



The Possibilities of Agriculture Production in the Mountains of Balkan Peninsula. On the Example of the Durmitor Region

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Introduction

Usually, the dynamic and wild nature of mountains isn't typical for agriculture development. During times, Balkan Mountains were the place for inhabiting the survivors. That means that mountains were a safe place for living. Since then, agriculture has been practiced in mountains. It has a very modest form, but with no less importance.

Durmitor region is a mountain area. The most precious of Durmitor region is its untouched nature. For example, "Durmitor" National Park covers more than 1/5 of the region (39.000 hectares) (Tomic, et all, 1996).

Therefore, Durmitor region is a perfect place for production of organic food. According to relief, climate, water and soil characteristics, animal breeding can be of a good perspective.

Geographic position of Durmitor region

The Durmitor region is situated in the North-West part of Montenegro (map 1) and it covers 13% of Montenegro (1.852 square kilometres) (Cerovic, 1989). According to the census in 2003, 2,2% of Montenegro inhabitants lived in Durmitor region (Republika Crna Gora, 2004). In this area are located 98 scattered villages.

Natural characteristics of Durmitor region

The geographical, geological and morphological characteristics of the Durmitor region qualify it as the most dynamic and interesting part of Dinaric mountain range (figure 1). It has its origins in the tectonic changes, the folding of earth's crust, during the alpine orogenesis.

Apart from Mt. Durmitor, which occupies the central part of the region, its scenery is marked by many rocky, wooded mountains that surround the region – from the peaks of Ljubisnja in the North and Maglic and Volujak in the West, than Sinjajevina and Lola in the East and South-East, and Vojnik and Golija in the South and South-West.

Its extensive grassy uplands, situated at about 1.000 meters above Sea level, represent another characteristic of the Durmitor relief.

These are gently rolling uplands of Jezero, Mountains Pivska and Sinjajevina, where picturesque villages and scattered summer cottages and shepherds give the landscape a special charm.

The most distinctive feature of the relief are the deeply cut gorges of the Tara, Piva, Komarnica, Susica and Draga rivers, which cut across the Durmitor region, causing difficulties for building communication network, but enhancing its scenic aspect and diversity.

The Durmitor massif has 22 peaks over the altitude of 2.200 m above the Sea level (Cerovic, 1989). The effects of glaciers during Ice Age shaped the rocky peaks of Mountain Durmitor and formed valleys wherever the glaciers moved (figure 1).



Map 1. Geographical position of Durmitor region.

Durmitor region abounds in phenomena originating from karst's erosion (figure 1), such as crevices, depressions and karst's fields. In this region were found about 200 registered caves and sinkholes of various depth and size (Novosel, 2001). Usually, the best cheese is made in caves.

Because of its geographical location and range in altitude, the region is under the influence of Mediterranean Sea and alpine micro climates. Winters are long and cold, summers are fairly short and cool and autumns are warmer than springs. Most of the Durmitor region has

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an average annual temperature of 2 to 8 degrees Celsius (Novosel, 2001). A characteristic phenomenon here is called inversion of winter temperatures. Then, cold air and fog descend to lower areas and valleys. Sunny days and warm air prevail in the higher mountain areas. This climatic change favors the development of livestock.



Figure 1. Cows in Skrcka Lakes valley.



Figure 2. Fish Lake at 1409 m above the sea level.

The Durmitor region represents a hydrographical centre and watershed between two drainage systems: the Adriatic and the Black Sea. Various hydrographic phenomena such as springs, disappearing rivers and underground streams, canyons and waterfalls, etc further enhance the landscape. Among Durmitor's remarkable natural wonders are its lakes. Nineteen natural and one artificial lake are spread over the entire region (Stankovic, 1998). Especially picturesque are the glacial lakes in depressions, cirques and other attractive settings (figure 2). The Durmitor's lakes or the "eyes of mountains" represent the most important places for livestock feeding. It is estimated that there are over 1.500 different plant species in the Durmitor region. Among them, mountain grasses are the most important for livestock. Owing to jagged filed many kinds of trees grow in the vast forests of the Durmitor region. Most numerous on the higher slopes are the coniferous trees: spruce, fir and pine. Beech, birch, aspen and maple trees are dominant among the deciduous species. On lower slopes and especially in the canyons, one also finds ash, oak, elm, linden, dogwood, and hazel trees. The rare species like the *Pinus leucodermis*, the yew, the gnarled pine and the mountain juniper should be mentioned, as well. Of the same interest is the inversion of the forest cover, which even above the conifer line may be deciduous shrub oak (Radovic, Cerovic, 2002). Mammals found in Mountain Durmitor have the same characteristics as forest dwelling mammals found elsewhere, such as bear, chamois, deer, wolf, fox, squirrel, rabbit, wild boar, marten, otter, weasel, dormouse etc. The number of game animals is sufficient, if appropriate measures are taken, to permit the organization of sports hunting. Around 130 different species of birds inhabit the Durmitor region. The most interesting are the grouse, the grey mountain eagle, the white-headed vulture, the partridge, the falcon, the crossbill, etc. The woodland choir is added to the delight of walks through woods and other areas. Fish species are represented mainly by the Salmonidae family, which lives in fast rivers or lakes, such as the trout, *Salmo hucho*, golden trout, etc. In pools and lakes, besides different kinds of fogs there can also be found *Tritoni vulgaris*, i.e. amphibious postglacial relicts that have survived until the present day. These are of exceptional scientific interest, hence protected (Radovic, Cerovic, 2002). During the last decades, the intensive processes of de-agrarization and depopulation resulted in a sustained decrease of the amount of worked land, as title fields became meadows, and meadows turned into pastures. These trends represent a degradation of the productive land, already limited in this region; hence the need for appropriate development measures to check these processes. In many parts of this region land erosion has reached alarming proportions, as a consequence of natural factors (high precipitation in certain rainy periods, the geological composition of the land, above the average density of the land) and also of the inappropriate activities of man (uncontrolled, excessive deforestation). This has resulted in torrents, flooding of fields and lowland settlements.

Social characteristics of Durmitor region

The Durmitor region has always been relatively sparsely populated due to the unfavourable natural conditions for earning a living and its slow incorporation into modern trends of development. Nevertheless, the population grew, though slowly, until the early 1950s when intensive de-agrarization and accelerated emigration set in, especially in the 1970s (figure 3). According to census of 1961, 4,93% of the total Montenegrin population lived here and now only 1,71% is being present here (Republika Crna Gora, 2004). Besides the general causes of depopulation, emigration from Pluzine was accelerated by construction of the Piva hydroelectric power station.

From a demographic point of view the situation is generally speaking negative. Natural population increase is exceptionally low, the consequence of a low birth rate. Age structure is likewise unfavorable, the percentage of inhabitants from 30 to 50 years due to age declining (Republika Crna Gora, 2004). The breakdown as gender regards is also unfavourable since females outnumber males.

The immediate conclusion to be drawn is that the Durmitor region is experiencing a rapid decline in the man power needed to initiate and sustain agriculture development, which can have far-reaching consequences. The downturn in farming population can not be considered favourable, as the most active inhabitants are moving to more developed parts of Montenegro and not to municipalities of the region. It is indicative that the number of aged people in area is constantly rising. Furthermore, the average household is only of 3,4 members, a critical borderline for economic stability (Republika Crna Gora, 2004). Most rural families are only marginally larger and no longer consist of three generations, which makes their permanence extremely doubtful.

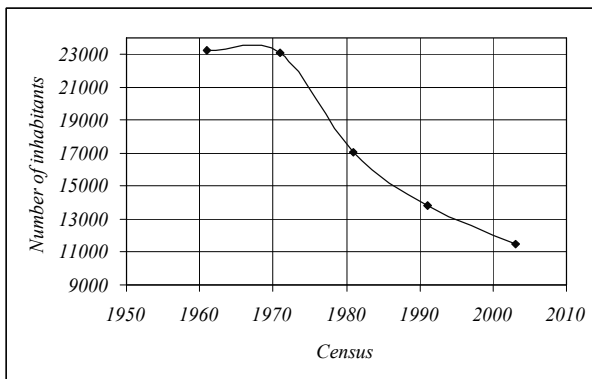


Figure 3. The number of inhabitants of Durmitor region according to Censuses 1961-2003.

In Durmitor region the number of settlements grew under the influence of the gradual expansion of the farmland. Scattered villages were first formed in the valleys of Piva and Tara rivers and then on, the slopes above were cleared, at the edges of uplands and plateaus. Today Durmitor region has a number of 98 settlements (figure 4).

Tradition of summer and winter tourism is dated from 1936. It is very important for agriculture, as well, because tourists can consume the food in its place of production. In Durmitor region, there are 4 hotels ("Jezera", "Planinka", "Zabljak", "Durmitor") and 6 motels summing up about 1.000 beds.



Figure 3. A typical village on Jezero uplands of Durmitor region .

All of these hotels are situated in Zabljak, the highest urban city (at 1450 m above the sea level) in the Balkans. The tourist trade volume in stable years is of about 90.000 overnight stays, including about 22.000 overnights of the foreign tourists (Novosel, 2001).

There are favourable conditions for promoting countryside holidays with an emphasis on agro-tourism. Holidays in traditional mountain cottages can be organized in accordance with the sea-mountain holidays; in which Zabljak has positive experiences.

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The multiplying effects of tourist consumption are to stimulate growth activity such as agriculture that provides opportunities for employing the active population.

Agriculture characteristics of Durmitor region

Despite the high altitude of the mountains in this region, the farmland covers a large area, of over 74.000 hectares, which come to a little over 14% of the total farmland of the republic (Radovic, Cerovic, 2002). As percentage of protected land is regarded, especially ecological indices pertaining to basic natural factors (land, air and water), the Durmitor region is a well preserved area offering highly favourable conditions for a long lasting orientation towards the production of high quality healthy food with a recognized trademark on the market sells for 2 to 3 times higher prices and at an upscale market even of 4 to 5 times higher.

Traditional underdevelopment, several decades of de-agrarization, depopulation and extremely limited investment in agricultural development, the result being the economic, demographic and social decline of the countryside and rural households, delay in abandoning the traditional ways of farming and inadequate equipment of cooperatives and individual producers for a large-scale production. The inevitably weakened the traditional resilience and vitality of the countryside and peasantry, while also resulting in the prevalence of aged households. Also contributing to the weakening of the reproductive forces of rural areas was the slow construction of infrastructure, the lack of organized purchase of market produce, the insufficient use of agro-technical measures, the absence of policies of adequate credit and of price in agriculture, and also the unsolved problem of social and retirement insurance for individual producers in agriculture.

Agriculture regionalization in Durmitor region

The Durmitor region is divided into three agricultural zones with three linear systems of settlements. The East zone is connecting the villages on the edge of Mountains Sinjajevina, Lola and Krnova. The central zone is connecting the settlements along the valleys of the Komarnica, Piva and Susica rivers. The West zone connects the villages beneath mountains Vojnik, Golija, Volujak, Bioc and Maglic.

Agro economics

The relative share that agriculture contributes with in creating the social product increased several times in all municipalities. The share is particularly high in Savnik, amounting to 79,4%, which means that order areas of activity were reduced to a minimum or came to a complete halt. It is characteristic that agriculture contributed with a high share in the municipality of Zabljak (42,3%) where tourism and other activities in 1989 were of 73% of the total social products, whereas in 1998 their share amounted to only 47,1%. In the municipality of Pluzine the share of agriculture rose from 13,2% (in 1989) to 37,4% in 1998 (Radovic, Cerovic, 2002).

Agricultural production, especially with the promotion of animal breeding, would economically valorise the region's significant farmland capacities. According to expert analyses the Sinjajevina uplands alone could graze over a four month period on average, about 7.000 head of cattle and 60.000 sheep, not counting the young. With better infrastructure – roads, water and electricity, the mountain could be one of the most extensive high-quality pastures in the Balkans (Radovic, Cerovic, 2002).

Agriculture policies

Since food production is one of Montenegro's long terms strategic commitments, it is quite certain that such production would be accompanied and encouraged by effective, active

economic and agrarian policies for food production, with the interactive development of tourist-catering services and allocation of investment from foreign and local sources.

An engaged, active economic policy aimed towards food production would directly and indirectly contribute to easing and bringing to a halt the process of depopulation and also to the demographic, economic and social revitalization of rural areas, which is certainly a long term interest. In order to implement this growth orientation, an emphasis must be put on promoting rural holdings based on: food production, tourism services and small businesses with a corresponding development of communications, technical and social infrastructure (Radovic, Cerovic, 2002).

Analysis of the Livestock farming

A more rapid development of livestock farming, especially sheep and cattle rising, would serve as a basis for advancing market-oriented production. Promoting primary production must be the concern of both the state and processing capacities, with financially consolidated, better organized producers in agriculture.

Measures must be much more promptly taken to improve livestock breeds, set up veterinary services, agricultural pharmacies, provide specialist training for modern production apply modern science and technology in producing and processing farm products adopt generally accepted norms and quality standards, organize sales and purchasing etc. There should be enough encouragement and financial help for building rural infrastructure, opening mountain areas, revitalization and electrification of shepherds' cottages, providing watering troughs for livestock.

In all the above mentioned and other activities is not only stated the assistance and the support that is needed, but also constant, programmed and well-organized expert help for agricultural producers until they become financially consolidated and have the necessary specialist skills.

In addition to improving livestock breeds and health protection it is necessary to introduce radical improvements in livestock feeding, i.e. to establish a balance between needs in livestock fodder in summer and winter periods, since this disproportion is one of the weakest points in livestock raising in this region.

Measures should be devised as soon as possible to check the continuous decline in the number of sheep. It would be realistic to expect that in the total republican figure for sheep this region would account for 15-17%. These relatively high requirements in the development of sheep farming are based on the fact that sheep can best use vegetal mass on extensive highland pastures and therefore this product (especially lamb) is of a good quality. In addition to these measures, efforts would be needed to improve the autochthonous breed of sheep (Balkan breeds) and their productive qualities. It had to increase the number of sheep by granting loans to agricultural producers. It is advisable to improve shelter, feeding and the increased production of livestock fodder. It is very important to improve production technology and health care. It had to organize continuous breeding and purchase of lambs and wool. Rural holdings, farms and cooperatives are seen as the chief exponents in promoting sheep breeding (Radovic, Cerovic, 2002). The gradual increase in the number of cattle since 1994 is encouraging. It can be attributed to measures taken by republican organs to improve breeding and increase the number of cattle, as well as a greater orientation towards rising cattle instead of sheep. This particularly applies to mixed-activity and aged households that lack the labour force necessary for sheep farming. If an active economic policy as regards cattle rising is pursued, one can realistically expect that the Durmitor region will contribute with 11-12% of the total number of cattle in the republic (Radovic, Cerovic, 2002).

In the future it will be important to improve breeding (from small brown highland breeds and their crosses to the Simmental breed), which would ensure an increased production of milk (about 4.000 liters annually) and meat, as well as good gains in fattening. It will have to organize selection services in cooperatives. It can be use to promote development in promotional dairies centres, with the obligatory keeping of records. Moreover, someone must carry about the allocation of financial means in order to adapt the existing barns and build new ones, thus making it possible to introduce modern zoo-hygienic and zoo-technical measures.

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The Durmitor region must organize its production of meat using the “cow-calf” system and fattening (500 kilograms) as well as extending seasonal fattening of cattle on pastures, using a minimal amount of concentrates (Radovic, Cerovic, 2002). The greater use of corn silage, grass, hay, etc. as fodder must be imperative. It has to examine the possibilities of organizing a cattle farm as a factor of promoting cattle breeding. As in other development mountain regions, it has to organize the purchase of milk and dairy products.

There is some interest among other types of livestock farming in the rising of horses and poultry, although here, decline is reported as well (figure 4). Pig and goat breeding was never traditional in this region although lately there has been a greater demand for goat cheese and goat meat. Definitely, these types of livestock farming will be of local interest in the future, whereas horse breeding may be of a greater importance, which would be a subject for special analysis.



Figure 4. Horses in Durmitor region.



Figure 5. Raspberry.

Organic Production

The local government of Durmitor region makes serious plans about the production of organic food. The fact is that Jezero uplands lie on the fertile mountain mould (figure 5). By linking tradition, sustainable development and science can result in a winning combination for success. In order to get the certificate for organic food production the soil shouldn't be treated with chemicals for at least three years but it should be prepared with manure or biological and liquid fertilizers. Those standards are accepted in the USA, WU and Japan but in Montenegro the research of this matter is just in its primary stage. Another important thing besides fertility is the healthy soil (not contaminated) without chemicals and additives. Organic food production is highly estimated over the world due to the absence of industry and the use of scarce chemical products in the food production. The farmer of Durmitor region and the soil have a great chance to obtain a very high position on the world market (<http://www.ekozona.com>). The organic products have about 20-50% higher prices as compared to the ones of conventional agriculture. The organic agriculture in Durmitor region is related to production of natural and health food, not containing harmful elements and production of organic products that have a certificate, a recognizable quality and origin, in demand on the world market. It is very important to preserve and promote the environment by introducing the organic agriculture as a segment of sustainable development. The development of organic agriculture does not require huge investments. It can significantly engage the local producers and induce development to the accompanying economic activities and bases for the development of the exclusive tourism. Organic farms are attractive for the eco tourists. It is suitable for the organization of voluntary working camps as well as for education of pupils and students within the eco-camps. An organically oriented agriculture ensures the preservation of a clean environment (clean water resources, clean air, preserved flora and fauna) which are of a great importance for the existing water factory and the eco tourism.

The “Durmitor Eco Zone” is the name of the new project. The basic idea is to transfer knowledge, ideas and information. That means to direct the development of the region towards the use of ecological potential, to the opening of new fields of activities that would significantly increase the number of new, specialized job positions and the reorientation of the ones already existing. In the meantime, the regional plan should be made; having the architectural solutions that would use as their basis the traditional Durmitor house and the mountainous constructing style (<http://www.ekozona.com>).

The main goal of the „ Durmitor Eco zone “ project is to obtain the international certificate for the soil of this region that has essential qualities to satisfy.

The feasibility of the project lies in a completely conserved soil which, due to a traditional way of agricultural production, may comply with the standards prescribed by the European Union. Such an approach shall help for the existing problems to be overcome (dislocation of the inhabitants, poor living conditions, and difficult sale of the most qualitative food products). Such solutions will stimulate a comeback of the old crafts, the ethno villages and the home-made production that can provide, in a short time, visible economic results.

If such a concept for development of this part of Montenegro is adopted, every product could have engraved a sign “Durmitor Eco Zone”, as a kind of a quality sign. Such products are in demand on the world market and with the application of a wise marketing they would soon find their customers.

This would certainly contribute to the establishment of the Durmitor brand products, such as Durmitor teas or vegetable preserves. Popular restaurants in Zabljak had completely re-oriented their offer to the national cuisine (<http://www.ekozona.com>).

For the development of agriculture in Durmitor region it has to organize an Internet presentation that will introduce the ecological offer of this region (food, herbal plants).

It will also be very useful to organize a seminar on Durmitor’s organic agriculture, for which a complete advertising material will be provided. It is a way of providing, in cooperation with the departmental ministries, an international certificate for the territory of the “Durmitor Eco Zone” (<http://www.ekozona.com>).

Other Agriculture Potentials

Durmitor region has numerous agriculture potentials. Therefore, it has to be very wise in using them in the best possible way, but at the same time it has to preserve the nature.

The most important thing is to enable a greater number of households (small farms) to produce for the market, to set favourable price ratios and provide a reliable purchasing system for milk. A higher level of economic valorisation is achieved through organizing milk processing and producing quality dairy products. Mini dairies should therefore be set up for this purpose. Apart from the mini dairy of Boan, for which a design has already been drafted, a mini dairy should be built on the territory of Pluzine, in a convenient site.

These new mini dairies will make it possible to produce dairy products, especially quality cheese and cream, also yoghurt, sour cream and butter. Priority should certainly be given to completing the project for making “Durmitor cheese” as a recognized trademark with specific chemical and physical characteristics (Radovic, Cerovic, 2002).

Apart from the traditional production of fresh lamb, beef and mutton, based on expert analyses and especially estimated future market needs, studies of the feasibility of processing quality meat should be made, in addition to its standardization, will make it necessary to build mini slaughter houses, smoke houses and other modern facilities.

Having in view the rivers and the large areas with pure water of the region one can reasonably claim that there are good conditions for rising quality fish.

This particularly applies to artificial Piva Lake where a large scale farming (fish raised in cages) could be organized. If there is an orientation towards rising fish in Lake Piva, it is realistic to plan its processing – canning and possibly drying. There are also good possibilities for raising trout in private mini-fisheries, as clearly confirmed by the private mini fishery of Mratinje. Exceptional possibilities with restocking and compliance with strict standards exist for promoting fishing sports in the pure Durmitor rivers, which could be an important and attractive branch of tourism.

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In the last few years production of quality honey has been constantly rising, so that by 1998 the region possessed 4,5% of the bee hives found in Montenegro.

While taking the appropriate measures for making honey and organizing bee keepers, the region could, in a relatively short period of time, organize the production and sale of honey with a recognized "Durmitor – made" trademark. Honey should also be seen as a component of pharmaceutical and cosmetic products as well as various finite products made of honey, which warrants more detailed study (Radovic, Cerovic, 2002).

In addition to the traditional raising of potatoes and cabbage, recently there has been an increased production (for local needs) of various types of vegetables, such as carrots, beets, onions and different kinds of lettuce. Given to the rising demand for this produce, fresh or processed, it would be good to study the possibilities of producing vegetables for the market, including fermented vegetable juice. It is quite certain that conditions for growing quality seed potatoes still exist.

Although the region produces a wide range of fruit cultivated in orchards (plums, apples, pears, strawberries) or picked in the wild (blackberries, raspberries, blueberries, hazel nuts) not a single type is cultivated for commercial purposes, nor (apart from traditional processing) are they made into finite products. A detailed study it is needed and then a commitment to quality production, especially berries (also in market gardens) and their final processing (juices, jam and others).

Since the gathering of mushrooms and various medicinal herbs (though picking certain types is forbidden) proceeds spontaneously, there is a danger that this natural resource will soon be degraded. Therefore detailed analyses are needed that should range from determining the raw material basis and possibilities of commercial growing, to final production and regulation by the authorities and especially rigorous protection of this wealth in the Durmitor National Park.

Of special note is the wealth of medicinal herbs and various kinds of wild fruits from the forest, which can serve as an important resource for finite products and employment of the population.

The agriculture problems of Durmitor region

The agriculture problems of Durmitor region are usually the same for all mountains of the Balkans. The quality of local roads is very bad. Building local roads to connect villages to municipalities and a regional road network is of a great importance for the general revitalization of the countryside. The veterinary service is undeveloped and poorly equipped, especially bearing in mind that this is a very extensive territory and the primary occupation is agriculture and livestock rising. As a particularly important measure there is the need for setting up agricultural pharmacies in municipalities.

A centralized system of financing that leaves very limited means at the disposal of municipalities, restricts any initiative to solve such problems as: building shopping centres, open air town and livestock markets, bus station, Automobile Association service stations and auto parks sale, sport fields and playgrounds, as well as facilities for cultural entertainment and informative activities (Radovic, Cerovic, 2002).

A special problem for the entire Durmitor region, where agriculture and livestock rising dominate as the main activities, is the almost total absence of a system for purchasing livestock and other farm products, so that the agricultural producers and gatherers of forest products and medicinal herbs are left to the mercy of middlemen.

Conclusion

Durmitor is a region that, due to its nature concentrated on tourism and agriculture, has been protected from the harmful influences of modern civilization. Durmitor region is the most attractive and promising territory of Montenegro that will become even more significant. In terms of the territory, the area is envisaged even beyond the National Park boundaries, since the entire region complies with the strictest ecological standards.

The development of agriculture and the revitalization of the countryside figures among the basic directions of growth for this region, especially since much of the population lives in the country and is engaged in this kind of work. The development concept for these activities proposes intensified livestock rising on the basis of mini-farms in the private sector and the coordinated, complementary development of agriculture, tourism and small businesses. Thus, it is necessary to promote high-quality products characteristic to this region and to improve processing capacities (dairies etc) and organize the purchase of livestock and other products.

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