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# ANALYSIS OF THE SITUATION AND THE IMPORTANCE OF FORESTRY IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT IN SERBIA<sup>1</sup>

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**Summary:** *This paper presents the analysis of situation of forests in Serbia. The data to be presented are related to the parameters of the situation of forests in Serbia in the last five years, according to official statistics. The aim was to draw attention to the status of forests in Serbia and the importance and prospects of further development of this important segment of the economy in the context of sustainable agricultural and general development of the state of Serbia. The forests are very important at the global level (primarily as the "lungs" of the planet) in this context should be carried out foreseen measures of care and protection of the forest area. The paper presents the legal documents and Forestry Development Strategy in Serbia. A section is dedicated to analysing the condition of forests in the Serbian Danube as an important region that is part of the Danube basin, which connects several states of the European Union.*

**Keywords:** *forestry, sustainable development, biodiversity,*

## INTRODUCTION

Forests are of great importance at the global level and have multiple roles. The importance of the noise is with respect to already-known syntheses of oxygen, in addition is also important that the volume of wood is used in the industry; forest affect the water cycle, the microclimate conditions, prevent soil erosion, habitat for many plant and animal species; Forests are a significant factor in the global carbon cycle as a reservoir of bound carbon. Previously, forest covered a much larger area but intensive logging has led to a significant reduction in these areas. To major deforestation has been the development of agriculture and increase of arable land in the nineteenth century. By the mid-twentieth century reclaimed two-thirds of the forests in Serbia. In addition to deforestation, there has been a degradation of forests in several ways: the development of certain diseases, the destruction by insect pests, the effect of natural disasters and fire.

The total territory of Serbia, according to national inventory (2009), forests was represented on 29.1% and that means Serbia is middle wooded ground (7.1% in Vojvodina, in central Serbia 37.6%). According to international definitions, woodland is also scrub and bush and in Serbia they occupy 4.9% of the area. According to the calculations, forest land in Serbia stretches to 34.0% or 36.3% compare to the productive land area. Years of monitoring forest cover in Serbia and statistics related to these issues in relation to the referenced 1979th shows that the forest area has increased by 5.2%, which certainly is relevance in a positive impact on the environment. This increase is a result of the implementation of forest cover planned forestation, but some other factors must be taken into account as a reduction in the number of residents in the rural area and the cessation of extensive agricultural production. The question is targeting also cadastral and recording categories and land uses that are not always in line with reality. The forest coverage in Serbia is close to the global one (30%) and significantly lower than the EU, which is 46% (2000).

In comparison to some European countries, Serbia is similar to Romania (28.0%), Spain (28.8%), Norway (28.9%), France and Greece (27.9%). The forest coverage in Serbia in relation to population is 0.3 hectares per capita. Compared with other countries, it is much smaller (1.01 ha Austria, Bosnia and Herzegovina 1.38 ha, 1.31 ha, Bulgaria, Croatia 1.25 ha, 0.75 ha, Czech

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Republic, Finland 5.91 ha, Germany 0, 92 ha, 6.93 ha, Norway, Rumunija1, 02 ha, ha, 1.02 Slovenia, Switzerland and Russia 11.11 ha). Quality of forests is determined on the basis of their structure and origin.

## MATERIALS AND METHODS

In this paper is analysed the available literature data related to the condition of forests in Serbian Danube. Also analysed the official statistics, and in terms of methodology were applied standard statistical operations.

## RESULTS AND DISCUSSIONS

Legislation in the field of environmental protection in Serbia has been adapted internationally, especially taking into account the protected area as a special nature reserve Upper Danube and the National Park Frushka Gora and the Iron Gate on the Danube area. These are unique natural ecosystems and are rare and valuable in terms of biodiversity that they have.

In the context of sustainable development and conservation of the environment and biodiversity, a growing need for protected areas in the national and international instruments ratified by our State exists. Protected areas are considered in the light of climate change, one of the main tools to mitigate these effects. Preserved, especially forests, ecosystems have greater flexibility and adaptability in relation to climate change. Protected areas can mitigate climate change by preventing the accumulation of carbon being lost in the process of photosynthesis absorb de novo and associate carbon from the atmosphere. Integral ecosystems contribute to the mitigation of extreme events such as storms, floods and droughts. Sustainable use of protected ecosystem has its economic importance in terms of tourism and fisheries, as in the Danube region can be emphasized. (The assessment of vulnerability to climate change, Serbia, Belgrade, 2012th)

Total number of established national inventory of woody species in Serbia is 49 species. Of this number, there are 40 species of deciduous and the other, evergreen, are represented by 9. The total volume record the highest percentage of beech forest 40.5%, 13.0%, followed by bitter and sessile oak 5.9%, 5.8% of farnetto, hornbeam 4.2%, 3.1% locust, oak 2.5% and 1.6% of ash. Spruce Coniferous has the largest capacity share of 5.2% and 4.5% of white pine and fir 2.3%. While the poplar is grown on 1.7% in volume of the total forests in Serbia, other types of trees have 1 or less than 1% share. Of the total forest area (2,252,400 ha) in Serbia state-owned is 1.194 million ha, or 53%, and other 1,058,400 ha or 47% is privately owned. (National Forest Inventory of the Republic of Serbia, 2009).

Climate change is a global problem with serious consequences at the local level. In the center of the Serbian Danube following climate change occurs:

- Absent of the usual seasonal changes, with frequent droughts and floods, which caused significant damage.
- The increases of temperature and drought have particularly negative consequences for the agricultural area of the Lower Danube and Vojvodina.
- Reduced winter snow cover and reduce indirect impact on the reduction of water resources (drinking water, as well as those designed for industry and agriculture)
- Forests are vulnerable in many ways by climate change: fires are more common and more dangerous, more frequent are disease outbreaks, epidemics and pests.

Global warming has an impact on forest ecosystems so that there is more to the withdrawal of forest and cooler locations. The impact of climate change is evident in Serbia and one of the areas most exposed to the impact of these changes is considered to be the Danube-Carpathian Basin. The impacts that climate change may have on the forest are as follows:

- Pushing the limits of some forest types in relation to the geographic breadth of the house, and elevation;

- Change the size distribution of different forest types and their relationship;
- The Decline and withdrawal of certain forest communities
- Changes in the composition of plant communities
- Changes in the ratio of individual species to the light
- All of the above will have the effect of cumulative effect, which will adversely affect the conservation of biological diversity and the possibility of a rational management of these natural resources. (Medarević et al., 2007).

The Upper Danube is special nature reserve is of great importance and is one of the first categories of protected resources. By classification of IUCN it is placed in category IV as Habitat and Species Management Area. The reserve represents an area (19 648 ha), placed on the left valley plain of the Danube from border with Hungary to Bogojeva, covering the city of Sombor and the Municipality of Apatin.

Special Nature Reserve of the Upper Danube is a large marsh complex. These marshes are composed of a number of plant communities such as forests, meadows, ponds and wetlands along the Danube River and its meanders. This wetland was drained and thus is very narrow, representing the rest of the great marsh ecosystem. The impact of human activities in this area is reflected in the establishment of forest plantations. These planted forests at the same time are used as hunting grounds. It has been realized as an imperative that these complex forest must be managed comprehensively and integrally, as this is a valuable natural resource and rarity.

This is a special nature reserve and one of the last refuges for plants and animals associated with floodplains. In terms of fauna presented in the reserve, there are, 51 species of mammals, 248 species of birds, 50 species of fish, 11 species of amphibians, 9 species of reptiles, many invertebrates. In terms of flora it is considered that there are more than 1000 species of plants. The reserve is home to dense almost impassable marshy forests composed of native poplars. The reserve is represented and some endangered species *Eranthis hyemalis*, *Hottonia palustris* and *Hippuris vulgaris*. It is quite obvious that reserve must be investigated not only in terms of biodiversity and natural values but in terms of tourism. There is a great potential in the authentic cultural heritage of this area, which makes it very authentic as destination. Developing hunting tourism and fishing represents certainly a big potential in this area. <http://www.gornjepoduna.vlje.info>

The Middle Danube in Serbia is area that has changed much with urban and agricultural activities. Near of the New Sad is the National Park Fruska Gora that is an Important Bird Area (IBA) and Important Plants Area (IPA). This mountain (539 m highest point) is rich with oak, hornbeam, beech, linden and other trees species. Flora of the protected area has over 1,500 plant species. The plant communities of the National Park are inhabited by over 50 endangered plant species. It should be noted that it was found more than 30 species of orchids, of which 18 species of international importance. In addition to dendroflora a fragmented steppe species might be found. Among fauna presented a protected species of insects, amphibians and reptiles, which are on the Red List of Threatened Species, might be found. Avian species are represented with 211 ones of which 130 are nesting. Fruska Gora is one of the most important areas for rare birds nesting in the Pannonian Plain and Serbia. Only in Fruska Gora eagle nest one of the endangered species. Of the many species of mammals protected species of bats, ground squirrel and mole rat should be set aside.

The central part of the Lower Danube, is National Park Iron Gate. That is a national park that meets the geomorphological, hydrological and natural science requirements for national park status (Official Gazette 36/09). Iron Gate National Park is the territory placed in southeast of the Europe and the north-eastern of Serbia, on the border with Romania. ([www.djerdap.np.org/start.html](http://www.djerdap.np.org/start.html))

Area of the national park Iron Gate under trees is 64% and they are mostly rich and diverse forest ecosystems. From over 1.100 plant species should allocate relict and endemic. Hazel (*Corylus Colum*) is one of the relict species, which here forms thick and old phytocenoses with other relics. Eternal green trees and shrubs in the Iron Gate are represented by holly (*Ilex aquifolium*), olive (*Daphne laureola*) and yew (*Taxus baccata*). Together with relict species in these communities one

can meet modern species of trees and shrubs. Approximately there are fifty plant communities in this area of which 35 are relict. Vegetation characteristic of this national park is that different types of woods alternate at a short distance. Large differences were observed in the forests of silicates in relation to the forest on a limestone base. In addition to the previously mentioned species *Corylus columna* relict communities are made up of the following types: Lilac (*Syringa vulgaris*), walnut (*Juglans regia*), silver linden (*Tilia cordata*), maple (*Acer monspesulanum*), downy oak (*Quercus pubescens*), hackberry (*Celtis australis*), (Corinus *coggigrya*). Most important with particular emphasis on forests are Moesian beech (*Fagus moesiaca*), oak (*Quercus petraea*) and hornbeam (*Carpinus betulus*). It can be based on these forest communities to conclude that in this national park, there is very interesting mosaic of forest types and communities of interest in the scientific and tourist sense.

The Iron Gate is the largest national park in Serbia and as such is protected by a special legal document. Local plan for use of the National Park represents the goals and objectives of nature conservation and development, and measures to improve conditions and sustainable use of the area. According to this document zone with three levels of protection were determined. In addition, the National Park was established as Iron Gate IBA (Important Bird Areas), IPA (Important Plant Areas) and PBA (Prime Butterfly Areas) and is a part of the EMERALD area network (Emerald Network of Areas of Special Conservation Interest - ASCII) - significant with point application of Convention on European wildy Flora and fauna and natural Habitats (Bern Convention) conservation in Serbia. The area of this park is placed on the Preliminary List of the World Cultural and Natural Heritage (UNESCO), is a candidate for the Biosphere (MAB), and is in the list of the Carpathian region (Framework Convention on the Protection and Sustainable Development of the Carpathians). (Spatial Plan of Special Purpose for national park "Iron Gate", 2011.) All regulations must be given to the importance and implementation of activities to protect this national park has to be implemented.

## CONCLUSIONS

Forest ecosystems in the Serbian Danube region who are considered in this work are part of the continent within the European Danube region and must be preserved as it is ratified in international and national regulations determined. Modern approach to the problem of forest ecosystems must be comprehensive and current climate change must be taken into account. Interactive relationship of climate change and the carbon cycle in nature is essentially linked to the condition and sustainable use of forests in the global and local level. In the Serbian region are significant forest preserved in its natural form and it is a resource that should be preserved and enhanced. The world trend of raising the city's forest plantations can be achieved in metropolitan areas related to the large industrialized cities such as Belgrade and Novi Sad.

The forests are especially in the lower Danube natural resource with high biodiversity. Serbian Danube area considered in this study is interesting a natural phenomenon that must be protected and preserved with the principles of sustainable development.

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