

## SUSTAINABLE DEVELOPMENT OF THE REGION FRUŠKA GORA WITHIN AP VOJVODINA

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**Abstract:** For the purpose of creating the strategic document "Master Plan for Sustainable Development of Fruška gora 2012-2022." it was analyzed all the components of sustainable development of Fruška gora. These components include the following areas: protection and enhancement of environmental values and natural resources, protection of cultural and historical heritage, protection and presentation of geological heritage, forestry, hunting, fishing and beekeeping, tourism, infrastructure, water management, water courses and utility infrastructure, agriculture; information system, branding of products and areas, demographic growth, and renewable energy resources. The central part of the mountain is incorporated in the National Park, which is surrounded by villages and agricultural land with extensive use. In a broader scope there are larger settlements, as well as areas that are intensively used. Agriculture is the traditional economic activity in this area. The need for introducing a new model of management for this area is caused by the fact that the development of Fruška gora in the previous period was marked by negative tendencies due to disregard the specific needs of municipalities within this region. Bearing in mind the specific requirements of a municipalities within the Fruška gora, a new model of management in this region was made on the model of developed countries of the European Union, taking into

account their experiences in terms of integrating environmental protection with other sectoral policies. In order to protect national park and sustainable development around the area, some analysis were made such as analysis of existing conditions and inter-sectoral harmonization of interests of all interested users. In accordance to the present situation, this document gives a comprehensive solution for the whole area, considering all activities that are performed on it. This paper emphasizes the aspect of interdependence of sustainable development and development of agriculture in this area. The principle of sustainability of Fruška gora was based on a synthesis of socio-economic, environmental and cultural aspects of development, and which complies with the conditions, limitations and capacities of the environment, ensuring future generations of improved conditions for survival and development. Multifunctional agriculture will have a key role in the future development of agriculture in this region. Development of multifunctional agriculture in Fruška gora should be based on the principles of sustainable development, which provides: production of quality food, rural development, adequate standard of living, protection of biological and geological diversity and environmental protection in its entirety.

**Key words:** Fruška gora, agriculture, sustainable development

### INTRODUCTION

Fruška gora is island's mountain in the Pannonian Plain. It is situated in Srem, in AP Vojvodina (Republic of Serbia). The research area is spatial-planning determined by a specific Plan for Special Purpose of Fruška gora until 2022 year. It includes mountain Fruška gora, Fruška gora loess plateau and part of the Danube, with the total area of 139,430.01 ha. Municipalities Sremski Karlovci, Petrovaradin and Beočin are entirely in the area. Municipalities Irig, Indija, Šid, Bačka Palanka and Ruma, and the city Sremska Mitrovica are partially included into the coverage plan. The central part of Fruška gora declared as a national park in 1960 year is on the surface of 25 525 km<sup>2</sup>. Protection is provided on the entire area,

and exceptional geological and biological values are being protected in accordance with the prescribed measures and activities that are defined through the protection regimes I, II and III. In the international context, National Park-Fruška gora was set aside as an important botanical area (IPA) and important area for birds (IBA). The national park is surrounded by rural area with a dominant participation of agricultural land, which are in the type of various degrees of use. Agriculture is the traditional economic activity in this area, with a dominant participation of small holdings (NJEGOVAN et al, 2011).

In order to improve development of the Fruška gora, the Government of the Autonomous Province of Vojvodina has initiated the making of the strategic document "Master Plan for Sustainable Development of Fruška gora 2012-2022", which is adopted by the Assembly of AP Vojvodina in 2011. year. "Master Plan for Sustainable Development of Fruška gora" is a comprehensive development and planning document of sustainable development of this area for the following fields: protection and enhancement of environmental values and natural resources; protection of cultural and historical heritage; protection and presentation of geological heritage; forestry and hunting; fishing and beekeeping; tourism; infrastructure; water protection, regulation of streams and utility infrastructure; agriculture; information systems; branding of products and areas; demographic development and renewable energy sources. Fruška gora should be a modern development region with high standards of protection of natural resources and sustainable use (PEJANOVIĆ et al, 2011).

The consequence of centuries of farming is conversion of many natural habitats into arable land (fields, orchards and vineyards). This trend of transforming is currently available. Natural steppe habitats are reduced to smaller fragments, and they are localized on the less accessible terrain. They are used for mowing-meadows or for grazing of livestock. Agroecological measures (mowing and grazing) contribute to the conservation of biological and landscape diversity (PANJKOVIĆ et al, 2008). The traditional and dominant activity in the area of Fruška gora is agriculture, which has a comparative advantage and has a long tradition: fruit growing, viticulture and vegetable crops, but they are still underdeveloped (PEJANOVIĆ et al, 2011).

#### **MATERIAL AND METHODS**

Methodological principles that were used for the comprehensive analysis of the sustainable development of the area are based on the basic principles of strategic planning (Pejanović et al, 2010). Methodological steps in the research are relate to: the collection of valid legal regulations, the adopted strategy of the Serbian Government and the Assembly of AP Vojvodina, planning documents, studies, plans, projects and other documentation, which has already been made in the function of the development of parts and/or areas of Fruška gora, an overview of the current situation, SWOT analysis, the proposed development concept (vision, sectoral target, operational tasks), the proposed measures for achieving those objectives; sustainability of proposed solutions with economic analysis (investments, income); mapping (detailed maps stored in the information base).

Sources of data are taken from a documentary of "Master Plan for Sustainable Development of Fruška gora", and the most significant are: Spatial Plan of AP Vojvodina, the Spatial Plan for Special Purpose of Fruška gora and spatial plans of municipalities which are included in the coverage of "Master Plan for Sustainable Development of Fruška gora". In addition, in the paper are used sources of unpublished data obtained from local authorities during the investigation on "Master Plan for Sustainable Development of Fruška gora"

## RESULTS AND DISCUSSIONS

New directions for the development of agriculture in the world are focused on question of sustainability of agricultural areas. Fruška gora has multifunctional aspect of using, because the implementation of sustainable development enables the realization of further development of agriculture, at the same time whit protecting the natural values of all the resources that exist on it (PEJANOVIĆ et al, 2011).

Aspects of environmental protection in the region of Fruška gora have three modalities:

- protection of natural resources and environmental improvements;
- protection and presentation of geological heritage;
- water protection, regulation of streams and utility infrastructure.



Figure 1: The protected area around Beočin

In terms of harmonizing the protection of natural resources and sustainable development of Fruška gora, which are significant for determining the direction of future development of agriculture, stands out (SZABADOS et al, 2011; PANJKOVIĆ, 2004; PANJKOVIĆ et al, 2008):

- preservation and enhancement of landscape, biological and geological diversity;
- the establishment of ecological networks;
- the use of natural resources based on ecosystem approach, use of agro-environmental measures with granting of subsidies;
- development of traditional forms of use of the revival of the livestock (domestic breeds of cattle, pigs and sheep), preservation of grassland habitat with the use of active measures and the traditional use (grazing, mowing);
- promotion of organic farming in order to preserve the beneficial micro- and macro-organisms in soil;
- waste management system;
- establishing a system of wastewater treatment;
- arranging protection zones of drinking water sources, waterways, coastal areas, with adequate protection from erosion and flood control.

**Aspects of agricultural development in the region of Fruška gora have several forms, namely:** rural development, fruit growing, viticulture, livestock breeding, vegetable crops, production of quality bio-compost, production of medicinal herbs and regulation of land roads and irrigation. Development solutions for agriculture of Fruška gora are directed to those branches of agriculture that have potential for development and which will not be in conflict

with environmental protection. Namely, in the future development of this region, agriculture remains as an important economic activity (PEJANOVIĆ et al, 2011).



Figure 2: Protected species - Imperial Eagle (*Aquila heliaca*)

Fruit growing, viticulture, livestock breeding, vegetable crops are most developed branches of agriculture in Fruška gora and their future development are based on the application of integrated and organic agricultural production systems (PEJANOVIĆ et al, 2011). This development is primarily determined by the optimal microclimate conditions, but the good tradition of the manufacturers. However, the concept of development of the region highlights the need for greater affirmation of these activities because they are under-used existing facilities. Also, the aspect of the collection and cultivation of medicinal and aromatic herbs in the past has been insufficient affirmed in Fruška gora. The concept of development of Fruška gora gives the possibility that available resources of this plants can be adequately used through: sustainable harvesting, cultivation, processing and processing of medicinal and aromatic herbs.

For successful implementation of organic production it is planned the establishment of Fruška gora's development centers for organic and traditional production, which will play an important coordinating function. Within these centers are established several demonstration centers for plant crops, vegetable crops, fruit, medicinal plants. Also important activities that will be provided in Fruška gora are: arranging land roads, irrigation and production of high quality biocompost (from straw and manure from farms using eco-technology-oriented microbial composting). Significant additional benefits for the region of Fruška gora are production of healthy and safety food provided by beekeeping and fisheries.

The entire Fruška gora's agriculture is based within the framework of the planned development of rural areas. Likewise, the management of forest land and the development of hunting as an essential part of rural development model are represented in the development concept of Fruška gora.

The development of fruit growing in the region of Fruška gora in the future should be based on the following activities: promotion of intensive fruit plantations based on integrated and organic model of production, with modern storage and processing facilities near production's microregions.

Also, the realization of this goal implies achieving greater total production and high-quality fruit that suits the requirements of foreign and domestic markets. In other words, it is expected that the current production of 37,000 tones of fruit is increased and is approximately 300,000 tons (University of Novi Sad, 2011).



Figure 3: Vegetable crops in the area of Fruška gora



Figure 4: Growing apricots in the area of Fruška gora

Development of viticulture in Fruška gora is scheduled by increasing plantings of new vines, by the latest technology, with the recommended varieties. In ten years it is expected that there will be increase the area under vines. This means that the current total area of 1,500 ha at the end of the planning period will be about 5,000 ha. It also gives great importance to the improvement of production technology and processing of grapes and wine. Significant fact is that part of the planning area (10%) is to be set aside for growing table varieties of grapes, and a portion (10%) for organic production of grapes and wine. This systematic work on the improvement of viticulture in the next few years in Fruška gora will make the wine routes (University of Novi Sad, 2011).

Development of livestock in the area of Fruška gora envisages the development of this branch of agriculture in the form of eco-farms. This development is planned on the basis of analysis of development opportunities in animal production and related crop production in the eco-farms. In the area of Fruška gora different models of eco-farms are planned-family multi-functional eco-farm, small-scale eco-farm, secondary and higher capacity. (University of Novi Sad, 2011).

Development of vegetable production in Fruška gora is based on long-term vision of production of 1,220 hectares organic, cultivated, and bio-garden's greenhouse of quality, health and safe vegetables for domestic needs and export, with the protection of biodiversity with trained personnel and producers.



Figure 5: Sheep breeding in the area of Fruška gora

In this context, certified organic cultivated land's and greenhouse's vegetable production and trade of bio-garden's vegetable production is intended for the domestic market and export. This supports the development of organic vegetable production. Multifunctional bio-gardens are a real support for sustainable rural development and biodiversity conservation of Fruška gora's areas (University of Novi Sad, 2011).



Figure 6: Growing tomatoes in the area of Fruška gora

Development of agricultural production in Fruška gora means completion of the whole plant and livestock production. In this unity, there is significant potential for production of quality organic fertilizer, while preserving the environment from any pollution. The available litter and manure application technologies aimed microbial decomposition will result in a high-quality bioactive organic compost fertilizer.

### CONCLUSIONS

Agriculture of Fruška gora is characterized by predominant small and medium sized family owned farms, with a reduced number of agricultural population, especially young people. The development of Fruška gora's agriculture is based on the development of extensive and intensive branches of agriculture and eco-farms on the principles of sustainable development. Sustainable agricultural development in Fruška gora in the future will provide a good market position in this region which will be important for the production of health and safe food. Great emphasis is placed on the future implementation of the organic model of production that will provide: economic profit and environmental profit (providing ecosystem services), ensuring social security of population. This unique concept of agricultural

development in the area of Fruška gora will provide that impacts of agriculture on natural resources (land, water and biodiversity) reduced the positive effects.

World experience in sustainable development is important guideline that best illustrates the statement that ecology may not be in conflict with economy. Threats to the environment and depletion of natural resources create "external" costs that exceed the profit arising from their use. Therefore, sustainable development is a primary objective for the development of the region of Fruška gora. Sustainable development of Fruška gora through the synergy between environmental, economic, social aspects best evaluate its value. Finally, it should be noted that this projection of agricultural development of region of Fruška gora is based on the model of developed countries of the European Union.

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