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Zoning as a Condition of Sustainable Agriculture Northeastern Montenegro: A Case Study

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1. Introduction

Agriculture made great progress during the "Green Revolution" of the 1960s and 1970s. Companies and public sector organizations around the world continue to achieve breakthroughs in many areas that contribute to global food security. Nonetheless, yields in key crops still vary significantly between farming regions, and often remain far below their optimal potential. Crop losses pre- and post-harvest continue to prevent an estimated 40 percent of agricultural produce from actually reaching the marketplace (Liu 2014).

Traditionally, the public and private sector have attempted to provide solutions independently from each other, with the exception of certain sections in the long path from basic research to widespread commercial deployment where collaboration was unavoidable. It has been argued, for example, that the "Green Revolution" was a public sector initiative that partially crowded out private activities and thus resulted in a general neglect of tailor-made solutions for farmers (Liu et al. 2010).

Attempting to arrive at a more precise, operational definition of sustainable agriculture is extremely problematic, partly because there is such a range and number of parties involved in the debate. This is not surprising, as there would appear to be little point in advocating a non-sustainable agriculture, and so all relevant groups are gating it out in the

sustainable camp (Gang 2015, Geng at al. 2014**)**. Even the chemical companies can claim that farmers should purchase their agrochemical products to improve their financial sustainability (Buttel 1993, Sima 2009).Therefore the debate over how to achieve sustainability is plagued by fundamental disputes and disagreements over which elements of production are acceptable and which are not.

To achieve sustainable development, we need to integrate the different dimensions of human activity on the basis of a moral reflection as to human responsibility for nature (Pawłowski 2006). Sustainable agriculture is an integral aspect of sustainable development because agriculture is the foundation of human civilization and thus is the foundation for all social and economic development. The sustainability of agriculture is current a problem of sustainable development because today's modern agriculture, and the global food system that has been built upon it, is not sustainable. One of the fundamental problems of modern agriculture is its lack of moral reflection on human responsibility for nature or even for the future of humanity (Zhihe et al. 2013).

Montenegro is facing a great task and challenge that is reflected in the remodeling of its economic and social system. Accession to the European Union will be an important stimulus to accelerated economic development. Within this economic system of agriculture is of special importance. Therefore, Montenegro undertakes a range of different organizational, institutional and economic measures, in order to achieve strategic determinations. From this orientation, and there is a need of studying all aspects of the development of agriculture, in which agricultural geography has its place and importance.

The aim of this paper is to present zoning as a precondition for sustainable development of agriculture northeastern Montenegro. Rating natural conditions aims to extract homogenous territorial units with a degree of convenience or limitation of certain types of agricultural development. According to the criterion amenities of natural conditions for agricultural development in northeastern Montenegro, we have singled out three relatively homogeneous areas as follows: I AREA – tied for Beransku, Andrijevičku, Polimsku and Plavsko-Gusinjsku Valley and the low landscapes Central mountain relief up to 1100 m above sea level. Within the area, we have singled out three spatial unit's lower hierarchical rank as follows: sub-area alluvial plains of rivers, river terraces,

lake sediments Beranske, Andrijevičke and Polimske Valley, sub-area, which includes Plavsko-Gusinjska Valley and sub-area of high mountain landscapes low relief and low area of the middle-mountain relief up to 1100 m above sea level. Followed by II AREA – linked to belt from 1100-1700 m above sea level and III AREA that includes high mountain belt above 1700 m above sea level. "Agricultural zoning is of strategic importance for the competitive advantage and sustainable development of multifunctional agriculture. It is the rational use of resources, achieves sustainable development, organic agriculture and protecting the environment" (Babović 2010, Babović & Veselinović 2010**)**. Thus, agricultural and rural policies must necessarily be included in global programs contributing to the growth of the local system as a whole (Buckwell & Sotte 1999**)**. "Rural development policy must be multidisciplinary in concept, and multi-sectoral in application, with a clear territorial dimension" (Cvijanović et al. 2009).

2. Research Methodology

The farming activity based upon the application of the measures recommended for the good agro-environmental practices, named organic farming, has a visible impact upon sustainable rural development, which is noticed in the economic, social, ecological and historic-cultural plan, both at local and national level. The whole information volume in this article was obtained through specific methods for the selective research, respecting all its stages from the methodological point of view: identification of the researched issue, research framework delimitation, information collection, data processing, analysis and interpretation drawing up the conclusions. Research also played an important role in the article, which consisted, on one hand, in the identification of other studies and articles on the same subject, and in the processing of some statistic data, on the other hand. Hence, the information sources used can be classified into governmental sources (statistic, ministerial and from research institutes), and into non-governmental sources (independent publications). As the statistical data on organic farming and its impact upon the economy, environment and human society are very few, the research results are based on a series of mainly qualitative analyses, on the one hand, and on a series of logical rationales, on the other hand (Rajović 2009).

3. Analysis and Discussion

Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological and mechanical methods, as opposed to using synthetic materials, to fulfill any specific function within the system' (FAO/WHO Codex Alimentations Commission 2007). Capra (1997) & Francis (1999) provide a conceptual framework for the link between ecological communities and human communities. He calls for a people to be "ecoliterate" and states that being "ecoliterate" means understanding the principles of organization of ecological communities (i.e. ecosystems) and using those principles for creating sustainable human communities. Community-based agri-ecological systems seem to provide opportunities to reconnect people with people and people with food, opening up spaces for "ecoliteracy" to develop through shared and reflective learning.

Organic agriculture has the potential Kilcher (2005): (1) To improve soil fertility, biodiversity and sustainability of agricultural production, (2) To conserve natural resources, (3) To improve agronomic and economic performance; to make yields more stable, especially in risk-prone tropical ecosystems; to achieve better food quality and food security, (4) To provide access to attractive markets through certified products, (5) To create new partnerships within the whole value chain as well as to strengthen self-confidence and autonomy of the farmers.

Organic farming is the subject of extensive research. A wide are range of studies (see Juma 2010, Mäder et al. 2002, Santucci 1997, DARCOF 2000, Tittonell 2014, Lancker & Nijkapm 2000**)**. Have demonstrated the advantageous are aspects of this system in terms of ecosystem functioning, soil fertility conservation and economic impact. NGOs and farmers' groups are increasingly adopting organic techniques as a method of improving productivity and food security in these systems. However, no systematic attempt has hitherto been made to track the extent to which these approaches are being employed, or their effectiveness compared to other approaches, in meeting economic, social and environmental objectives (Singh & Dhillon 2004).

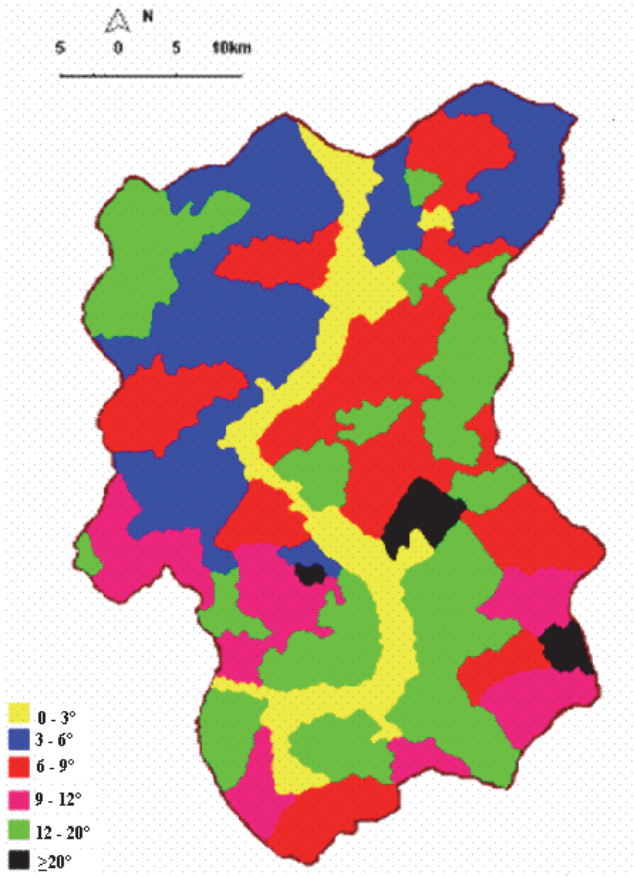

Fig. 1. The structure of slopes in northeastern Montenegro, on the example of the municipalities of Berane, Petnjica, Andrijevica, Plav and Gusinje (Rajović 2011)
Rys. 1. Struktura pochyłości stoków w północno-wschodniej Czarnogórze, na przykładzie gmin Berane, Petnjica, Andrijevica, Plav i Gusinje (Rajović 2011)

Based on the morph metric characteristics of the relief, agroclimatic and hydrological characteristics of the terrain (Morison at al. 2008, Moss 2008, Oerke at al. 1996), representation of genetic soil types (Koohafkan at al. 2012), it is possible in northeastern Montenegro, separated areas with different benefits for profitable agricultural production.

The complex nature of the interrelationships between agricultural production and the natural environment means that we far from know which methods and systems in deferent locations will lead to sustainabil-

ity (Stockdale 2002). This seems to be a crucial issue in the debate, and leads one to ask, how long should an agro system behave sustainably to be considered sustainable, and how should sustainability be assessed? It is extremely difficult to determine whether certain agricultural practices are sustainable or not. It is only in retrospect that sustainable techniques can be truly identified. The identification of technologies as sustainable today is questionable, since such identification is based on hypotheses regarding the sustainable management of natural resources, maintaining their productive capacity through time. This implies that a constant process of monitoring and reevaluation is required (El-Hage Scialabba & Hattam 2002). Let's show this on the case of northeastern Montenegro.

Combining favorable and limiting factors in the observed geospace, we can distinguish three relatively homogeneous areas for the development of agriculture.

1. I AREA – is related to Beransku, Andrijevičku, Polimsku and Plavsko-Gusinjsku Valley and the low landscapes Central mountain relief up to 1100 m above sea level. Within the area can be distinguished spatial units lower hierarchical rank:

a. Sub-area (A) alluvial plains of rivers, river terraces, lake sediments Beranske, Andrijevičke and Polimske valley has the most favorable conditions for intensive agricultural production. These are spaces with a slope side to 3° and unexposed exposures. Length of the vegetation period with Td ≥ 10°C over 150 days and the sum of active temperature Td with ≥ 10°C over 2100°C, which allows the cultivation of various vegetable crops. However, low values of relative humidity ranges in April (about 62%) increases the risk of spring frosts and dew and make these areas less favorable for fruit production. Adverse climatic characteristics are related to the small amount of rainfall during July and August. In summer (July-August) mean monthly relative humidity in the afternoon (14 h) was below 45%. Like this low value of saturation of air with water vapor, it adversely affects on agricultural crops. Summer low flow rate, inaccessibility coastline, distance from the river bed, and the pollution of rivers in summer, reducing the possibility of using river water for irrigation. For alluvial plain rivers they are related to fluvial lands that are the most important aspects of the production of possible cultivation of most agricultural crops. According to the natural advantages of the alluvial plain of rivers and river terraces are suitable for intensive

agriculture, particularly crop production. On river terraces as the dominant soil types of different production values appear smonitza, cultivating soils, pseudogley and amphigley.

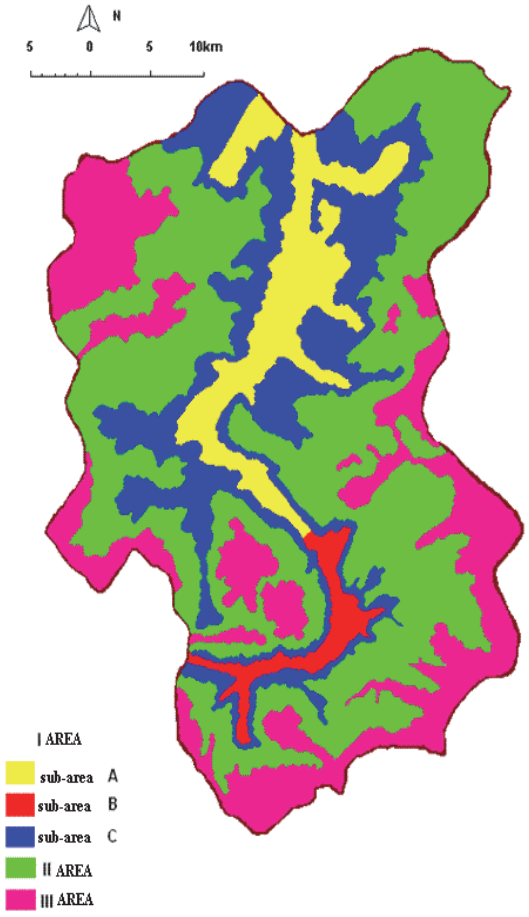

Fig. 2. Altitudinal zones of northeastern Montenegro on the example of the municipalities of Berane, Petnjica, Andrijevica, Plav and Gusinje (Rajović 2011)
Rys. 2. Strefy wysokościowe północno-wschodniej Czarnogóry na przykładzie gmin Berane, Petnjica, Andrijevica, Plav i Gusinje (Rajović 2011)

To overcome the restrictions in northeastern Montenegro sustainable agricultural development, it is suggested that the following actions should be taken: harmonization of different land-use patterns to meet

demands of economic development and agricultural production, enhancement of ecological and environmental protection when supplementary land is brought into cultivation, design of a suitable land reclamation policy, and increase in capital investment for land consolidation and recultivation of abandoned land.

b. Sub-area (B) which includes Plavsko-Gusinjska valley has similar agro-climatic characteristics as the previous sub-area. Characterized by a slope of 0-3°, unexposed and southern exposure, and altitude belt to 948 m above sea level. Dominant soil type is fluvisol, sporadically present distric Cambisols, euritics cambisols, podzol, planohistol (Plav Lake). Different varieties of forest soil allow fruit production. These subareas belong to the class of so-called II very suitable land for agricultural production. Length of the vegetation period with Td ≥ 10°C over 140 days and the sum of active temperature Td with ≥ 10°C to about 1200°C, allowing cultivation vegetable crops. In summer (July and August) mean monthly relative air humidity in the afternoon (14 h) is below 46%, and this low value of saturation of air with water vapor, it adversely affects agricultural crops (Rajović & Bulatović 2012). Water use efficiency can be improved in two ways: modify pipe systems to reduce unnecessary loss in transportation. More investments in agricultural infrastructures are needed, technology and equipment for water saving need to be advanced. For example, current flood irrigation can be transformed by small border irrigation or long border irrigation; sprinkler irrigation technology and equipment; drip irrigation; and micro-sprinkler irrigation technology.

c. Sub-area (C) of high mountain landscapes low relief and low landscapes Central-mountain relief of up to 1100 m above sea level. This sub-area is characterized by mild forms of relief and side slopes of 6° to 9° (except for the part between Brzava and Lima 3°-6°), greater depth of soil cover (luvisols, smonitza, euritics cambisol, distric Cambisols, sometimes represented rendzina), consists of a structured form relatively suitable for agricultural production. The land is suitable for the production of various agricultural cultures, and above 1000 m above the sea represents mainly forest land (beech- fir forests, oak forests and pine and Scots pine), pastures and meadows. Socket Balja, landscape Kralje in the valley of the crusts, Trešnjevik (relief forms and side slopes (3°-9°)) are favorable for the production of fruits and some vegetable crops. Repre-

sented are the following lands: distric Cambisols, euritics cambisol, rankers, colluviums ... Konjuhe the village around Zlorečica in which the instills Kutski rivers and Perućica (slopes 3°-6°), the land of good production potential (eugley, euritias cambisol, rendzina, distric Cambisols…), suitable for growing various agricultural culture, plants such as alder, field ash, birch, and various types of forests (beech, oak, pine...). River valley Kutski River may be considered as favorable for the production of certain agricultural crops (barley, oats, and corn) and fruit from the mouth Zlorečica to Cecuni. Further to the source geomorphologic characteristics that make up the system on a particular area are not favorable for agricultural production, but there are mainly pastures, meadows and forests. Areas on the left side of Lima, starting from the expansion in Luga until Pepić (slope of 3°-6°) with the soil (Eutric Cambisols, colluviums, smonitza, and amphigley) are suitable for the production of vegetable crops, cultivation of meadows and forests. Landscapes Jerinje head (slope 6°-9°), with the dominant land rankers and rendzina allow rising of orchards, the development of grassland and forest (oak, maple, ash, spruce, beech). Areas on the right side of Lima, which include footer Rasojevića head, Javorišta, Grahova, Koradžinog hill, Prijedola and the part between the confluence Piščevske River do Gornje Ržanice (slope 6°-9°, or 12°) with a dominant land distric and euritics cambisols are favorable for agricultural production. Areas above Plavsko-Gusinje basin (1100 m) include on the left side Lima, Ljuče and Grnčara, foothill Visitora and Grebena; between Grnčara and Bistrice foothill Trojana; Bistričice and Dolje foothill Karaule; Vrulje and Đuričke River foothill Bora; Đuričke River and Komarače foothill Kofiljače; Komarače and Veličke River foothill Prševog karst to Ćelave towers. Specified spatial entity characterized by slope mainly from 12° to 20°, with the dominant land: calkocambisol, podzol, brunipodzol, rankers, a sporadically occurring eutric and distric Cambisols. valley Skakavača and Bilećkog stream, Jaseničke River, the part where the Treskavička and Tamjanska River flow into the in Komaraču and part between Novšića and Veličke River, and a part with left and right side of River Vrulje; the slope predominantly 9°-12° can be used for agricultural production, and all other parts are mainly forest land (forest of spruce, fir, pine, oak). The average air temperature in the sub-area during vegetation period is about 12°C, relative air humidity of about 68% and the length of the vegetation period with

Td ≥ 10°C 130 days and the sum of active temperature to 1800°C allow cultivation of certain vegetable crops. This sub-area has natural resources that can meet the requirements for the establishment of long-term organic farming. In these areas, large unemployment of the population, a large percentage of elderly households, migration to the cities and the exodus of young people in developed countries.

2. II AREA – related to the band of 1100-1700 m above sea level in places dissected by deeply-cleaved river valleys. This spatial entity characterized by severe forms of relief to the slope of 12°-20° (valley Visitora, Grebena, Trojana, Karaule, Vezirov brade, Bora, Kofiljače...). The exceptions are areas with slope 3°-9° or 12° (Vlahovi, Đuč, Turjak, Javorište, and Divjak). This area has thinned ecological cover, with the dominant land: rendzina, podzol, calkocambisol, calkomenasol, rankers, and in places the distric Cambisols which indicates that mainly under grassland and forest vegetation (forests of pine, spruce, beech, oak, fir). The relief unit is suitable for livestock development. Our research evidence based on similar studies Arsić et al (2010) points out that due to the depopulation trend has been a partial fading of agricultural activities in this area, so I did not realize the development of intensive production. In cattle production and sheep production predominant racial composition and traditionally keeping livestock on pastures and preserved the traditional production of indigenous species of dairy products (cheese and cream) on farms good for the development of organic livestock production. Also, the potential is the presence of large areas of meadows and pastures that are not used in this area due to the ongoing decades-long decline in the number of cattle. The II AREA precisely because of underdevelopment avoids the chemicals and pollution that accompanies development, and the natural communities and habitats preserved. Very pronounced resistance of indigenous breeds to their cultivation without major investments in health care and treatment, and in this way obtain special quality animal products for human consumption, which does not contain residues of various antibiotics and plant protection products. Length of the vegetation period with Td ≥ 10°C from 91 to 130 days, the sum of active temperature Td with ≥ 10°C from 1100°C to 2300°C, the mean air temperature during the growing period was 9.5°C-12°C. Since for every crop fixed biological minimum, growing period was 9.5°C-12°C. Since for every crop fixed biological minimum, in this area, near

the river valleys (for example Kutski river) or in the foothills Vlahova, Javorišta..., it is possible cultivate specific agricultural crops (wheat, barley, oats, peas, beans, rye), orchards and lawns (dominated Eutric Cambisols and rendzina). Our research evidence based on similar studies Milić & Petronić (2007) points out that due to the extensive agricultural production in the second area, i.e. low use of pesticides and fertilizers, land and water are uncontaminated. For the reasons stated the long-term investment planning resources necessary to pay special attention to this area thereby stimulate organic agricultural production. On the territory of the area's population are often engaged in the collection, a rarer and production of medicinal plants, which serve as an important source of income. Cultivation of medicinal plants has become topical in recent years ... The main limitation the rapid development of this sector ... is a relatively small number of vital rural households, and the lack of machinery for this type of production. The choice of crop depends on the accessibility conditions of the ground and the size of the farm household. For example, smaller households tend to have a higher proportion of cropped area under maize in different accessible areas. Only a minority of farmers uses fertilizers and, although there are signs of the development of a more intensive cropping pattern with increased multi-cropping during the year, the extent to which farming technology has altered is limited. As the possessors of agricultural land, households can obtain direct and indirect benefit. Land provides a potential employment opportunity for peasants who have less chance to work in urban settlement (Brandt & Huang 2004) but, more importantly, access to agricultural land can help peasants avoid an uncertainty of food supply and income providing the necessary food guarantee and insurance (Tao et al. 2005).

3. III AREA – comprises a high mountain belt above 1700 m above sea level (Prokletije, Bjelasicu, Komove, Visitor, Cmiljevicu and Mokru Mountain). In this area have deteriorated relief are thermal and Pedology conditions. In the structure of the slope of the spatial units are dominant slope over 18°, and slope over 20°. The most represented soil is: calkomenasol, litisoli, rendzina and podzol, so this area of the forest vegetation and mountain pastures with blueberry and juniper. Length of the vegetation period with Td $\geq$ 10°C is less than 90 days, the sum of active temperature Td with $\geq$ 10°C about 1100°C and the mean daily temperature is less than 4.9°C, and the maximum snow height is greater

than 240 cm in the winter months. Which is to say that the area of suitable is for tourist valorization? Our research evidence based on similar studies Lancker & Nijkamp (2000) indicates the besides cultivation, land is used to keep livestock, which also supports cultivation of soil by providing fodder. Ground with low accessibility (high mountain areas) tends to have a higher proportion of grazing land for livestock than highly accessible land, which is used more for crop cultivation. Agro-forestry is also a source of income, but more and more forests are chopped because of a lack of fertile ground for crow cultivation and to provide fuel wood. This causes serious deforestation and increasing environmental pressure.

However, the development and application of sustainable agriculture in northeastern Montenegro are not without problems: the lack of sufficient research on sustainable agricultural theory and methods. Technological innovation, introduction and application of high technologies in sustainable agriculture are slow and do not support the expansion of eco-agriculture. A low level of industrialization in eco-agriculture. At present, sustainable agriculture northeastern Montenegro is solely a production system that focuses on agricultural production and neglects the relationship between production and the market. Furthermore, the characteristics agricultural production of northeastern Montenegro prevent the industrialization of sustainable agriculture. Inefficient measures for popularizing sustainable agriculture. Although economic, social, and ecological benefits have been obtained, effective technologies and modes of sustainable agriculture have not been effectively popularized more widely and benefits of sustainable agriculture to environmental protection are limited.

In order to solve these problems in northeastern Montenegro, how emphasizes Zhang (2000) the current land tenure rights system should be reformed. It is suggested that the following actions should be taken: identify distinct land property and access rights, and define reasonable rights and responsibilities of possessors (collectively) and managers (peasants), strengthen land use supervision on cultivated land by collective and government action, improve transfer mechanisms for land use rights, and form multiform distributions of land use rights that accord with the rules of the market economy, establish market distribution mechanisms for farmland, and accelerate the introduction of price mechanisms that are suitable for a land market, establish and improve the tax system of com-

pensation for land use and reclamation for new construction land, and enhance the effects of economic measures, such as land price and land tax, on land use adjustment and control, and establish economic compensation mechanisms for cultivated land protection, and adjust benefit participation mechanisms to solve problems of externalities and unmatched cost profit in cultivated land protection.

Table 1. Classes of general amenities morphometric characteristics terrain of agricultural northeastern Montenegro, in the case of municipalities Berane, Petnjica, Andrijevica, Plav and Gusinje
Tabela 1. Klasy ogólnych udogodnień cech morfometrycznych terenów rolnych w północno-wschodniej części Czarnogóry, w gminach Berane, Petnjica, Andrijevica, Plav i Gusinje

Classes	I class P-1	II class P-2	III class P-3	IV class P-4	V class P-5	Without class N
Color coding						
Morphometric amenities	A very favorable terrain	A very suitable terrain	Moderately suitable terrain	Slightly suitable terrain	Not suitable terrain	Terrain for winter tourism

Source: calculations by the authors

Assessment benefits morphometric characteristics of the terrain northeast of Montenegro, is based on research Husnjak et al (2008) whereby the in this text tabular units terrain the classified as ranks and classes. Namely rows are determined suitability (P) or unsuitability (n) lands, and the columns are determined the degree of class amenities, whereby the P-1 (I class), P-2 (II class), P-3 (III class), P-4 (IV class), P-5 (V class), N grounds for winter tourism. Table 1 shows the results evaluation the suitability of mapping units.

Very favorable and very suitable terrains for sustainable agriculture (P-1 and P-2 class benefits) include the only one land in which there are no limits to sustainable agriculture, or the limitations are very low intensity. Limitations of these lands arise in the form of less severe skeletal structure and lack of nutrients. Very favorable terrains (P-1) for sustainable agriculture includes alluvial plains of rivers, river terraces, lake sediments Beranske, Andrijevičke and Polimske valley has the most favorable conditions for intensive agricultural production. Very suitable are terrains (P-2) which includes Plavsko-Gusinjska valley.

Moderately suitable terrains for sustainable agriculture (P-3 class benefits) include the lands in which such restrictions appear slightly shallower depth, mild skeletal structure, lack of nutrients and in some places ramparts. In specified class benefits belongs terrain of high mountain landscapes low relief and low landscapes central-mountain relief of up to 1100 m above sea level.

Slightly suitable terrains for sustainable agriculture (P – class 4 benefits) include land with significant and serious limitations. As the main constraints appear shallower depths, discontinuous soil composition, pronounced skeletal structure and lack of nutrients. This will include terrains that characterize severe forms of relief with a slope of 12°-20°. This relief unit is suitable for development livestock. These terrains are suitable for slightly meadow-pasture production and the production of fodder plants, with the application of terracing is possible production of fruits.

Unfavorable terrains for sustainable agriculture (P-5) include terrain with permanent limitations that prevent their use in agriculture. As the dominant constraints occur are shortage of land, discontinuous soil cover, very shallow depth, expressed slope, large skeletal structure, soil erosion and high ramparts. The specified class facilities are grouped terrains that include slopes above 20˚. In places are these spaces conditionally favorable for meadow-pasture production.

Without class (N) are terrains for winter tourism. In specified class benefits are grouped terrains that include altitude belt above 1700 meters above sea level.

The proposed procedure is confirmed by that it is possible and necessary to plan through the development of sustainable agriculture in northeastern Montenegro, the case of municipalities Berane, Petnjica, Andrijevica, Plav and Gusinje with the application of environmental cri-

teria. Zoning as a condition of sustainable agriculture represents the realization of the basic requirement of "healthy" of solving problems of significance to the application of the principles of sustainable development in the decision making process. Analyzed I AREA (Sub-area A, Sub-area B and Sub-area C), II AREA and III AREA was carried out selection of the most appropriate varieties – compromise model benefits that provides sufficient natural resources for the development of sustainable agriculture in northeastern Montenegro, with minimal impact on the quality of the natural environment. Based on the overall analysis are the proposed guidelines for the further development of sustainable agriculture in northeastern Montenegro.

4. Instead of conclusion

Our research evidence based on similar studies Cvijanović et al. (2009), Kesavan & Swaminathan (2008), Tittonell (2014), Du & Huang (2010), Santucci (1997), Tewari (2013), Gang (2015) points out that the problems of agriculture in Montenegro, can be grouped into:

1. Problems in the organization of agricultural production: (a) extensive, low productive, unprofitable and illiquid production; (b) fragmented production, with the absence of organized market performance of agricultural the manufacturer, through the associations, cooperatives, clusters; (c) the inability of favorable loan debt for larger and longer-term capital investments; (d) high market risk, primarily due to the disunity of primary agricultural producers, undeveloped competition policy and oscillating demand,
2. The lack of good governance within the following areas: (a) the construction of infrastructure and institutions; (b) building up an efficient market inputs and agricultural markets (those markets characterized by a large influx of "gray" economy, "disrupted" proprietary and contractual relationships of primary production, processing and trade); (c) agricultural policy measures, which do not bring the desired effects for primary agricultural producers, especially for agricultural enterprises and cooperatives; (d) the delay in the adoption of the necessary legislation and the establishment of national bodies,
3. It should thus be evident that realization of sustainable agriculture requires several facets of modern science blended with traditional

wisdom, participation of farmers, scientists, planners, policy makers, etc., as well as market and trade linkages that are not only free but also fair. Sustainable agriculture holds out hope for humankind and the planet Earth which are at a crossroads; it can succeed only if all the developed and developing nations stand together for common good. Sustainable agriculture and development is for 'our common future,

4. Tittonell (2014) define organic farming as "a viable, environmentally and socially sustainable method of agricultural production" using no synthetic chemical fertilizers or pesticides. Reliance on external inputs is extremely reduced while maximum use is made of farm-derived resources and natural products and processes are employed for plant nutrition and pest control. The same principles are applied to livestock breeding and of rearing practices where animal welfare is safeguarded. Moreover, organic farming provides consumers with quality products (Du & Huang 2010; Stolze et al. 2010) that are healthy, have natural flavors and fragrances, and contain no harmful residues while contributing to maintain and enhance soil fertility and biodiversity.

Modern agriculture at the beginning of the twenty-first century is characterized by a number of uncertainties 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. According to Bellows & Hamm (2001), Singh & Dhillon (2004) agricultural area is not uneventful. In it ruled by various production and socio-economic conditions that, individually or collectively, influence to on various narrow areas develop different agricultural "structure" with various production and economic characteristics and social meaning. It is, after all, the practice of the European Union. Countries joining the EU are obliged to have a policy of regionalization. Therefore, Liu et al. (2010) and Grigg (2003) emphasize that it is necessary total agricultural area divided into smaller areas (agricultural area), it is pointed out that Pacoima (2014) in these smaller "homogeneous" areas can be seen all significance and developmental problems of agriculture.

Organic agriculture is not only a specific agricultural production system, it is also a systemic and encompassing approach to sustainable livelihoods in general, where due account is given to relevant factors of influence for sustainable development and vulnerability, be this on phys-

ical, economic, or socio-cultural levels (Eyhorn 2007). OA has a long tradition as a farming system and it has been adapted for many climate zones and local conditions; as a result, much and detailed situation-specific information on Organic agriculture is available. Furthermore, OA has a recognized potential as a development strategy for rural communities (see DARCOF 2000, El-Hage Scialabba & Hattam 2002, Eyhorn et al. 2003, Halberg et al. 2006, Muler 2009, Purushothaman et al. 2013, Such 2015).

However, Zhihu et al (2013) referring to the research James (2006) & Ikerd (2007) emphasize that the modern economic theory, usually attributed to Adam Smith emphasizes self-interest. According to which, as Harvey James put it, it is self-interest that ultimately drives economic activity. Such a theory not only encourages competition, but also, in John Ikerd's words, allows a reasonable level of profits to be attained. It doubtless can stimulate farmers' enthusiasm for organic farming by paying attention to their self-interest profit seeking. In doing so, the objective of sustainable agriculture might be more effectively achieved.

The level of development of individual regions in Montenegro stems from its geographical position in a number of cases, the cause of functional isolation in relation to economic centers and development axis, which often results in slow development processes (Ni Laoire 2000, Youngberg & Harwood 1989, Lampič at al 2007, Whitby & Adger 1996, Gennaioli at al 2011, Michalopoulos & Papaioannou 2013). Barbour & Teitz (2001), Amdam (2004), Wezel at al (2014), Lee (2007), Mayere et al (2008), Balaguer-Coll et al (2010), Liu (2014) say about the role of the state and the region in the processes of regional planning as well as key stakeholders who develop the concepts of regional development and thereby establish a framework for the development actors at the local level.

To achieve the objectives of the "Strategy for the Development of Agriculture" northeastern Montenegro should be: functional guidance use in certain areas, technological training of agricultural holdings for modern production, suppression of the unstable and stable establishment of sustainable modes of production, increasing competitiveness of agricultural products, linking agriculture with other branches primarily in tourism, revival of the village, increase employment of rural population in the processing of service activity, enabling goods or commercial farmers, the establishment of efficient organization of agriculture, harmonization

and synchronization of Agriculture in accordance with the principles of the European Union. Set tasks in the "Strategy for the Development of Agriculture" will be achieved only if the grounds that the more numerous and stronger commodity-commercial agricultural holding accomplish projects with quick and distinctive economic effects. The strategy indicates the possibility of increasing production and expanding markets in the coming short-term and long-term future to the municipality in the northeastern part of Montenegro: Berane, Petnjica, Andrijevica, Plav and Gusinje have significant agricultural and other natural resources, which are now used in unacceptably low scale.

The question is what we want as a state when a further development of agriculture and rural development is concerned (the issue of the internal prioritization located in the area of the political decision-making). The Montenegrin agriculture priorities regarding the defined strategic development sectors should focus on: the growth of measures which finance direct income and production support, a more intensive investments to increase the competitiveness, rural development and the IPA infrastructure, the establishment and accreditation of the Agency for Agricultural Payments, the introduction of new food safety standards, agricultural registers and data bases, the Farm Accounting Data Network (FADN), the LFA Regulation implementation, new employments... (Đurović & Bulatović 2014).

Certainly, the current level of funding of the Montenegrin agriculture is not even remotely sufficient to respond to the current and future development and the EU accession negotiations challenges. A new, stable and consistent concept of agricultural policy and an adjusted budgetary support is one of the prerequisites for the necessary changes. The practice shows that the forthcoming preparatory period has to be used for strengthening the agriculture so that after the accession, it might be able to be competitive in the much larger EU market (Đurović & Bulatović 2014).

The analysis proposed is intended to be indicative rather than exhaustive. It is advanced as a starting point, which will, hopefully, inspire new illuminating research work. A next interesting step could be the identification of appropriate network descriptors. The use of relevant indicators would increase our understanding of organic farming's contribution to sustainable rural development. It would also enable decision-makers and development workers to plan and implement new initiatives

in order to optimize synergies existing between organic farming's potentials and rural communities and territories' needs (Pugliese 2001).

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Strefowanie jako warunek zrównoważonego rolnictwa w północno-wschodniej Czarnogórze: studium przypadku

Streszczenie

Zrównoważony rozwój rolnictwa różni się w zależności od miejsca, czasu, wartości i dostępnych zasobów. Proces rozwoju gmin wiejskich, z punktu widzenia zrównoważonego rozwoju, po pierwsze oznacza świadomość potrzeby planowania rozwoju, właściwej oceny mocnych i słabych stron gmin wiejskich, istniejących lub potencjalnych szans i zagrożeń, które określą priorytetowe działania krótko- i długoterminowe. W pracy autorzy wydzielili strefę w północno-wschodniej Czarnogórze na podstawie korzyści dla rozwoju zrównoważonego rolnictwa wynikających z warunków naturalnych. Podobnie jak wiele razy w historii, również obecnie, studiowanie przestrzeń to szukanie nowego paradygmatu rozwoju gospodarczego, a przy tym nie wolno zapominać ani marginalizować rolnictwa. Strategia Rozwoju Rolnictwa wskazuje na możliwość zwiększenia produkcji i rozszerzenia rynków, gdyż ta część północno-wschodniej Czarnogóry posiada znaczne zasoby rolne, które obecnie są wykorzystane na niedopuszczalnie niskim poziomie.

Abstract

Sustainable development of agriculture differs according to space, time, values and available resources. The development process of the rural communities from the sustainability perspective first implies the awareness of the development planning need, of the correct assessment of strengths and weaknesses of

the rural communities, of existing or potential opportunities and risks, which will determine the priority actions on short and long term. In this paper authors singled out area in northeastern Montenegro on the basis of benefits of natural conditions for sustainable agricultural development. As well as so many times before in history, and in these times, studied the space is looking for a new paradigm of economic development, and should not be forgotten, nor marginalize agriculture. Agricultural Development Strategy points to possibility of increasing production and expanding markets since this part of northeastern Montenegro have significant agricultural resources, which are now used in unacceptable the low extent.

Słowa kluczowe:
północno-wschodnia Czarnogóra, zrównoważone rolnictwo,
powierzchnia terenu, warunki naturalne

Keywords:
northeastern Montenegro, sustainable agriculture, area, natural conditions