Some Geographical Aspects of sustainable
development of agriculture with view
on Montenegro: a review

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ABSTRACT

The paper discusses some geographical aspects of sustainable agriculture with a view on Montenegro. Sustainable Development agriculture refers to the creation and maintenance of social and economic development. In order to achieve this it is necessary to provide interaction between environmental, social and economic components of the agricultural system, synchronized in time and space. Each of these interactions has its specific dynamics, requires the involvement of certain resources. Montenegro on path to membership in the EU will have to comply with the requirements and standards of the EU, which will significantly change the situation in the Montenegrin agriculture, it is that sustainable agricultural development involves the restructuring and diversification of existing agricultural production and agricultural households, in order to comply with EU standards, increasing quality and productivity, competitiveness development and training for the occurrence outside (global) market in the EU accession process.

Keywords: Agriculture; Sustainable development; geographical aspects; European Union; Montenegro

1. INTRODUCTION

The issue of development of national economy today, is largely evolved and surpassed theoretical considerations which were in force in the twentieth century. Namely of the former theory of development based on "natural" constraints in realizing high growth rates in long period of time, at the beginning of the last decade of the 20th century shaped by is today in applicable development concept - the concept of sustainable development. The most widely
and at the same time the most acceptable interpretation of sustainable development is that basically of this concept findings preservation of different (economic, environmental and social) capital in order for the present, so and for future generations [1].

Agricultural production is sustainable only if it is profitable and beneficial for families and communities to provide adequate income and quality of life by protecting the environment. In accordance with that, sustainable agriculture involves achieving the following objectives: (1) economic viability - in the system of market economy and the existing conditions evaluation, each production, no matter how desirable in terms of resource conservation and environmental protection in general, must be economically justified. If it is not, is not and cannot be sustained; (2) social sustainability - entails a high quality of life for people living and working on the farm, as well as the community to which they belong and (3) environmental sustainability - sustainable agriculture may be seen as an ecosystem management, and the complex relationships between soil, water, plants, animals, climate and people. All of these factors need to be integrated in the productive system, which is harmless to the environment, people and economic conditions where production is located [2].

Montenegro on path to membership in the EU will have to comply with the requirements and standards of the EU, which will significantly change the situation in the Montenegrin agriculture, it is that sustainable agricultural development involves the restructuring and diversification of existing agricultural production and agricultural households, in order to comply with EU standards, increasing quality and productivity, competitiveness development and training for the occurrence outside (global) market in the EU accession process. Modeled on the EU practice, this process involves in particular the following objectives and approach: the development of specialized, competitive and long-term sustainable agricultural households; creating the conditions for the maintenance of a large number of small and mixed farming households, through modernization and guidance to new products and industries that have better conditions and to generate increased new value (diversification); connectivity and joint participation of local producers for joint production and marketing of quality of local products (development of local brands as well as commercial and competing products); development market infrastructure for agricultural products.

2. RESEARCH METHODOLOGY

The set object of the present work it was possible to realize the combined use of different research methods. The core of the methodological procedure used in this study consists of: a method of analysis, synthesis method, statistical and graphical methods. We used the data from the Internet. By applying the above methods, we managed to derive some general conclusions about the geographic aspects of agricultural development with reference to Montenegro, to which we came during the research [3-6].

3. ANALYSIS AND DISCUSSION

Literature dealing with the definition of the concept of sustainable development is broad and largely inconsistent. The domestic and foreign literature we come across many definitions that are often either too wide or too narrow, that the strategy of sustainable development is seen as part of the social ecology or state policies that this notion gives ideological nature or represent a goal to be sought, but that is economically irrational. Although it has become an
indispensable element of government documents and international agreements, the term sustainable development is interpreted in different ways and its strategy of selectively apply from state to state. Many definitions can be found in state documents, sustainable development give a political character which is sustained economic growth aligned with a better use of natural resources, reducing pollution and preserving biodiversity [7].

The most commonly cited definition, which has managed to avoid these pitfalls, it is the definition given in the publication of "Our Common Future", formed as a report of the World Commission on Environment and Development in 1987. By this definition, sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs [8]. It’s been more than twenty-six years since he began to use the term sustainable development as we know it, but the concept of sustainable development or sustainability was first mentioned in a German forest and is associated with the names of H. C von Carlowitz and L. Hartiga. He talks about the permanent preservation of forest reserves so that it and the next generation can be used [9].

According to Cobb [10], Bowler [11], Kilcher [12] it is necessary to point out the basic principles of sustainable development, which are the guidelines to the sustainable development of agriculture: (1) renewable resources should only be used to the fullest extent permitted by the rate of their recovery; (2) the sources of raw materials which threatens destruction may not be used in agriculture only if it is possible to and from the material and from a functional standpoint replacement of raw materials that can be renewed if the use of the same guarantees higher productivity; (3) environmental pollution should not exceed the capacity of the degradation of harmful substances that may offer major environmental media - water, air and soil and(4) there must be a time equivalence between the time of starting to feed and soil damage from both natural weather recovery process ground on the other side.

Modern agriculture at the beginning of the twenty-first century, according to Kovačević [13] is characterized by a number of the unknowns regarding the direction of future development. At the end of the second and beginning of the third millennium there are new views and new philosophy for the future development of agriculture. Based on the current trends in agriculture, many authors have observed and predicted number of changes that have taken place up to the present day [14-21].

Kovačević and Milić [22] with the right point out that depending on the starting point: ecological, economic, sociological nature has different interpretations of sustainable agriculture. Thus, the ecological starting points mostly related and were related to the provision of non-renewable resources and the conservation of biological diversity. According to Lješević [23] research methodology environmental components of sustainable development implies, first check the current agro-ecological zoning of the territory. In this regard, it is important to examine the consequences of the current method of cultivation leaves the environment. The biggest change is exposed to agricultural land, which due to inadequate exploitation gets degraded and exposed erosion. Therefore, it is necessary to study the intensity of soil erosion in the function processing method, and the properties of the terrain (slope, soil characteristics, rainfall, temperature, water regime of the territory, population density…). Inadequate methods of processing can lead to the activation of landslides, so the feasibility study of potential landslides also necessary. Inadequate method of cultivation (especially the excessive use of agrochemical substances) can lead to pollution of land, water and air, which is why the body of a method that examines the impact of the current modes of cultivation necessary to include the chemical, physical, physic-chemical and biological methods of research. So, according to Wilfried and Gaum [24] when it comes to the environmental dimension of the natural resources of soil, water and air is used to prevent the long-term negative impact on them.
This specifically means that the fertilizer, pesticides and herbicides used in the minimum extent necessary so as not to pollute the surrounding soil and water. Such relationships should protect the natural resources that sustain life and genetic potential of plant and animal culture. Lješević and Markićević [25] emphasize that the analysis of the economic implications of sustainable agriculture can be conducted in the light of theory development thresholds and cost analysis and cost-benefit analysis. In this sense, the lower threshold of development can be considered as all investments are made in a given space, but do not exceed the predetermined threshold of profitability. The threshold limit development in the first place considered everything that leads unfavorable environmental outcome, i.e. the threshold limit of development are considered, and all those investments that exceed the threshold of profitability or lack of justification increase in get the new way of doing business. As well as the cost-benefit analysis, which involves the development of balance where it is on one side of the data structure costs (losses and expenses), and the other structures obtained (yield). According to Wilfried and Gaum [24] employed in agriculture do not receive their income only producing healthy nutritional support, their further processing and placing on the market, but also the inclusion of other opportunities for profit in their work, such as the tourism sector, the production of raw materials that can be used and energy from biomass. In addition, there are other options to get the fees from the state that promote the protection of nature and environment. However, the opposite of the environmental and economic interests objectively exist.

![Figure 1. "Magic triangle" of sustainable agriculture [26].](image)

The satisfaction economic interests related to the use of natural materials, which reflects the fulfillment of ecological function of the environment. In a series of cases shows that nature is able to maintain itself optimal biological conditions of life. Society takes the nature of raw materials and energy, processing them into useful products and at the same time in her returns bin. In this sense, the problem arises of defining the optimal ratio of environmental and economic interests. As criteria for evaluating the environmental consequences are taken: the level of deviation from the normal functioning of the ecosystem, the character of ecological damage to the natural environment, the ability to influence changes in the natural environment on the health of humans and other creatures. Economic consequences can be defined on the basis of: costs for prevention of the harmful effects on the environment;
effectiveness of nature protection measures; economic losses due to adverse effects on the environment [27]. Sustainable development as a paradigm that underlies modern economic activity, including the agriculture, must be equal to the environmental and economic aspects of sustainability examines the social component of agricultural development. Lješević and Markićević [25] emphasize that in economic activity, or spread in space management (based on the principles of sustainability) man may be viewed as a control person or entity management; man of the consumer; man as an indicator of standard of having to use protection. Observed in the context of the possibilities of sustainable agriculture first paragraph of this three-type division can represent man as a farmer in the widest sense (of planners, managers, direct agricultural producers, innovators ...), simply put the workforce, which is the most important socio-geographical potential of sustainable agriculture.

The second paragraph of this division is subject to consideration of the entire economic aspects of sustainable development and applies just the new market economy model that the center raises the needs of the market (consumers), while the third position is the best indicator of the reversible relation agriculture - a landscape in which it takes place, as the front man asking questions: whether resources are maximally utilized space from the standpoint of profitability of production and that the pressure exerted on the landscape in the manufacturing process makes it possible self-regulatory regions. Analysis of the social component of sustainable agriculture includes two sets of indicators: (1) Objective - demographic indicators related to are agricultural population and labor force in agriculture, and (2) subjective - is the subject of a behavioral approach.

In social terms sustainable agriculture provides workplace in agriculture, and when it comes to ethics, provides protection of animals and that the animals raised food properly and not subjected to torture. Consumer protection represents a new political paradigm. Historic compromise that was made after the Second World War, after which it was necessary to provide sufficient food for employees in the industry and the needs of the state, he served his time. Changing social structure of this compromise is now itself being questioned. There is growing skepticism towards permanent subsidizing certain products and independent of their quality and the consequences caused by their production. This changes the formation of a new social milieu that sets and other more the qualitative requirements” [24].

The opposite of the environmental and economic interests objectively exist. Meeting economic interests related to the use of natural materials, which reflects the fulfillment of ecological function of the environment. In a series of cases shows that nature is able to maintain itself optimal biological conditions of life. Society takes the nature of raw materials and energy, processing them into useful products and at the same time in her returns bin. In this sense, the problem arises of defining the optimal ratio of environmental and economic interests. As criteria for evaluating the environmental consequences are taken: the level of deviation from the normal functioning of the ecosystem, the character of ecological damage to the natural environment, the ability to influence changes in the natural environment on the health of humans and other creatures. Economic consequences can be defined on the basis of: costs for prevention of the harmful effects on the environment; effectiveness of nature protection measures; economic losses due to adverse effects on the environment.

The aim of the Common Agricultural Policy - CAP European Union is to support farmers' incomes while also encouraging the raising of the quality of production and seeking new development opportunities. Therefore, the EU seeks to enable producers of all kinds of food, including grains, meat, dairy products, fruits, vegetables or wine, to produce sufficient quantities of safe, high quality food for European consumers to make a full contribution to varied economic development in rural areas and respect the very high standards of environmental protection, as well as standard with regard to safety and health of animals.
The priorities of the Common Agricultural Policy are: ensuring product quality and safety; environment and animals; raising the competitiveness of EU farmers without disrupting trade at the global level; preservation of rural communities and strengthening their internal dynamics and sustainability. The European Commission presented a set of draft legislation that aims to make the CAP more effective policy for a competitive and sustainable agricultural economy and rural living areas. The Commission proposes to develop a coherent policy framework of six key priorities: encouraging innovation; strengthening the competitiveness of farmers; risk management; encourage the efficient use of resources; ecosystem; promotion of social inclusion [28].

Agriculture plays an important role in the economic and social life in Montenegro. However, according to Šarović [29] in Montenegro under the influence of industrialization and urbanization proceeded rapidly process deagrarization and de rural shrinking share of the agricultural population in the total population and the population that still lives in the countryside. The process went very quickly, much faster than in the more developed parts of the world. Agricultural population in the total population, for a few decades, declined several times - from about 75% immediately after the Second World War, to around 6%, according to the latest estimates in most of the municipalities today. In a short period of time (even abnormally short for this type of social processes) a huge number of people have changed occupation and place of residence. On are the Montenegrin village, however, remained to live much more people compared to those who are engaged in agriculture.

According to the last Census of Agriculture in 2010 in Montenegro, there are 48.847 family agricultural holdings but also the unprocessed 59.360 ha of agricultural land, which shows that it is largely the separation of agriculture and rural areas. Official it is water that is over 48.000, and realistically practical in Montenegro, we have very few "pure" rural agricultural farms. The criteria for their determination are to put it mildly debatable, while the percentage of the majority of them living in the suburbs of major cities (and, as such, before I fall in mixed households than in rural) [29]. According to the National Statistical Office of Montenegro [30], are the Montenegrin households living 98.949 people, which also represent workforce households. The age structure of agricultural holdings is characterized by a high proportion of older working-age population in the farm and a small number of younger members. Of are the total number of working-age residents of these 23.204 persons older than 65 years. Process aging village is deeply affecting all spheres of Montenegrin rural communities, as nearly 44% of the total number of persons employed in the household over 55 years of age. At least those which would be progressive farm that most, only 7% of the workforce in the Montenegrin households younger than 24 years.

According to Šarović [31], most family agricultural holdings in Montenegro have between one and four. Of the total number of households (48 847) is by far the most of those holdings are counted from 1 to 2 members, even 37,518 or 76.8%; 3 to 4 members is 9,686 (19.84%) households; 5 to 7 members, numbering 1,424 (2.93%) households and is by far the least of those farms with more than 7 members who were once the backbone of the rural areas, they have only 196 or 0.43%. Taking into account the age structure and size of the family on the farm, we can argue that the Montenegrin village most other elderly couples or single people, and they now form the basis on which to build a safe and Montenegrin disappearance of family farms and the village as a whole. In conclusion, Montenegro in the period from 1948 to 2011 demographically transformed from a country with a high birth rate, with harmonious stationing in space, in a country with low rates birth rates, low and uneven population growth, high rates of internal migration and all the unfavorable spatial distribution of population. In fact, over 80% of Montenegrin villages recorded a declining population growth rate, and about 70% of them are affecting the process, more or less distinct,
depopulation. They did not rare, and the villages that were literally before shutting down, and those that have disappeared from the demographic map of Montenegro [31].

In order to get a clearer picture of agriculture in Montenegro we shall use the research Rajović and Bulatović [32] and Rajović and Bulatović [33], using data of the Statistical Office of Montenegro in 1975 [34] and 2012 [35], the underscore:

1. Using the alternating splitter design in Systems 6/6 and determine the next course: $O_1 \ L_2 \ P_3$ uniformly grazing direction of agricultural land use with higher participation of meadows and participation plowed land in 1973, which in 2007 was transformed into $L_2 \ P_4$ 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.

2. 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%.

3. 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 to Bulatović and Rajović [36], Rajović and Bulatović [37], Rajović and Bulatović [38], Rajović and Bulatović [39-43], finally, conditions for plant production are characterized by fragmentation of holdings, low technical equipment and a significant diversity of natural conditions.

4. 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.

5. 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.

6. In the period 1960-2010, the numbers of livestock units of livestock in Montenegro have reduce from 133,773 on 117,753.1 or for 16,020 livestock units. Of total agricultural households in 2010 (32.675), they 32.656 dispose of 117.753.1
conditional throat livestock while 19 business subjects have a at disposal 4891.2 conditional throat livestock.

7. The total numbers of agricultural farms that are with breeding sheep, the period 1960 - 2010 have been reduce from 38. 942 agricultural farms on 6.088 or to 84.37%. The total number of agricultural farms involved in breeding cattle, in the period 1960 - 2010 has been reduce from 55. 560 agricultural holdings on 24.624 or 55.68%. Total number of goats (35.756 throat) that raised agricultural holdings in Montenegro is 3.583, of which family agricultural holdings (3.580) grown 35.001 throat and business subjects (3) 755 throat. The average number of pigs per family agricultural household was 3.1, and in average is 409.7 pigs grown on business subjects. Census agriculture in 2010 in Montenegro covers 16,313 agricultural holdings that breed 620.802 pieces poultry, of which family agricultural holdings grown 411.086 pieces poultry and business subjects 209. 716. The average number of horses per family agricultural household is 1.4 throats, while the average number of donkeys, hinnies and mule by family agricultural household 1.2 throats. Total number of agricultural holdings of 2010 involved in breeding of bees is 2.533, of which almost all the family agricultural holdings, respectively more precisely 2.532 who grown 49.520 hives bees. Only one business subjects in Montenegro deals breeding bees respectively owns 252 beehives bees.

8. The total meat production in the period 1964/68 to Montenegro amounted to 10.964,0 tons, of which on beef meat 3.693,0 tons of waste, mutton 3.559,0 tons, pork 3.347,0 tons and poultry 365.0 tons. Total milk production in the same period amounted to in Montenegro 57.710,4 (ooo l), and egg production 30.826,0 pieces. The average production of cow of milk per agricultural household in 1967 amounted to 1.428 l of the sheep 540 l, 694 pieces of egg production and wool 26 kg. The total meat production in the period 2001/02 in Montenegro amounted to 13.330 tons, of which on beef meat accounted for 8.500 tons, mutton 4.830 tons, pork about 5.000 tons. Total milk production in Montenegro 2011 amounted to 202.449 (ooo l), of which on cow's milk accounted for 190.769 (ooo l) per dairy cow 3.244 l, milk from the sheep 8.830 (ooo l) by sheep 79 l. Total egg production during the same period amounted to 75,804 units, by hen 169. Honey production amounted to 394 tons, per hive 9 kg.

9. In Montenegro, we highlight two types of livestock production and to semi-nomadic and stationed. Total number of agricultural holdings that raise cattle was 32.675, of which 18.9 % or 6.166 agricultural holdings which have a semi-nomadic way of breeding cattle and 26.509 or 81.1 % agricultural holdings have a stationed system of livestock production. Holdings that have a semi-nomadic way of livestock them 6.166 the holdings of livestock grazing on common land (summer pasture, commune).

10. In all branches of the livestock sector in Montenegro, there is significant potential for the development of organic livestock production, especially in mountainous areas. Code cattle, sheep and goat predominant racial composition of the traditional livestock on pastures in mountainous areas, and preserved the traditional making of indigenous species of dairy products (cheese and milk cream) on agricultural holdings, favors the development of organic livestock production. Also, a huge
natural potential and the presence of large areas of meadows and pastures (450,943 ha) which is not used rationally because of decades of continuous decline in the number of livestock in Montenegro. Through measures applied for the improvement of livestock, the state is trying to reverse this trend, where in the lowland areas of the subject of work focus on cattle raising (meat and milk), and in the mountainous area on sheep, goat and cattle production.

According to Batakić [44] SWOT analysis of agriculture in Montenegro shows: Benefits (available land resources, price competition for a limited number of products, good preconditions for organic agriculture, the tradition in the production of certain products, new capacity in the manufacturing industry, the positive changes of the institutional framework); Weaknesses (lack of technological development resulting in poor competitiveness, small production – the prevailing subsistence farming, unfavorable age, social and educational structure of the manufacturer, the food chain is still weak); Opportunities (organic farming, traditional certified products to a greater extent, tourism driving force of domestic products, exports of wine, vegetables, fruit, lamb ...); Hazards (open market can threaten sensitive sectors, neglect of agriculture in the overall economic policy, lack of support, inconsistency of legislation with the EU acquires and capacity building).

Our research evidence based on similar researches [28] emphasizes that agriculture Montenegro could meet the very difficult challenges on the road to European integration, it is on the road to the EU will have to comply with the requirements and standards of the EU, which will significantly change the situation in the Montenegrin agriculture. Economic targets set by the Copenhagen criteria (defining the conditions for the entry of a country in the EU) involve the creation and functioning of a market economy that will be able to integrate into the market economy, the other Member States, ability to withstand competition, so that the country's economy withstand entry into the EU single market and adapting the whole set of EU rules and practices by which the EU works. Harmonization of legislation with the EU acquires is the most demanding in the European integration process of Montenegro since it is necessary to harmonize related to agriculture, rural development, food safety, veterinary and python sanitary policy and fisheries.

4. CONCLUSIONS

It is impossible to have a healthy society and economy quality in a world where there is so much poverty and environmental degradation. Economic development cannot be stopped, but it should change direction to become less damaging to the environment and social development. Convert those insights into action and move toward sustainable forms of development and ways of life is a challenge in today's world. With such a set objective, the environment becomes much broader than the traditional view, according to which the predominantly engaged in the protection of human health and the preservation of the integrity of ecological systems [43-44].

Since the end of World War II agricultural production was in two different but complementary ways. The first is the period when agriculture transformed from subsistence, agricultural, commercial to agricultural production, which is characterized by specialization [45]. Another direction of development, particularly evident in the European Union, with specific reference to the geographical origin, aims to emphasize the production of high-quality, specialized goods intended for sale in certain internal and external market niches. The
agric-food sector continues to be simultaneously dominating different paradigms: addiction, competitiveness, multi functionality and globalized production [45].

According to paradigms depending on agriculture provides food security, as well as social and political stability and income in rural areas. Such approach involves state control of supply and demand, and is characterized by chronic low income agriculture, non-competitiveness with other sectors of the economy, without government assistance, as well as non-competitiveness in the international market without the existence of agricultural protectionism. The paradigm of competitiveness viewed agriculture as a competitive economic sector, with average or even above-average income, successful, both on the domestic and international market. According to this paradigm, agriculture should operate in terms of market laws, without undue state interference. The paradigm of multi functionality agriculture is perceived as integral part of the rural area, which is next to the market and provides certain non-market goods, which refers to the protection of the environment and landscape, maintaining the family business, stimulating rural development, preservation of cultural and historical heritage, improving the conditions of livestock... The paradigm of globalized production puts agriculture in a global framework to insist on the quality and safety standards due to market-oriented production [46].

In conclusion, we know the most famous definition of sustainable development that emphasizes how we need to meet all their needs without compromising the ability of satisfying the needs of future generations. Given to the growing use of resources, environmental pollution, global climate change, economic and political inequality in the world, the spread of hunger and disease, energy crisis, population growth and other global and local issues, concepts of sustainability are critical to the survival of life as we know it [47].

References


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