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Geographical View on Agricultural Land and Structural Changes Plant Production Montenegro

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Abstract

This paper analyzes agricultural land and structural changes in plant production Montenegro. The Montenegro represents a significant potential for agricultural development, but plant production insufficiently developed in relation to natural resources and the demands of intensive agricultural production. Average possession by agricultural holdings in 1960 amounts is 5.34 ha with only 2.05 ha arable area per agricultural holdings. Yet more unfavorable is the situation with arable surfaces. Namely, agricultural holdings in the Montenegro in 1960 are on average dispose with maximum of 0.74 ha of arable land. Judging by the size of the cultivated area, production volume, as well as according other parameters, plant production in the Montenegro in 2007, mainly used for meeting need households. A smaller area for is market. The role of the Montenegrin village and agriculture must be first-rate, as are its potentials, the main power future development of Montenegro. This requires radically new relationship between society and science to agriculture and the countryside. Instead of the existing approach in which they observed the preventive as producers of cheap food has to be developed a new concept, a comprehensive agricultural and rural development, which will be based on demographic, natural, economic and socio-cultural potential of Montenegro.

Keywords: *Montenegro, agricultural land, plant production.*

Introduction

Montenegro is a state located in Southeastern Europe who lies on coast Adriatic Sea. It is bordered to the east and northeast with Serbia to the west and northwest Croatia and Bosnia and Herzegovina and on south-east with Albania. In the southwest is the Adriatic Sea is shared of Italy. Montenegro is at about 5.00km from Rome, 1.500 km from Paris and Berlin and about 2.000 km west of Moscow. It lies on the Balkan Peninsula at the very heart of Europe. It spreads between 41° 51' and 43° 30' north geographic width and between 18° 26' and 20° 21' eastern geographic length. It covers surface area of 13.812 km ² and according to statistics from the 2011 in Montenegro hosts 620.029 inhabitants. Per territory size of Montenegro in Europe are only fewer countries: Andorra, Liechtenstein, Luxembourg, Vatican, Monaco and San Marino (www.visit-montenegro.com).

Agricultural land due to their stationing and qualitative characteristics representing are favorable base for the development of agriculture in Montenegro. However, analysis of the research below shows that plant production Montenegro is not in conformity with all available natural and social conditions. Incompatibility between the available potentials and modern plant production is determined by the global economic policy, tradition, demographic trends, economic structure, and market ... In fact, in the territory of Montenegro insufficient attention was paid to the problems of agricultural development, especially the choice of the optimal structure production. Former way management (small plots, out of date processing land, uncoordinated structure of production), not in the agricultural development (Rajović, 2012; Rajović,2013).

Higher respect agriculture as a primary activity, I can the exploit comparative advantages of Montenegro. The cycle of economic activities can best be initiated and run if the first approach to investing in the development of agriculture, because it as a sector of economic disposes the most resources. These resources is needed wise and rational to use. Plant production, as part and one of the most important parts of agricultural production and the area with the fastest turnover of capital in agriculture, directly depend on all the parameters that influence the market, either at the macro or micro level (Rajović,2011).

In order to keep the population in rural areas in Montenegro necessary to invest more in the livestock development, development of farm cooperatives liven, to invest in the infrastructure of the village, establish small enterprises, a young farmer from the state especially encouraged to remain the countryside. Agriculture and the village in Montenegro, developed in sustainable system, it is essential that over the long-term development strategies and regulating relationships and obligations that the strategy to be fully state obligation and responsibility to agriculture grasp and to accept as the backbone of economic development, village as a necessity, and historical development of facts. Agriculture Development Strategy should clearly define macro-zones on which to foster specific healthy Food, and based on that subsidizes and assists farmers and households (Lazić,2013).

Methods

Two basic group's data sources were used in the study. The first group includes sources of statistical data on the use of agricultural land and plant production from 2007, available as of the Statistical Office of Montenegro (2012). The second group makes the results of previous research: agricultural monographs, proceedings, textbooks, published in both local so and in the international literature. Data on the structure use agricultural area in 1973 are given based on the data of the Statistical Office of Montenegro (1975). Data on the share of plant production in the structure of the overall market production in Montenegro in 1967, as well as the average an annual plant production in Montenegro conducted is from five-year period 1969/73 year, and the structure use of agricultural area agricultural holdings in 1960, are given on the basis of research Kalezić (1976).

That is, data on the percentage of agricultural products, the average arable area in hectares per agricultural holdings, and the average fruit production in 1967, are given based on the research of the Institute of Agricultural Economics (1968). Focus in research is based on the structural changes of agricultural land and plant production in the Montenegro. The core methodological procedure used in this research consists of the following methods: descriptive, a causal, comparative method and theoretical analysis.

Descriptive and causal methods were used to detect the cause consequential link between the territorial distribution and the quantitative and qualitative characteristics of plant production. Methods of theoretical analysis encompassed theoretical basis of the research. The combination of these methods it is possible to validly have defined achieves the research goals, which refers to the structural changes in agricultural land and plant production. In the scientific explanation of terms, have applied the two methods are used: the method of analysis and synthesis methods. The method of analysis we were able to deconstructed the complex notions and courts in research and bring out conclusions as to their simpler components and elements. Synthesis methods included is way of systematization of knowledge according to the laws of formal logic, a process of theoretical knowledge in the direction of special to general((Rajović and Bulatović,2013; Rajović and Bulatović,2013). In the context of agro-geographical research agriculture, applied is and method alternating splitter design in Systems 6/6, worked out in Geography Institute of the Polish Academy of Sciences (Kostrovicki, 1969 and 1970). This method determines orientation agriculture been studied territory (Jaćimović, 1976). A literature review and of concepts in framework agrarian structure and procedure code implementation methods "kolejnih ilorazow" (alternate splitter design) gives and Tyszkiewicz (1978).

Results and Discussion

Plant production is the most important branch of agricultural production. The degree of intensification of agriculture, measured by its share of this sector in total value of agricultural production (Baessler and Klotz, 2006; Chen et al, 2009; Kaminski et al,2013). Compared with agrariandeveloping countries, Montenegro is significantly lagging behind by any measure of development of livestock production (number of heads of cattle breeding, the total volume of livestock production ...). Before than we approach view the current state of animal husbandry in Montenegro, it is important to stress that plant production it is plant production represents a significant potential for agricultural development, but is underdeveloped in relation to natural resources and the demands of intensive agricultural production (Rajović and Bulatović,2013).

Before you approach the view plant production in the Montenegro, it is important to point on structure use agricultural land. In the period from 1973 to 2007 in the structure of agricultural area Montenegro there was a change in the manner of utilization of directed towards the decrease area under arable land and pastures? Agricultural areas in Montenegro were reduced from 531.771 ha in 1973 to 516.465 ha in 2007, or 15.306 hectares. Surfaces under pastures during the period were reduced from 340.663 ha to 323.876 ha, or 16.787 hectares. In addition, area under ponds, fish ponds and reeds were reduced from 3.968 ha to 2.650 ha or 1.318 ha. In contrast increased are area under orchards and meadows. Surfaces under orchards and vineyards borrowing were increased from 11.272 ha in 1973 to 16.201 ha in 2007, or 4.929 ha. In the same period have increased and the surface under meadows and with 115.345 ha to 128.782 ha, or 13.437 hectares. So we compare the structure of the agricultural land in Montenegro in 1973 and 2004, we applied the method alternating splitter design in Systems 6/6 and determine the next course.

Table 1. Agricultural area according to categories of use in 1973 and 2007.

Year	1973		2007	
Category of land	u ha	%	u ha	%
Agricultural areas	531.771	100	516.465	100
Arable land and Garden	60.523	11.38	44.957	8,70
Orchards and Vineyards	11.272	2,12	16.201	3,14
Meadows	115.345	21.69	128.781	24,94
Grasslands	340.663	64.06	323.876	62,71
Ponds, fish ponds and reed	3.968	0.75	2.650	0.51

Source: Statistical Office of Montenegro (1975 and 2012), Agriculture in 1973 and 2007, the calculation of data by authors

Table 2. Use of agricultural land in the Montenegro 2007.

Land categories and culture	ha	%		
		Participation in the group	Arable land and garden	Agriculture area
I. Arable land and garden	44.957		100	8.70
A. Grains	5.201	100	11.57	1.01
Maize	2.756	52.99	6.13	0.53
Wheat	808	15.54	1.80	0.16
Rye	194	3,73	0,43	0.04
Barley	868	16,68	1,93	0.17
B. Vegetables	221	4.25	0.49	0.04
Potato	354	6.81	0.79	0.07
Beans	173	100	2.61	0.03
Other vegetables	17.988	100	40.01	3.48
V. Cattle forage crops	10.190	100	22.67	1.97
Alfalfa	675	56.65	1.50	0.13
Other Cattle forage crops	7.123	6.75	15.84	1.38
C. Fallow land	7.959	39.60	17.70	1.54
II. Orchards	3.250	100	7.23	0.63
III. Meadows	4.709	40.83	10.47	0.91
IV. Grasslands	13.636	59.17	30.33	2.64
TOTAL	16.201	100		3.14
	128.781	100		24.94
	323.876	100		62.71
	2.650	100		0.51
	516.465	100		100

Source: Statistical Office of Montenegro (2012), Agricultural Census of 2007, the calculation of data by authors

O1 L2P3 uniformly grazing direction of agricultural land use with higher participation of meadows and participation plowed land in 1973, which in 2007 was transformed into L2P4 predominantly pasture direction use agricultural land with higher participation meadow. Such a high percentage of meadows and pastures in are overall structure of agricultural land, indicating to hilly and mountainous character of Montenegro.

Structure use land according to certain categories is of particular importance because it is the result of development and intensity of agriculture, and also expresses the degree depending territorial conditions for the development of certain types of agricultural production (Todorović, 1985). The structure of arable land in 2007, there was on grain 11.57 %, industrial crops 2.61%, vegetables 40.01%, fodder forage 17.70% and uncultivated arable land, fallow and hotbeds 30.33%. Arable land is the most important category

of land. However, the statistical data for 2007 indicates that the arable area spontaneously abandoned, or planning translated into other categories of land, or alienating for non-agricultural purposes. Adverse changes in the structure of the use of arable land are contained in the fact that in 2007 was 13.636 ha of uncultivated arable land with fallow and nurseries (of which the nurseries encompassed an area of 4 hectares), or 30.33%. This much surface untreated arable land (13.632 ha) was due primarily to, the advent of old households in the especially in the rural areas of Montenegro that are not able to handle their possessions to. To get a proper picture of the structure of arable land here we are apply the method of alternating splitter Systems 6/6 and established the next direction of arable land use:

P02N2Ž1Sk1 direction with equal participation of vegetable crops, uncultivated land and a share granary and forage crops1."This is obtained direction use arable land is a typical reflection of the underdeveloped agriculture, where arable land is not used rationally "(Todorović, 1985).

Plant production in the Montenegro emerges as the ultimate effect already outlined the structure exploiting of agricultural lands, ways and directions of land utilization in it. Judging by the size of the cultivated area, production volume, as well as according other parameters, plant production in the Montenegro, mainly used for meeting need households. A smaller area for is market. Here are the following, which it confirmed.

Arable land is used mostly for sowing grains. According to data Kalezić (1976) in the structure total commodity production in the 1967 of cereals share of 1.1 %. It follows from this that are of cereals for agricultural producers in 1967 in the Montenegro, was the least attractive market product. As per territory size where are grows maize is the dominant cereal. In fact, according to the Institute of Agricultural Economics (1968) the maximum number of agricultural holdings in 1967 the engaged in manufacturing maize 59.3 %, and the average sowing area in ha by agricultural holdings was 0.27 ha. According to the data of the Statistical Office of Montenegro in 2007, corn is represented on total area of 2.756 hectares or 52.99 % of the total area under cereals. Maize is one of the most important crops and universal significance. From corn starch or mixtures with other types of flour prepared, a variety of breads, rolls and polenta, and is used as a vegetable (condiment and salad). Mostly they widespread, the two types of maize: white and yellow. Maize is suitable for human consumption because of the relatively few calories it contains, but there are plenty of starch, fiber and other beneficial substances. So has high energy value and good effects on human health. Maize the used in livestock feeding and is the main roughage in the diet of cattle in the form of flour or silage. Significant resources and are industrial processing. However are total area under maize fields and gardens in 2007, share of 6.13 %, or 0.53 % of the total agricultural area?

Production maize in the Montenegro 2007 the low and amounted to 6.937 tons and the average yield per hectare was 2.5 tones. According to the data Kalezić (1976) the average an annual production of maize derived from the Five-year period 1969/73 year was in Montenegro, 4.232 tones. Thus, the areas sown with maize in the Montenegro, as well as production and average yields are small and primarily determined by the amount of rainfall during the growing season, especially government deficit in July and August, when the maize is in the process of maturing grain. Stable yields of maize in the Montenegro, can provide irrigation of arable land. However if you we bear in mind the temporal and spatial distribution of water suitable for irrigation is insufficient and that they are mainly used for irrigation of vegetable crops, then so insignificant amounts of available water remaining irrigation area under maize.

[1] Variables and their symbols used in the formula: Po-Vegetables, Sk- Fodder crops, Ž-Cereals, No- fallow arable land.

By prevalence wheat is other plant crops. In fact, according to the Institute of Agricultural Economics (1968) the total number of agricultural holdings in 1967dealing with production of wheat was 21.7 % and the average area in hectares per agricultural holdings was is 0.36 ha. According to the data of the Statistical Office of Montenegro in 2007, wheat is grown on a total area of 808 hectares or 15.54 % of the total area under cereals. Wheat is not only the most important agricultural crop, but also the most important agricultural product, and generally the most important product of human activity. A utility value is technological raw material for the production of flour, bread, biscuits, pasta. Despite are use of high-yielding varieties and to a large extent, the modern agricultural practices, to a large extent determined by the agro-climatic conditions. Production wheat in the region 2007 the low and amounted to 1.969 tons, and the average yield was 2.4 tons. According to the data Kalezić (1976), the average
an annual production of wheat and rye derived from five-year period 1969/73 year was in Montenegro 2.612 tons. Therefore, the cultivation of wheat in the Montenegro are minimal, since, on great expense related to its production and labor shortages, and because of the simple reason that it is cheaper to buy bread in the shops than "look on wheat field and worry about what will be its genus despite the effort and expense "(Jaćimović,1971). The total areas of arable land are gardens, wheat share of 1.80 % respectively 0.16 % of the total agricultural area. Wheat bran in the Montenegro, are used in animal husbandry as a concentrated food. Wheat can also be used for the production of starch, with a by-product the adhesive and spirit. In extensive livestock straw, chaff and in particular, been are used for nutrition livestock. Straw used as bedding in livestock, but straw from wheat, can be used for making paper, pulp, construction panels. Wheat is of great importance in other industries especially in milling industry, biscuits, cakes, bread, pastries, beer industry...

The structure of cereals similar changes occurred with rye and barley. Thus, the harvested area rye in the Montenegro in 2007 amounted to 194 ha or 3.73 %. The total area of arable land and gardens, rye participates with 0.43 %, and 0.04 % of the total agricultural area. According to the Institute of Agricultural Economics (1968) the total number of agricultural holdings in 1967dealing with production of rye was 14.4 % and the average area in hectares per agricultural holdings was is 0.13 ha. Rye is an important bread cereal. Bread produced from rye flour is a delicious, nutritious and digestible and long stays fresh. Rye bread is especially recommended for diabetics. It contains a large amount of protein and vitamins A, B, E. In the region of the rye, used as cattle feed in the form of bran, flour and grain. It can be used as green animal feed, or as a pure stand or in mixtures with vetch, peas, rapeseed and other crops. Rye straw, used as bedding for livestock, and for roofing, for making hats, baskets ... Unfortunately in the Montenegro, rye is grown for its own needs and on less fertile soil. In accordance with the circumstances, the production of rye in the Montenegro in 2007 amounted to 214 tons, and the average yields were about 1.1 t / ha. Higher planted with area and production would cause the industrial application of this cereal because it is known that the straw of rye used to make: acetic acid, cellulose, coal, paper, and rye grain in the alcohol industry, starch, vinegar.

Barley is grown on 868 ha or 16.68 % of the total area under cereals in the Montenegro in 2007. The total area of arable land and gardens barley participates with 1.93 % respectively with 0.17 % of the total agricultural area. According to the Institute of Agricultural Economics (1968) the total number of agricultural holdings in 1967which was producing barley was 23.4 % and the average area in hectares per agricultural holdings was is 0.49 ha. This vegetable crops, tolerates cold, drought, and even moisture and thrives where other crops

could be difficult to adjust. Despite this, the area under cereals is not great, because it is grown for its own purposes. Production of barley in the Montenegro 2007 amounted to 1.058 tons, and the average yield per acre was 1.2 tons. According to the data Kalezić (1976), the average an annual production of wheat and barley derived from five-year period 1969/73 year was in Montenegro 2.272 tons. Barley is rarely used in the present context of use as human food. Generally has greater application in livestock, respectively for nutrition livestock, used barley straw. Although barley are straw used for litter, which is important in the production of manure. The current barley varieties with high yield potential, if used properly, intensive cultivation technology can achieve higher yields of wheat. Barley is the main raw material in the production of beer, used in bakery, confectionery (sweets), textile and pharmaceutical industry, in the production of malt milk, alcohol, acetic acid, yeast ... From decupled barley obtained semolina, cereal, coffee substitutes…

Oats are grown on 221 hectares or 4.25% of the total surface under cereals in Montenegro in 2007. The total area of arable land and gardens barley participate with 0.49% respectively with 0.04% of the total agricultural area. According to the Institute of Agricultural Economics (1968) the total number of agricultural holdings in 1967which was producing barley was 12.1 % and the average area in hectares per agricultural holdings was is 0.35 ha. Oats is a very important part in the diet food patients. Used for treatment of anemia, of different inflammation of the digestive organs, diseases of the kidneys, then rheumatic problems at all... Production of oats in Montenegro in 2007 amounted to 240 tons, and the average yield per acre was 1.1 tons. According to the data Kalezić (1976), the average an annual production of wheat and barley derived from five-year period 1969/73 year was in Montenegro 966 tons.

Other cereals (millet, buckwheat ...) are harbored in Montenegro on an area of 354 ha or 6.81% of the total area under cereals in Montenegro in 2007. The total area of arable land and gardens barley participate with 0.79 % respectively with 0.07 % of the total agricultural area. Millet is a grained-starch plant that is used for human and animal consumption. Grain millet can be used in the brewing industry and alcohol. Unpeeled serves as an excellent animal feed are especially for pigs and poultry. There are no exact data on area and production under millet in Montenegro. According Ćetković (2012), the average world grain yield is about 776 kg / ha, which is a very low yield, due to the potential yield of millet. In Montenegro, could be grown in much larger areas, especially in post-sowing with irrigation. Millet is until recently the have been unduly neglected cereal. However, thanks to the new trends in nutrition, again the returned to our dining room. Otherwise, millet contains magnesium and iron, and is therefore recommended for people suffering from anemia. Mineral composition of millet positive impact on the nervous system and its basic properties help arthritis. Buckwheat is a typical mountain plant short growing season. It grows on sandy and wet areas at an altitude of 1 000 m. Do not tolerate frequent rain and high humidity. Buckwheat has exceptional healing properties: it helps the blood vessels, improves memory and helps with rheumatism, diabetes, reduces high blood pressure and rejuvenates the blood vessels, reducing the weight. According to the data Ćetković (2012) the total sown area under buckwheat in Montenegro in 2004 was 8.8 ha, the total yield of 9,900 kg, and the yield in kg / ha 1.125.

Industrial crops are grown on 173 hectares of the total area under cereals in Montenegro in 2007. The total area of arable land and gardens barley participate with 2.61 % respectively with 0.073% of the total agricultural area. According to the Institute of Agricultural Economics (1968) the total number of agricultural holdings in 1967 which was producing tobacco was 11.3 % and the average area in hectares per agricultural holdings was is 0.13 ha. Production tobacco in Montenegro in 2007 amounted to 358 tons, and the average

yield per hectare of 2.3 tones and a total planted area of 159 ha.

Vegetable farming represents one of the most intensive fields of plant production in the Montenegro, since, on our work and realized production. Vegetables are an important food product that provides vitamins, minerals, simple and complex carbohydrates, dietary fiber, antioxidants, organic acids and various Physiochemical compounds. Raw vegetables contain a lot of water and all the necessary enzymes. The energy value of vegetables is low, except for starch vegetables (leguminous vegetables, potatoes) whose energy value is much higher. The total area under vegetable crops in 2007 amounted to 17.988 hectares or 40.01 % of the total arable, or 3.48 % of the total agricultural area. Because nutrients that contain medicinal properties that it has are potatoes used for human consumption, and domestic animals. It is used as a cooked, baked, fried or as a puree. As an addition a variety of dishes of vegetables or meat, potatoes are almost indispensable ingredients. Healthiest is baked potatoes. Coverings of potatoes are an old folk remedy for headaches or high temperature, herpes, open sores, cracked skin, sores, pimples and other skin diseases. Potatoes are the official statistics dominant vegetable crop. Under this vegetable crop in 2007 there were 10.190 hectares or 56.65 % compared to the total sown area under vegetable crops, or 22.67 % of total arable or 1.97 % of total agricultural area. The main problem is even greater acreage under potato is the fact that despite the use of quality planting materials (Dutch seed potatoes and homemade potato), unfavorable rainfall in the second half of the growing season. According to the data Kalezić (1976), the average one-year potato production derived from the five-year period 1969/73 year was in Montenegro 8.652 tons. The total production of potatoes in 2007 was 106.909 tons and average yield of potatoes per hectare was 10.5 t / ha. Surveys made with potato producers indicate that the yield is much higher than the official statistics (12 - 14 t / ha). The yield of early potato varieties per unit area is much lower, as he put on the market before the biological maturity (young potatoes). The production of early varieties of potatoes for example in the valley of Lim and: Navotina, Lužac, Dapsića, Zagorje, Bogaje....

According to the Institute of Agricultural Economics (1968) the total number of agricultural holdings in 1967, which specializes in potatoes, was 91.16 % and the average area in hectares per agricultural household was 0.07 ha. According to the data Kalezić (1976) in the structure of commodity production in 1967 vegetables is participated with 12.0 %.

Beans are unjustly neglected in the diet. Of Proverbs, commoner as beans, indicates the attitude towards these very healing and nourishing vegetables. Knowledge about its effect on health could pay him an important place in the diet of the population in the Montenegro. Plain beans are strong funding for the lowering of cholesterol; regulate blood sugar, diabetes, protecting the stomach and gall...

Beans in the Montenegro grow best on loose and fertile soil, particularly at the upper alluvial plains. Traditionally sown as a sub-crop corn, but the penetration of sunlight hinders its development. It has caused the planting of beans in the "pure culture." The total area under beans in the Montenegro in 2007 amounted to 675 ha or 3.75 % of the total area under vegetable crops, or 1.50 % of the total arable or 0.13 % of the total agricultural area. The total production of beans in 2007 was 1,067 tons, and the average yield of beans per unit area was 1.2 t / ha. According to the data Kalezić (1976) an annual average production of beans derived from the five-year period 1969/73 year was in Montenegro 958 tons. Every day more and more new varieties and hybrids, which not only provide higher yields and better quality, but have a greater resistance to the most prevalent pathogens (disease, pests, weeds). There is an, for now, the biggest problem, as no or less chemicals, get the products without their remains, especially pesticides. Vegetable plants thanks to the great botanical diversity and different growing conditions meet the

many needs of the human diet in the Montenegro. They contain necessary vitamins, useful and accessible minerals, and precious for the proper metabolism of the human organism. Montenegro has favorable climatic conditions, very well elaborated technical solutions, high yielding varieties and hybrids, so, with a good set of economic relations in the reproduction chain, completely unable to provide agricultural products, not only the markets Montenegro but could become and a significant exporter (Maksimović, 2007).

Other vegetables (onions and garlic, tomatoes, peppers, melons and watermelons, peas, cabbage and kale ...) are very widespread in the Montenegro. Areas planted with to these kinds of vegetables amounted to 1.723 hectares or 39.60 % of the total area under vegetable crops, or 15.84 % of the total arable or 1.38 % of the total agricultural area. The introduction of new varieties, improved agricultural technology and organization of production, planted area under "other vegetables" may be increased because it has favorable natural and ecological conditions in the Montenegro. Total yield and average yield per hectare in 2007 was for: black port 2.793 according 4.9; garlic 523 according 2.7; tomato 22.084 according 22.6; pepper 17.275 according 21.5, melons and watermelons 39.672 to 27.9; peas 258 according 1.9; cabbage 26.297 according 14.2. According to the data Kalezić (1976) an annual average production of "other vegetables" is derived from the five-year period 1969/73 year was in Montenegro, 5.520 tons. Statistical Office of Montenegro does not provide data on the production of "other vegetables" (cucumber, carrot, spinach…).

Table 3. Production and crop yields and forage crops in Montenegro 2007.

Field crops and forage crops	Total yield in tons	Yield in tons / ha
Maize	6.937	2.5
Wheat	1.969	2.4
Rye	214	1.1
Barley	868	1.2
Oats	240	1,1
Industrial Crops	358	2.3
Potato	106.909	10.5
Beans	1.066	1.2
Black onion	2.793	4.9
Garlic	523	2.7
Tomato	22.084	22.6
Pepper	17.275	21.5
Melons and Watermelons	39.672	27.9
Peas	258	1.9
Cabbage and Kale	26.297	14.2
Alfalfa	11.474	3.5
Clover	2.800	3.2
Fodder beet	1.946	8.3
Maize for fodder	1.417	12.5
The yields of the meadows	184.290	1.4
The yields from pasture	73.685	0.2

Source: Statistical Office of Montenegro (2012), Agricultural Census of 2007, the calculation of data by authors.

The importance of vegetables in the diet, has long been underestimated, and in recent times, when it was discovered the role of vitamins and mineral salts, the importance of vegetables in the diet is increased. Today, it can be argued that the fundamental importance of vegetables in the human diet, as it contains vital and important and irreplaceable biological complex substances that the organism not

provides for other food other nutritional support. Garlic, for example, be used against asthma, diseases of the respiratory composition, arteriosclerosis and high blood pressure, onion is used in the cold. Tomato works against allergies, anemia, arthritis, asthma, heart disease and vascular disease, eczema, sore muscles and ligaments, strengthens the immune system and protects the body from infections and colds. Peppers is useful for preserving vision and against different types of infections, feeds the nervous system and improves immunity, the appetite, stimulate digestion, positive effect on the kidneys and intestines. Melon extraordinary is effect against wrinkles on the face. Watermelon is very beneficial effect on the body when it comes to: acne, dental disease, heart disease and blood vessels, headaches, infertility, burns. According Lazić (2011) in modern medicine it is considered, that some vegetables can be used as therapeutic resources and directly, but aside from them, the active ingredients of which are made with certain medicines. Governing the for organic vegetable crops in the Montenegro, we should start from the fact that it is an intensive agricultural area in which conventional, especially in organic production to establish a high income, provided that the various and continuous (year-round) and the green market vegetables intended to be a special area or part of the food stalls or hypermarkets. High effect is achieved commodity production of organic vegetables processing, provided that the products are intended for a known buyer. Both modes of production are closely linked to organic production in protected environments, to produce quality seedlings or vegetables that provide continuity year-round consumption. Bio-fireplace principles permeate all the ways of organic vegetable production, as this production gives the necessary environmental conditions similar to those in which the entire natural world living in harmony, as one only true measure achieves the goal: the production of safe food, protection of arable land, plants, animals, nature and the environment. Then man becomes part of the natural, sustainable production systems important for its health and financial benefits. Responsibility organic producers is large, because the production not only law (and regulations), regulated and controlled, but the right to use the logo of organic products means and a high ethical consciousness manufacturer, which has positive effects on the environment and gives the consumer confidence in food safety and quality. This is especially important for vegetables with fruits should be eaten as fresh and of great importance in the diet of children as a precaution and prevention of many diseases that are now appearing (Lazić, 2011).

The most important in the diet of cattle in the Montenegro, in addition to changes in the way of growing there is fodder from natural grassland and arable land under forage crops. Moreover, as fodder for cattle feeding, much less sheep used the maize for fodder. In 2007 the area for production forage crops amounted to 7.959 hectares or 17.70 % of the total area under arable land, respectively 1.54 % of the total agricultural area. Sown area of alfalfa amounted to 3.250 hectares or 40.83 % of total area under livestock fodder or 7.23 % compared to the arable land area, or 0.63% of total agricultural area. Total production under alfalfa in 2007 amounted to 11.470 tons, and the average yield was 3.5 t / ha. In the same period, the area under other livestock forage crops (clover, vetch, fodder beet...) encompassed an area of 4.709 hectares or 59.17 % of total area under livestock fodder or 10.47 % compared on arable, or 0.19 % of total agricultural area. Basic reason insufficiently of sown area under livestock forage crops are poor agro-techniques, improper selection and variety of protective measures. Areas under natural grasslands in the Montenegro in 2007, including area 452.657 ha. Namely area of meadows with 128.781 ha respectively 323.876 ha of pasture, part of the total agricultural area, i.e. respectively 24.94 % meadows and pastures with 62.71 %. Total production of tenders in the Montenegro 2007 the meadow was at 184.290 tones and average yield of 1.4 tons per hectare. On

average pasture yield was 0.2 tons per hectare and total production of 73.685 tons. According to the data Kalezić (1976) in the structure of commodity production in 1967 fodder accounts for 2.4%. According to the Institute of Agricultural Economics (1968) the total number of agricultural holdings in 1967, which specializes in meadow hay, was 85,8 % and the average area in hectares per agricultural household was 1.96 ha. Therefore, the natural lawns give small yields, as in most of the areas are not applied cultural practices such as tillage, fertilization, control of weeds... In addition, on oscillation of the total biomass production in the period, influenced by climatic conditions.

"On production and quality of feed on the natural environment greatly affects the way the use of food" (Popović, 1986). For example, late mowing the lawn and use pasture with no system power supplies allow undisturbed multiplication weed plants and impairs the quality of the obtained biomass. "Increasing yield of melioration natural grasslands, relieve the substantial portion of arable land for the production of another"(Rajović,2010). The decline sheep and goat breeding in the Montenegro, more natural grassland win, a variety of shrubs and weed communities. Weed vegetation occurs in many types of agricultural land along the road. Predstavnici su: nettle (Urtica dioica), dandelion (Taharacum officinale), spurge (Euphorbia cuparissias), wild oats (Avena tatua), Atlantic bonito (Cirsium arvense), buttercup (Ranunculus pepens), bur (Lappa majok), black mallow (Malva silvestris). Combination of mechanical, chemical and biological methods, may be suppressed weeds only in a rotation crop rotation, however, is already in the next, he reappeared.

In 2007, the area that covered the pond fishponds and reeds was 2.650 ha or 0.51% of the total agricultural area.

Fruit growing and viticulture are is a branch of agriculture that studies the properties of various fruit trees, respectively vineyard environmental factors that influence their successful growth, propagation methods, and application of various cropping and management practices in order to achieve the highest possible yield. The results are now achieved in fruit and vineyard production in the Montenegro, are important, but they are still well below possibilities. It is known that the Montenegro has the most rational terms that can be used just for fruit production. To the Montenegro, it has more people interested in growing fruit, it is necessary to take the necessary organizational measures and work to train personnel for this agricultural activity. In recent years, a growing interest in fruit production, showing farms, cooperatives and associations of agricultural producers. Young people today, who want to deal with fruit, often ignorantly make big mistakes, and do not know where to turn for help (Krajinović, 2008). Certainly, you need an organized approach to the improvement of fruit production, and it will have a special place Biotechnical Institute in Podgorica. In order to develop a love of fruit and thought and producers focused their desire toward this activity must be talking about the importance of dealing with fruit, both from a health point of view, and the cultural and material. Fruit production has advanced so much that the people who want to deal with this branch requires extensive knowledge. Modern intensive crops, requiring not only a great investment, but also the knowledge are technological process of production. In manufacturing, introducing high quality and productive varieties, which require are proper care and use of agricultural management practices. They need to know the requirements of individual varieties of agro-ecological conditions, vegetative and generative propagation, in the shape of the crown, irrigation, mineral nutrition, grafting, regeneration, grafting, selection pollinators of fruit crops from pests and disease-causing agents.

Table 4. Number of fertile of trees, production and yield of some types of fruit in Montenegro, 2007.

Type of fruit	*Number of fertile of trees*	*Total yield (tons)*	*The yields tree (kg)*
Apples	405.628	5.374	13.2
Pears	194.265	2.105	10.8
Plums	1.099.202	6.076	5.5
Cherries	112.285	1.779	15.8
Peaches	248.076	3.721	15.0
Nuts	49.973	658	13.2
Olives	417.470	1.211	2.9
Figs	197.658	4.121	20.8
Oranges and tangerines	282.025	5.329	18.6
Vineyards grape production	*Number of fertile of trees*	*Total yield (tons)*	*The yields vine (kg)*
Vineyards	16.959.900	35.402	2.1
On a U.S. ground	11.446.988	25.396	2.2
Domestic vine	5.358.812	9.494	1.8

Source: Statistical Office of Montenegro (2012), Agricultural Census of 2007, the calculation of data by authors.

So today, to effectively address growing fruit, essential to are broader theoretical knowledge and practical experience. Therefore, efforts should been made to rectify the mistakes of orchards or in the application of agricultural management practices, as the manufacturer of the fruit, to avoid disappointment. Therefore, the task of scientific mining in the field of agriculture, not only in the region but also beyond, to show the importance of knowing all the factors of fruit production in the Montenegro to take risks in fruit growing to a minimum and manufacturers were motivated for this production (Krajinović,2008).

Plums are the number of trees and total production of fruit dominant culture. Number of fruit trees in 2007 was 1.099.202. Such a large number of fruit trees, plums, determined the creation of orchards on the outskirts of the mountain, the replacement of local varieties (cultivar), other domestic (Čačak Beauty, Čačak healing) and foreign varieties (Stanley). The total production and yield per tree in the first place, are determined by the agro-climatic conditions. The average yield in 2007 amounted to 5.5 kg per tree, native, and total production of 6.076 tons. According to data Kalezić (1976) in the structure of commodity production in 1967 fruit and grapes accounted for 8.2 %. From this it follows that the fruits of agricultural producers in 1967 in the Montenegro was the amounting attractive market product, it is the plum is produced in 27.4 % of the agricultural holdings in the production of fruit."Tendency to higher yields and production been generated support required processing capacity and better organized plum buying, choice and selection of better varieties, modern treatment and protection from diseases and pests. This would also encourage faster reconstruction of plum orchards "(Grčić and Grčić,2002). Total number of apple trees in 2007 was 405.628. In this period there has been a renewal of seedlings, but came to the fore and disease in apples: "Erwinia amylovora", "Venturia inaequalis", "Podosphaera leucotricha", "Monilia fructigen", "Nectria galligena", "Phytophthora cactoru". Total production in 2007 was 5.374 tons. The general level of apple production in the Montenegro is characterized by the application of a modest cultural practices varied assortment, resulting in the yield per tree, which in 2007 amounted to 13.2 kg per tree native. Assortment apple is more diverse than in other fruits. Noble varieties - Delicious and Jonathan are somewhat suppressed by the acidic and sweet sour varieties I dared. Are grown and indigenous

varieties like: pastry, "budimska", "krstovača", "petrovača"... According to data Kalezić (1976) in the structure of commodity production in the apple producing in 1967 to 41.7% of the agricultural holdings in the average fruit production. Pear by the number of trees is the third in the region. In 2005, the number of pear trees was 67.070. Pear production in 2005 amounted to 583 tons, and the average yield of 8.7 kg per tree native. According to data Kalezić (1976) in the structure of commodity production in 1967 pear produced to 16.0 % of the agricultural holdings in the average fruit production. Statistical Office of Montenegro (2012) indicating also to other, fruits, fruit production and average yield. Thus, in 2007 the total number of fruit-bearing cherries was 112.285, the total yield of 1.779 tons and an average yield of 15.8 kg per trunk. Number of fertile peach trees of was 248.076, the total yield of 3.721 tons, the average yield of 15.0 kg per trunk. Followed walnuts with are total of 49.973 trees, the total yield of 658 tons and an average yield of 13.2 kg per tree. Total production of olives in 2007 in Montenegro amounted to 1.211 tons, the average yield was about 2.9 kg per tree and number of trees was 417.470. Number of fertile of trees fig trees was 197.658, an average yield of 4.121 tons and an average yield of 20.8 kg per tree. The total production of oranges and tangerines in 2007 in Montenegro amounted to 5.239 tons, the average yield was about 18.6 kg per tree, and the number of fruit of trees was 282.025. According to the data of the Statistical Office of Montenegro (2012) in 2007 in Montenegro, there is the next offering from the domestic processing of fruits and dried fruits: 7.7 tons of prunes, 623 tons of dry figs and 32 tons of other dry fruits. Followed by jam from plum 259 tons and the other jam 13 tons. Domestic processing of olive oil yield was 1.872 hl. Total production of brandy in the domestic processing of was 32.194 hl, of which the a soft plum brandy accounted for 1.104 hl angry plum brandy 2.193 hl, brandy from other fruits 355 hl grape brandy and 25.542 hl. Since ancient times, the fruits had a measurable role in the human diet, and recently became an important factor in the prevention of many diseases. Fruit due to the high water content in it quenches thirst and helps prevent obesity, anemia, allergies, fatigue, colds, heart disease and vascular disease, infertility, impotence, diabetes, against memory loss, prostate problems.

Anyone geographical area has a specific climate and soil conditions for agriculture. Agricultural products of the area carry a part of its climate and soil characteristics. Viticulture Montenegro has a number of features in their products: grapes and wine, which are have become recognized beyond the borders of Montenegro. In them can be recognized Mediterranean splendor of the sun, brightly heaven and fasting Montenegrin country. Growing vines last year attracted more and more are interested to opt for the independent production of grapes for consumption or processing. According to data from the Statistical Office of Montenegro (2012) the total number of vines vineyards in Montenegro in 2007 amounted to 16.959.900. In the same year was the total yield of 35.402, or 2.1 kg per vine. On a U.S. ground total number of trees vines is 11.446.988, with a total yield of 25,396 and an average yield of 2.2 kg per vine. The total number of domestic branches of trees in 2007 in Montenegro amounted to 5.358.812 with a total yield of 9.494 and an average yield of 1.8 kg per vine. The total production of wine in Montenegro in 2007 amounted to 129.912 hl. Area Crmnice, which is located next to Lake Skadar, holds a special place in the Montenegrin wine: it is the cradle of indigenous grape varieties, place a long tradition of producing high quality wines and spirits. Followed by Ćemovsko field not far are from the Podgorica. Large plantation vineyard was planted various kinds of grapes, among which are two local grape varieties, the black "Vranac" and white"Krstač". "Vranac" is a top dry black wine, dark red color with shades of purple, pleasant varietal fruity aroma, full, temperamentally. It contains 12% alcohol. " Krstač" is top white dry wine of controlled origin, exceptional fullness, with 12.5%

alcohol. Brandy is the best ambassador of Montenegrin vineyards. To flavor the famous brandy responsible is an indigenous cultivar Montenegro – "Vranac". Strength of brandy is 50 degrees. It can be drunk as an aperitif, chilled, and Montenegro is preserved custom in the morning, before eating, to drink a small glass of grape brandy (www.montenegro.travel).

Table 5. Domestic processing fruits and grapes in Montenegro, 2007

Dried fruit	Production in tons
Types of fruits	
Plums	77
Figs	623
Other fruit	32
Jam	
From plums	259
Remaining jam	13
Olive	
Processing of olives	Production in hl
Olive oil	1.872
Brandy	
Remaining brandy	Production in hl
Total	32.194
From plums	
Gentle brandy	1.104
Angry brandy	2.193
Brandy other fruits	355
Grape brandy	28.542
Wine	
Total	129.912

Source: Statistical Office of Montenegro (2012), Agricultural Census of 2007, the calculation of data by authors.

Finally, special attention in the Montenegro, attracting fruit species in the forest ecosystem (the total area of forests and forestland in the Montenegro, according to Directorate of Forests of Montenegro (2004) amounted to 734.609 ha, hardly explored. "Wild berries, are a very important natural resources, inexhaustible gene pool, exceptional for two reasons. First, are genetic potential of enormous importance to the objectives of the selection and breeding of cultivated fruit trees? Second, the wild (wild) fruits, fruit bearing most excellent quality and high nutritional value, which is been used for human consumption and for industrial processing "(Mratinić and Kojić,1998). Forest fruit is a real source for health and beauty; it is a real reservoir of vitamins, minerals and folic acid. It contains large amounts of vitamin C, which acts as a powerful antioxidant. Except that having a positive effect in the case of colds, asthma and other diseases, reduce the risk of some cancers. They're great for alleviating different allergies and fatigue, and are recommended for pregnant women.

Conclusion

Our research records, said are in the foreground, several important conclusions:
So we compare the structure of the agricultural land in Montenegro in 1973 and 2004, we applied the method alternating splitter design in Systems 6/6 and determine the next course: O1 L2P3 uniformly grazing direction of agricultural land use with higher participation of meadows and participation plowed land in 1973, which in 2007 was transformed into L2P4

predominantly pasture direction use agricultural land with higher participation meadow. Such a high percentage of meadows and pastures in are overall structure of agricultural land, indicating to hilly and mountainous character of Montenegro.

Average posed by the agricultural holdings in 1960 in the Montenegro was 5.34 ha with only 2.05 hectares of arable land per agricultural holdings that, agricultural holdings are on average possessed with a maximum of 0.74 ha of arable land. The structure of the total value of commodity agricultural holdings in 1967, husbandry accounted for 21.3 %, fruit and grapes with 8.2 %. Compared to the maximum value of market production agricultural holdings by producing vegetables 12.0%, followed by industrial crops 5.6%, forage crops 2.4%, cereals 1.1%.

The average an annual plant production derived from the five-year period 1969/73 ranged in Montenegro in the following correlations: maize 4,232 tons, wheat and 2.612 tons of rye, barley 2.272 tons, oats 966 tons, potato 4.232 tons, beans 958 tons, "other vegetables" 5.520 tons, apples 456 tons, "other fruit" 3,108 tons, grapes 1.768 tones, tobacco 71 tons. According Bulatović and Rajović (2007) finally, conditions for plant production are characterized by fragmentation of holdings, low technical equipment and a significant diversity of natural conditions.

Of the total agricultural land (516.464 hectares) arable land in the Montenegro is widespread in 2007 on 44.957 hectares or 9.70 %. Orchards and vineyards occupy 16.201 ha or 3.14 % of total agricultural land. Under pasture is 323.876 ha, or 62.71 % of total agricultural land, under meadows of 24.94 % or 128.781 ha. Such a high percentage of meadows and pastures in the overall structure of agricultural land, indicating mountainous character of the Montenegro.

Judging by the size of the cultivated area, production volume, as well as according other parameters, plant production in the Montenegro in 2007, mainly used for meeting need households. A smaller area for is market. That would problems mention were resolved in an adequate way, it is necessary to adopt a strategy in agriculture of Montenegro with the proposed policy development that has to be long term.

Responsible role in the development concepts agricultural development, which will be based on the natural and socio-economic potential of Montenegro, should be sure that has geographical sciences, especially agricultural geography which the comprehensive approach needs to integrate research efforts and the results of other scientific disciplines.

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