



STRUCTURE AND TRENDS OF SOIL USE IN MONTENEGRO

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SYNOPSIS

Agricultural development, for its current importance attracts the attention of economic thought, both in highly developed market economies, and in the economies traditionally designated as the undeveloped ones. Therefore the paper presents the structure and trends of soil use in Montenegro and the efforts made for its conceptualisation. Applying the method of alternating distributors in 6/6 system, we have established a soil use path $PP_2 \check{S}_4$ what indicates that main direction of soil use is for forestry with a substantial share for agriculture. Long term goal of agricultural development of Montenegro must be rational use of soil potentials. Only in that manner will the agriculture become an equal partner to the rest of the economy and justify its primary role and importance. That way it is possible to reach higher and more diverse food production for domestic needs and for export. Montenegro has all necessary natural, social and geographic conditions for that.

SINOPSIS

STRUKTURA I TRENDOVI KORIŠĆENJA ZEMLJIŠTA U CRNOJ GORI

Problematika poljoprivrednog razvoja, svojom aktuelnošću zaokuplja pažnju ekonomske misli, kako u visokorazvijenim tržišnim privredama, tako i u onim ekonomijama koje se tradicionalno označavaju kao zemlje u razvoju. Stoga se u radu prikazuje struktura i trendovi korišćenja zemljišta u Crnoj Gori i vrši pokušaj njihove konceptualizacije. Primjenjujući metod naizmjeničnih delitelja u sistemi 6/6, utvrdili smo sledeći pravac korišćenja zemljišta $PP_2 \check{S}_4$ što svedoči o pretežno šumskom pravcu korišćenja zemljišta sa većim učešćem poljoprivrednog. Cilj dugoročenog razvoja poljoprivrede Crne Gore mora biti cjelishodno i racionalno korišćenje zemljišnog potencijala. Samo tako poljoprivreda može postati ravnopravan partner sa ostalim djelatnostima privrede i opravdati svoju primarnu ulogu i značaj. Jedino se tako može postići veća i raznovrsnija proizvodnja hrane za domaće potrebe i za izvoz. Crna Gora za sve to ima prirodne i društveno geografske uslove.

INTRODUCTION

By the title of this paper we have defined the goal we follow, not trying to claim that it is a detailed analysis of social-proprietary, organizational-technical and production characteristics of agriculture. We consider it a special and larger theme that requires the analysis in interaction of all components, natural conditions, historical development, earlier economic and social favoring of industry, neglecting of raw materials basis and market of agricultural goods, traffic connection etc.

As for this study, we should start from the main paths of soil use the basis of which were laid by J. Kostrovicki from Agricultural Department of Polish Academy of Sciences (KOSTROVICKI, 1969). Montenegro has not been analysed in this respect more complexly, and the research performed has been even more obscure, since nowadays it is more popular to do the more general studies, in which the problems of smaller space units cannot even be seen. And problems (demographic, social and economic) exist in every region of Montenegro, and some of them have been transformed due to the process of urbanization and deagrariation, to the extent that made them lose their agricultural function (JAĆIMOVIĆ, 1985). In order to develop the agriculture in Montenegro in the future more successfully and to use more actively the potentials for its development, it is necessary to implement numerous changes, starting from the social treatment, to the specific measures of agrarian and total economic policy.

Starting from these assumptions, observations and statements, by this paper we wanted to give a certain contribution to soil use research in Montenegro. To that end, through the analysis of structure and acknowledging the trends, we have made an effort to point to some regularities in these developments, as well as to the perspective regarding further structural changes. By accepting this criterion, it was possible to group the data and make them comparable to the period we are analysing.

STRUCTURE OF THE WAYS OF SOIL USE

One of the most important components in the natural resources of Montenegro, is its terrain expanse. In order to present the agro complex of Montenegro we need to do a good survey of soil use as a whole. Term „sterile“ was taken from the official statistics for the year 1973. We will not question the adequacy of this term, because in this study we use all statistical data we can obtain. In the same manner we have adopted methodological soil classification on forestry and agricultural one for the year 2004, accepting the data obtained from the Forestry Administration of Montenegro. „We consider that the classification of soil on productive and non-productive is more logical, as the productive soil includes both agricultural and forest ones. Between

agricultural and forest soil there is a close organic and ecological connection and balance because the irrational use of one endangers the other“ (TODOROVIĆ, 1985).

To see a larger picture of Montenegro's soil fund we started to separate ways of exploitation, which has both a scientific and practical significance. By applying alternative distribution model in 6/6 system, we concluded that in Montenegro there is the course $PP_2 \check{S}_4$ which testifies that larger portion of soil is under forests, but agricultural use is at rise.

According to data from the Forestry Administration of Montenegro for the year 2004 from the total area of Montenegro (1,382.812 ha), forests and forest soil seize 734,609 ha, or 53.85% of the territory of Montenegro. Not-overgrown forest area seizes 122,737 ha or 16.51% of the total surface area of forests and forest soil.

The largest expanse under the forests is under the socially owned property 500,041 ha from the total surface area, and forests in private property comprise 243,568 ha or 32.75%. In the structure of state forests there are the so called economic forests which seize 347,581 ha or 81.43 %, protective 66,283 ha or 15.53 % and forest in national parks 12,975 ha or 3.04%. High forests seize 212,261 ha or 71.21%, offspring 39,721 ha or 13.33%, and underbrush (maquis) comprise 46,082 ha or 15.46% of the forests ([http:// www.direkcija-suma.co.yu](http://www.direkcija-suma.co.yu)).

It is obvious that deciduous forests are by far more presented with 42,529,144 m³ or 59.02%. The conifer forests seize 29,527,555 m³ or 40.98%. Total amount of lumber is 72,056,699 m³. State forests possess most of the lumber. Conifers seize 28,355,35 m³ and deciduous 31,275,245 m³. Conifers in economic forests seize 26,499,651 m³ while deciduous seize 26,602,225 m³. Relatively small amount of lumber is seized by protective forests, national parks and private forests (total 18,954,823 m³), but their importance is expected to increase. In private forests deciduous forests seize 11,425,819 m³ and conifer forests 1,171,920 m³ ([http:// www.direkcija-suma.co.yu](http://www.direkcija-suma.co.yu)).

Total increase in state owned and private forests of Montenegro is 1,489,189 m³. Volume increase in economic forests is 1,133,889 m³, protective 72,661 m³, national parks 33,831 m³, state owned 1,240,381 m³ and private 248,808 m³. Yearly etate in state owned forests is 671,307 m³ (conifers 406,813 m³, decidous 264,494 m³), and in pivate 144,390 m³ (conifers 15,878 m³, decideous 128,512 m³)([http:// www.direkcija-suma.co.yu](http://www.direkcija-suma.co.yu)).

It is possible to predict that in the time to come there will be significant changes in forest regions, because a part of these regions can be ameliorated into agrarian soil. At the same time with the process of intensification of agricultural surfaces, we also expect improvement in existing structure of soil use. This especially relates to transformation of surfaces under the meadows, to more intensive use of fruit, vines and vegetable production. In order to secure forest management in ecologically acceptable, socially stable and economically sustainable manner, a special attention should be directed to introduction of FSC standards. By the implementation and

development of FSC standards in Montenegro we expect a more responsible approach to forest management by all the subjects participating in that process, and an easier access to demanding foreign markets (<http://www.minpolj.vlada.cg.yu>).

Structure of agricultural soil use by individual categories has a special significance, because it represents the results of development and intensity of agriculture, and in addition it expresses the level of evaluation of territorial conditions for development of some types of agricultural production.

Respecting the fact that the whole space of Montenegro is mountainous and hilly, it is natural that on this territory, in scope of differentiation of directions of agricultural soil use, we have not seen expanses of plowed fields, which is a reflection of relief, but also the reflection of extensive character of agricultural soil use, well illustrated by presence of large parcels of land are under meadows (128,261 ha) and pastures (326,620 ha). Pastures were created by forest clearings, frequently on the places that were inclined with erosion. Same as that, significant surfaces of natural grasslands, especially meadows are located in the plain regions and river valleys, mainly areas with high potential. This is a result of disorderly water regime, which started to be more organized in the past few years.

Table 1: Use of agricultural areas in Montenegro, 2004.

Land categories and cultures	ha	%		
		Part in whole	Plowed fields and gardens	Agricultural areas
I Plow fields and gardens	46,888		100	2.42
A.Grains	5,937	100	12.66	1.46
B.Industrial plants	196	100	0.42	-
C.Vegetable plants	18,181	100	38.77	3.51
D.Livestock plants	7,588	100	16.18	1.46
E.Hothouses and flowers	22	100	0.04	0.00
F.Fallows and unworked fields	14,964	100	31.91	2.88
II. Orchards	9,696	100		5.02
III. Meadows	128,261	100		24.76
IV. Pastures	326,620	100		63.05
Total	518,047			100

Source: ZSCG, Agricultural census (corresponding year)

Plowed fields represent the most important category of agricultural soil. But, statistical data show that plowed fields are being abandoned or changed into other categories, or alienated for non-agricultural purposes. Analyzing the structure of

plowed fields in year 2004 we see that 12.66% of these fields are planted with grain, with no industrial plants. Vegetable plants have 38.77% of plowed fields and gardens, or 3.51% of total agricultural expanse. Livestock plants have 16.18% of plowed fields or 1.46% of the total agricultural expanse. This structure of plowed fields is characteristic for all of Montenegro. Hothouses and flowers are even less represented with only 0.04% of plowed fields terrain. Negative changes in the structure of soil usage are contained in the fact that not worked fields comprise 31.91% of total plowed fields terrain.

By the method of alternating distributors we have chosen the following path for plowed soil use, and that is:

♦ $P_{02} N_2 \check{Z}_1 Sk_1$ path with significant participation of vegetable plants, unworked soil and grain and livestock plants. „Path obtained in this manner is a reflection of a typically undeveloped agriculture, where all the products and soil expanse are not being used rationally“ (TODOROVIĆ, 1985).

As we can see in Table 1 orchards make only 5.02% of the total agricultural expanse. By personal observations on field and by survey of literature we have found out that the state of orchards is not satisfactory. Many orchards are in very bad condition, and because of that incomes are very low, with negative assortment of fruits in the individual sector. Nevertheless, orchards with their size and potential, with further investment can become a major agricultural branch in Montenegro.

Instead of thinking about the natural production (everybody produces everything for own needs), stimulus should be given for creation of fruit plantations and a modern production of forage, what would provide the conditions both raw material basis for the existing processing industry, and the conditions for modern production of livestock products. In Montenegro this modern concept has already been accepted, its share is rather small but standards of modern industry and plantations are being adopted. The thing to be done is stimulation and attraction of private producers, to go in the same direction.

TRENDS IN WAYS OF SOIL USE

Problem of adequate statistics is much more serious when it is about trends rather than problems in soil use. Exact monitoring on international level is almost impossible; controls and registers are not proceeded every year in all of the countries (ĐORĐEVIĆ, 1994). Special problem is a change of definitions and classifications that happens periodically in Montenegro's statistics; therefore data from those statistics should be taken with caution. Even then some trends in soil use can be noticed. Although existing classification does not dedicate attention to urbanized areas and so on, trends can be studied for expanses under plowed fields, orchards, meadows and pastures.

Table 2: Agricultural areas according to use categories in Montenegro, 1973 and 2004.

Year	1973		2004	
	in hectare	%	in hectare	%
Agricultural areas	531,798	100	518,047	100
Plowed fields and gardens	60,523	11.38	46,888	9.05
Orchards	9,411	1.77	9,696	1.87
Meadows	115,345	21.69	128,261	24.75
Pastures	340,663	64.05	326,620	63.04
Swamps and reeds	3,968	0.74	2,661	0.51

Source: ZSCG, *Agricultural census (corresponding years)*

In period 1973-2004 in the structure of Montenegro's agricultural expanse there were changes in the ways of soil use and reduction of expanse under plowed fields, gardens and pastures. The surface under plowed fields declined from 531,771 ha in 1973 to 518,047 ha in 2004 or precisely for 13,724 ha. Also in the same period pastures declined from 340,663 ha to 326,620 ha, for 14,043 ha. Expanses under orchards and meadows have risen from 9,411 ha in 1973 to 9,696 ha in 2004 precisely for 285 ha. In the same period meadows have risen from 115,345 ha to 128,261 ha, for 12,916 ha.

In order to compare the structure of agricultural soil in Montenegro for the period 1973 - 2004 we have applied method of alternating distributors and placed the following path:

♦O₁ L₂P₃ balanced pasture path with greater participation of meadows and plowed fields in 1973, which in 2004 transformed into L₂P₄ mostly pastures path of agricultural soil use, with greater share of meadows.

Generally speaking, in period 1974-2004 dominant trend is losing of plowed fields expanses. These expanses are disappearing because of erosion, floods and other forms of soil devastation, which is the product of human influence; this phenomenon is hard to quantify, but its influence on soil use trends is not doubtful. From the agricultural point of view this process is compensated with growth of expanses under the pastures. Beside physical-geographic characteristics of Montenegro, this is the product of unpopulation and aging of work-capable population in agriculture; meadows and pastures are much easier to maintain than plowed fields. This trend is in Europe considered as a transitional phase towards the reforestation of the terrain. Loss of agricultural terrain is compensated with bigger needs for agro technical measures in agriculture, and even in production increase. Therefore surplus of this terrain in European countries is at first changed into meadows and pastures, and these into forest regions (FISCHEL, 1982). In Montenegro this trend is still reduced because of non-controlled forest cutting, insufficient public pressure toward ecological protection and other factors.

Getting to know, analysing and research of these developments and tendencies is facilitating the creation of agricultural policy and attitudes toward practice. That is especially important for agriculture of Montenegro in which agricultural household is still a very important subject. Therefore, methods of total economic, and especially agricultural development are under the great influence of oscillations in domestic households. After the Second World War industrialization led to abandoning of agriculture as an economic activity. Analysing this phenomenon we have found KALEZIĆ's (1976) statements that point out major motives for agriculture abandoning:

- provision for non-agricultural production in which stable income is of importance. Society should obtain needed means for production and other work conditions that employ labour force on individual agricultural household.

- existential security, that comes from high level of certainty for introduction of non-agricultural activity. In agricultural production, on individual household that is always under the influence from outside there is uncertainty, about income and prices for the products, which brings oscillation in amount of incomes. The fear for achievement of material safety is of great importance.

- a labour relation, brings to individual agricultural producer health care for him and his family, right for pension, what makes an important element of social security.

- common life conditions in the city bring great opportunities for education, complete health care and other comforts a city can offer, different from the countryside, which is the main motive for migrations, especially of young population (KALEZIĆ, 1976).

At this place we want to point out the opinion we accept, that the structure of agriculture is determined by the total structure of human activities as a reflection of the level of economic development. Policy of economic development of Montenegro after the Second World War was directed towards the strengthening of secondary and tertiary activities. That made space for new working positions, mostly in industrial facilities. Industry employed surplus labour force from agriculture. This is confirmed by the fact that in Montenegro after the Second World War there was 80% of agricultural population, in 1971 it totalled of 35%, and in 2004 only 5.32%.

This is a classic example, that an essentially invisible numerous labour force, that was insufficiently or only to a low extent employed in agriculture, with a hasty industrial development immediately as it started moved towards it. Importance of agriculture in Montenegro is presented in the study by I. Vinski, which contains main active means in economy and non-agricultural activities. Structure of active fixed funds on Montenegro's soil was rapidly changed in period 1953-1973. In 1953 agricultural participation was 15.5%, but in the 1973 it fell to 5.6%, while industry increased from 9.0% in 1953 to 28.9% in 1973. Existing structure of fixed funds is a result of different growth rate which was accomplished according to economic activities. In agriculture it was only 2.4 but in industry 14.2."That kind of movement had established paths of development that were realized through investments, in the

agriculture this investment was at the smallest rate“ (VINSKI, 1972). Therefore it is not enough to insist on industrialization as part of labour force transferred from agricultural to non-agricultural activities, but rather on agricultural development which is also important for this transfer. Dependence of industrialization and agricultural development is not unilateral, neither the parallel development of industry and agriculture is endangered by their opposition; they supplement each other which is a part of balanced development. Examples of some of the countries (Denmark, France) prove that theory (JAĆIMOVIĆ, 1985.).

When we speak about the anthropogenic manifestations in the trends of soil use, we should not neglect the fact of soil transformation, from agricultural to urban. Needs for building expanses are the most intense in the outer zones of the cities. Loss of these agricultural soils is the result of cities growth which brought many controversies and concerns in the world, especially in the last two decades; this trend is often present when there are polemics on soil use. There is a viewpoint that this process is irreversible, and as such leaving consequences on relationship problems for population and food supply (ĐORĐEVIĆ, 1994). In Montenegro this process is present and noticed, but its intensity is reduced because of low point of urbanization. "Scope of expanses lost in this way has lesser importance than quality of the surface: most of the time that soil is of I and II bonet class“ (BEST, 1979).

Continuous development needs to be stimulated especially in rural areas of Montenegro. That is the most important task of Department for Agriculture along with making better conditions for farmers and possibly adjustment to EU regulations. Agriculture in Montenegro is challenged by market, EU standards and new technologies.

Program of development has to be made and followed. Long term program has to be rational and made in accordance with regional characteristics. Area around Skadar Lake is fit for agricultural production. Still this possibility is not used. Mild climate is fit for sheep, cows, early fruits and vegetables and vine. In northern part of Montenegro farmers grow sheep and cows, but with new solutions potato, barley and oat could become lucrative crops.

This would be one suggestion how to give significance to agriculture and how to increase crops. Montenegro has geographic position which allows that. Improvement of agriculture and preservation of environment is a task which has to be fulfilled. Therefore Department for Agriculture is investing in agricultural production and development of rural areas in Montenegro.

CONCLUSION

Decrease in arable fields occurs in Montenegro. Using of arable fields lies in shadow of traditional natural production for one's own needs. Terrain in Montenegro is

mostly mountainous. Such geography does not allow arable fields, but illustrates extensive character of meadows and pastures.

Well developed agriculture helps to develop economy in Montenegro. Current economy suffers the period of transition and the long term strategies and technological development was slowed down. Development of agriculture needs to be promoted because agriculture is the basis of economy. Geography and climate influence agricultural production. Well developed agriculture leads to economic achievements which speed up the overall progress.

Achievement of long term planning can be seen through the rational use of arable fields. Agriculture is a key to every successful EU economy and Montenegro as member to be needs to work on its development. Modern strategy for rural areas is needed. That is the only way for Montenegrin agriculture and economy to become equal and to justify its significance.

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