. Mitteilungen der geographischen Gesellschaft in Hamburg, No 70, p. 14-39;

Kostrowicki I. (1969), *"Tupologia rolnictwa"*. Warszawa, Pryeglad Geograficynu, t XLI, z. 4, p. 599-621;

Kostrowicki I. (1979), *Some methods of determining land use and agricultural orientations as used in the Polish land utilization and typological studies.* Warszawa .Geograpfia Polonica, p.93;

Meyer H. (2002), *Jahre nach Rio - Wie nachhaltig ist die Agrarpolitik?;* in Aus Politik und Zeitgeschichte No 31-32, pp: 28-29;

Mihalić V. (1967), *Agriculture. Zagreb,* Agricultural encyclopedia, p. 64-68;

Rajović G. (2005), *Geographical bases for development of economy of Gornje Polimlje*. Belgrade, Printing “Vedes”, p. 46-51;

Rajović G. (2007), *Valorization of morphometric conditions and specificities in making of the project plan for agriculture of Gornje Polimlje. Niš, “Economics*”, Economists Society “Economics” No 3-4, p. 62-63;

Rajović G. (2010), *Infrastucure traffic and valorization morphmetrics handles for northeast Montenegro traffic.Belgrade,* "Roads and Traffic", Road Association of Serbia No 2, p.23-29.

Rakićević T. (1989), *Natural resources of The Republic of Serbia, its utilization and protection. Belgrade*, Geography Faculty PMF, No 36, p. 18;
Todorović M. (1985), *Modern development of agribusiness in municipality of Gornji Milanovac. Belgrade*, Autotype from the Papers and Studies Proceedings of the Geographic Institute "Jovan Cvijić", No 37, p. 56-60;
Vasovic V., Biočanin R. (2007), *Sustainable development. Belgrade*, "Ecologica". Scientific-Professional Society for Environmental Protection of Serbia, No 49, p. 68 – 69;
Volf M., Dimitrovskij J. (1981), *Geografija mirovogo hazajstva*. Moscow, „Misl", p. 34-37;
Topographic map 1:100 000 (1986), *Sheets Ivangrad, Peć and Skadar*. Belgrade, the Military Geographical Institute.

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