Forest-based companies, their roles and their potential to contribute to the economic development of the municipality of Majdanpek

- Feasibility study -

gtz

Introduction

The project ***Forest-based companies, their roles and potential to contribute to the economic development of the municipality of Majdanpek-Feasibility Study*** and the study elaborated during the project represent a comprehensive review of the present state and current status of forest resources, forestry and the wood-processing industry as well as possibilities for their future development. Mapping forest potential on the local level in the municipality of Majdanpek together with recommendations for improvement should be a good starting point for local and national authorities in decision-making processes, and also useful for the local population, especially for existing entrepreneurs and others that want to start their own business.

The efforts of the GTZ-KWD program to improve the economic livelihood and incomes of the population in several municipalities within the project *Economic development of municipalities in the Danube region*, in this case the municipality of Majdanpek, could be realized through supporting local authorities with baseline analyses of forest-based companies. Economic development is strongly dependent on good and realistic planning, and this kind of study is a valuable source for the local authorities in the planning process. It might also contribute to private sector development through clearly defining the needs for indirect support measures (advisory services, Human resources management, etc) and direct financial support measures.

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Contents

List of acronyms

SP	*Social product*
EU	*European Union*
MU	*Management unit*
HDI	*Human development index*
JSC	*Join stock Company*
LTD	*Limited company*
PE	*Public enterprise*
SME	*Small and medium enterprises*
SMEE	*Small and medium enterprises and entrepreneurship*
NI	*National income*
NP	*National Park*
NES	*National employment service*
RES	*Renewable energy sources*
PII	*Pension and invalid insurance*
MU	*Management unit*
RS	*Republic of Serbia*
ŠG	*Forest Estate*
ŠU	*Forest subestate*
UNDP	*United Nations Development Programme*

1. Project description

1.1 General project framework

This project and study should identify and review the crucial indicators in defining the sustainability of forest-based companies and their potential to contribute to local economic development in the municipality of Majdanpek, and the possibilities to enhance business activities so as to diversify the products and services of existing companies. The identification of specific constraints on the development of companies and an objective assessment of their needs and development possibilities should contribute to the creation of mechanisms and strategies that might initiate the establishment of new companies and the improvement of existing ones.

The main analytical and documentary basis for this study is the preparation of a local economic development study of the municipality of Majdanpek (2006/b) as a document for strategic development. It will exist alongside current national strategies for equal regional development, rural and sustainable development, poverty reduction, economic growth and development, and thereby contribute to the fulfillment of the vision that in the next 10 years municipal Majdanpek will become a town suitable for its citizens, with an appropriate infrastructure and environmental protection that can integrate successfully into modern economic, technological, communicational and legal trends (2004/b).

1.1.1 Basic characteristics of the municipality of Majdanpek

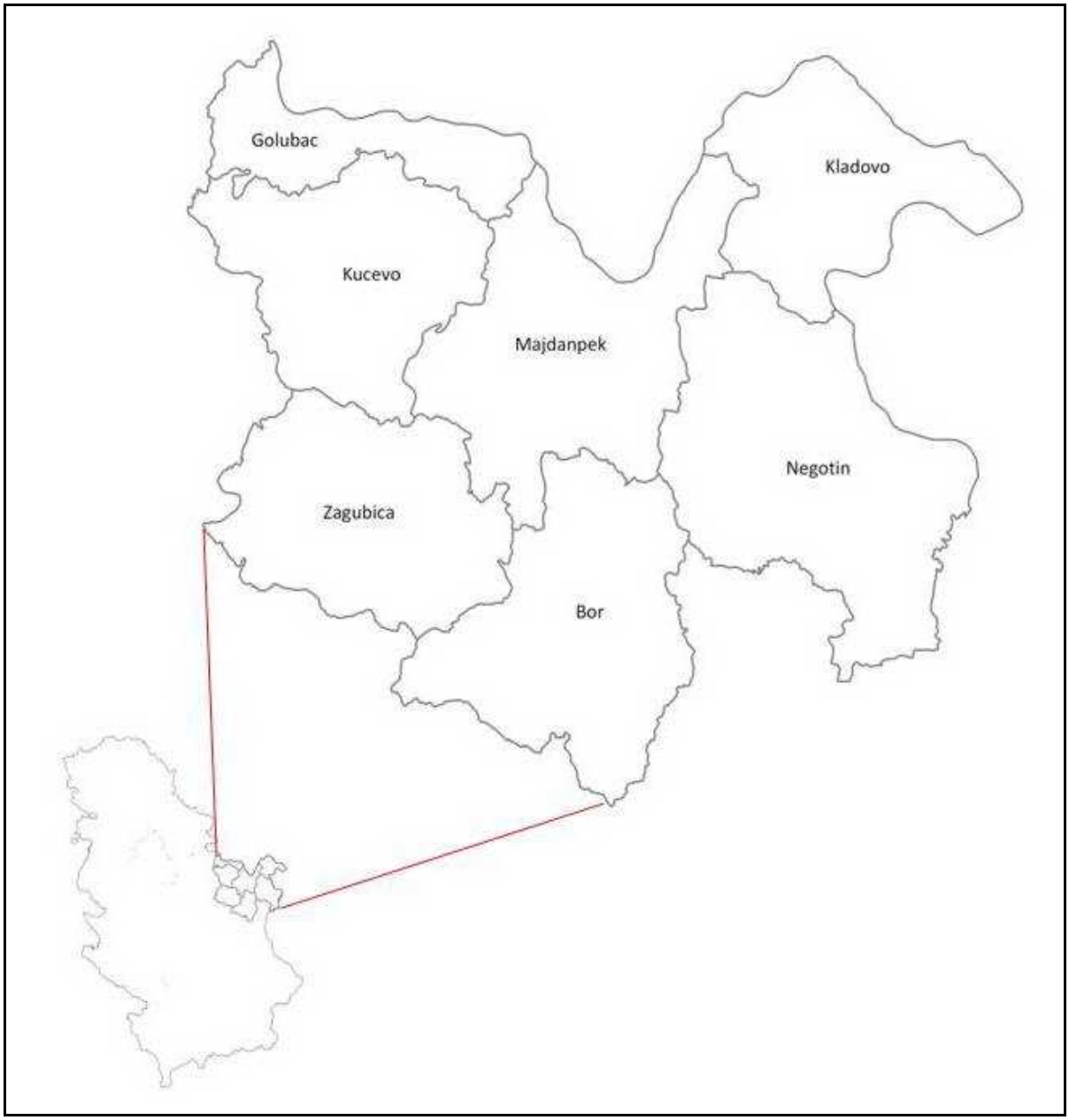
The territory of municipal Majdanpek with an area of 932 km² (1,1% of the territory of the Republic of Serbia) is situated in eastern Serbia and is characterized by great forest and mining resources. The municipality of Majdanpek has 23,703 habitants and with 3 other municipalities, Kladovo, Negotin and Bor, constitutes the Bor district (**Map M-1**.) with 146.551 habitants. Its geographic relief is predominantly hilly-mountain (76,1%); agricultural areas are 21,6% of the total municipal area and forests and forest land areas are 67,8..

The most significant natural resource that exceeds the local framework also go beyond the local economy is copper, with elements of gold, silver and selenium . The territory of municipal Majdanpek belongs to the Timok mining area and according to its geological characteristics is among the most attractive copper deposits in Europe; there is an active copper mine/placer with two deposits in the municipality of Majdanpek. The vision of the development of the municipality of Majdanpek considers mining an already well-developed sector that is equal to copper processing, wood processing, tourism and other service activities (2004/b).

The number of settlements within the municipality of Majdanpek is 14 (12 in rural areas and 2 administrative centers) with 25 inhabitants per km², which is significantly below the average of the Republic of Serbia (85 inhabitants per km²). A general municipal economic stability existed for a long period in the municipality of Majdanpek as well as in the entire Bor district and eastern Serbia; it was, however, disturbed during the last decade of the 20th century, and today the municipality of Majdanpek is in the group of economically undeveloped municipalities[1] in Serbia (2007/b).

[1] Criteria was NI/inhabitant <50% of Serbian average 2002-2004

M-1. MUNICIPALITY MAJDANPEK WITH COUNTY

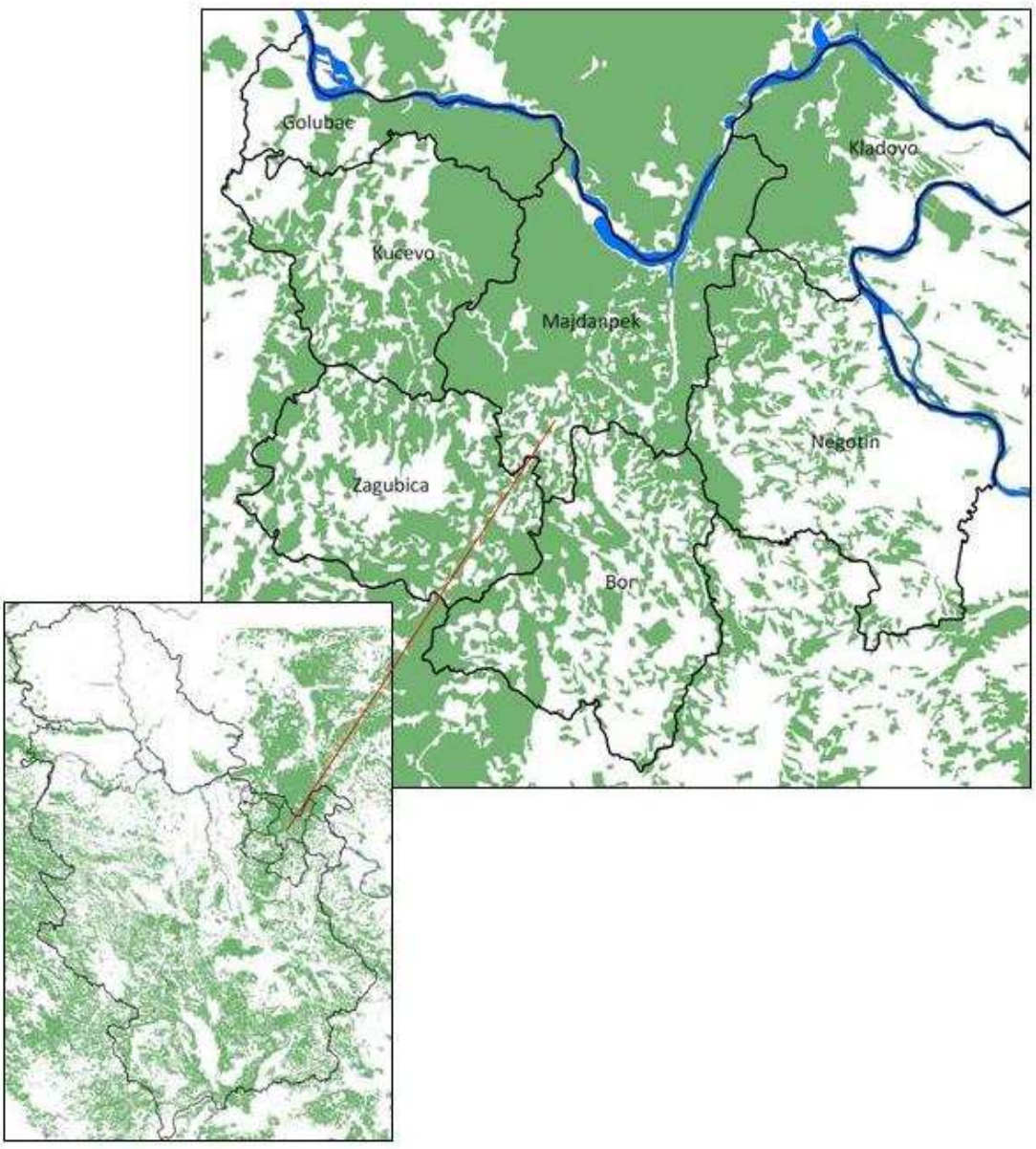


The economy in Serbia is in a transitional period of restructuring. Many barriers and limiting factors have developed (technical-technological obsolescence, low competitiveness, unemployment problems, lack of legislation) and made this a long and demanding process of adaptation by institutional political, social and economic systems to the conditions of the modern market economy. The ongoing economic activity of municipal Majdanpek is characterized by a structure still dominated by industry based on one disposable/available natural resource while other resources (primarily forestry and forest municipal potential), are not activated or used adequately. This results in inadequate and insufficiently-developed infrastructural and institutional predispositions for local economic development.

1.1.2 Forest resources and potential in the municipality of Majdanpek

Forests cover around 2,25 million ha of territory in the Republic of Serbia[2], or 29,1% (Map M-2.), with a total volume of 362 million m³ and an annual increment of around 4,0 million m³. Around 40% of forest and forest land is state-owned, 52% is privately owned, and around 8% is owned by monasteries, churches, and the Faculty of Forestry in Serbia. The dominant tree species are beech and oak in zones of mixed forests with 91% of broadleaves and mixed broadleaves forest stands. There are several public enterprises that manage state forests: 78% are managed by PE "Srbijasume", 11% by "Vojvodinasume" and 8% by PE National Parks. Other forest areas are managed by the Faculty of Forestry, water management and agriculture enterprises, the army and others.

M-2. FOREST COVER IN SERBIA AND MUNICIPALITY MAJDANPEK



[2] Internal data from the National Forest Inventory from Directorate of Forests as well as data about Serbian volume and volume increment

Besides the fact that private forests cover more than 50% of the total forest area in Serbia (Nonić et al 2008), those forests are characterized by small average forest estates (1,27 ha) consisting of several cadastral parcels (4 to 6 cadastral parcels with an average area of 0,3 ha), usually fragmented (dislocated in space). Private forests are rich in tree species with a high percent of broadleaf forests, but have low quality stands where the total standing volume and volume increment compared to state forests are lower; private forests, though, dominate in terms of the total forest area in Serbia. Still great areas of private forests, with significant volume and annual volume increment, emphasize the importance of these forests as a valuable natural resource in Serbia (Nonić et al 2008).

The municipality of Majdanpek has 63.150 ha of forests or 67,8% of the total area of the municipality which is much higher than the Serbian average of 29,1% and the Bor district average of 43,4%. Majdanpek is recognized for its forest resources with an average 2,3 ha of forest per inhabitant (central Serbia has 0,31 ha and Bor district 0,85 ha of forest per inhabitant). The structure of the forest areas is very favorable in several aspects. High forests cover 70,9 % of all forests in the municipality, coppice forests 14 %, shrubs 7,7%, plantations 0,9% and other wooded land 6,6%. Broadleaves, comprised of beech, oak and hornbeam, are dominant. The total standing volume is 10.620.895 m^3 and the annual increment is 168.215 m^3. 65,8% of forests are state owned and the rest is privately owned. The annual cut is around 76.000 m^3; 70,2% is used as fuel wood and only 29,8% as technical wood (2006/b).

The accessibility to forests by roads is expressed by km of forest roads per 100 ha; that number for the municipality of Majdanpek is close to the Serbian average (7,1 km/100km) but is insufficient (optimal value is 15km/100ha) because it represents a great barrier to optimal, rational and sustainable forest management as well as to the use of all forest potential.

The value of forests in the municipality of Majdanpek is increased by the existence of non-wood forest products (broadleaves seed, medicinal herbs, forests fruits, mushrooms) and by the different game species (chamois, deer, wild boar, fallow deer, musk ox) that are not properly used according to potential.

1.2 Project general

In addition to recommendations and the development of a framework for the enhancement of the use of local forest resources in the municipality of Majdanpek, this project and study should primarily indicate the contribution of forest-based companies to the economic development of the municipality of Majdanpek. The presentation and analysis of forest potential, like that of existing forest-based companies, provided the basis to identify key factors and possibilities for support of those companies externally (policy, legislation, institutional, financial) and internally (capacities, skills, networking) as well. Having the local authority as a direct user of the results of the project and study on forest and company potential should contribute to decisions taken and activities planned to overcome development problems, initiate private entrepreneurship and direct the development of the local economy.

1.2.1 Project objectives

The general objective of the project and study is to support the economic development of the municipality of Majdanpek through sustainable use of local forest resources.

The ***specific objectives*** of the project and study are:

1. Exploration of possibilities and potential for the establishment of forest-based companies in the municipality of Majdanpek,

2. Development of a framework to involve forest-based companies in local economic development.

Forest-based companies can be defined as business operations aimed at making a profit from activities linked to the forest. They may operate in many different sub-sectors: primary processing and production, secondary and final production of wood products, non-wood forest products and services, etc. These companies can provide many opportunities for local economic development and poverty reduction. Small and medium enterprises are standard in many developed countries and often make up 80-90% of the total number of enterprises and more than 50% of forest-related jobs.

The purpose of this study is to identify and define crucial issues related to forest-based companies in the municipality of Majdanpek in order to:

characterize the forest-based sector (forestry and wood-processing industry) in the municipality of Majdanpek,

- identify key factors which currently support or undermine the profitability and sustainability of forest-based companies in the municipality of Majdanpek,

- review options for developing an external framework (institutional, policy, legal, administrative, financial) and an internal framework (capacities, skills, links) for supporting forest-based companies in the municipality of Mjadanpek,

- determine how, through an improved external and internal context, forest-based companies may best contribute to the local economic development of the municipality of Majdanpek.

1.2.2 Main project activities

This project and study should identify and define crucial issues in the assessment and determination of the sustainability and contribution of forest-based companies to the local economic development of the municipality of Majdanpek.

The main project activities conducted during this project and preparation of the study were:

1. Identification of the main socio-economic characteristics of the municipality of Majdanpek,
2. Identification of forest potential and forestry in the municipality of Majdanpek,
3. Identification of the potential of forestry companies in the municipality of Majdanpek,
4. Identification of the potential of wood-processing companies in the municipality of Mjadnpek,
5. Identification of recommendations for improvement and further development of forest-based companies in the municipality of Majdanpek .

The direct project result is a written study of explored and defined possibilities for establishing forest-based companies, and a strategic framework for further development of forest-based companies with recommendations for improvements to and increased contribution of those companies to the local economy.

The realization of objectives was conducted within different project phases.

The first phase involved preparatory activities and the analysis of available documents concerning the importance of forest-based companies, their overall potential and their status in

regards to the general national and local socio-economic environment. Analysis of basic indicators relating to forest-based companies, like in secondary analysis of studies on similar or relevant issues and national strategies, helped in defining and structuring causes and recommendations on the national, regional and local levels where the field research was conducted.

In ***the second phase*** of the project research the methodology for the field research was defined. Several possible conceptual approaches and problems were considered because there is no previous research in Serbia conducted on statistically significant samples or with a unique methodology in this field. In addition, most of the indicators, mechanisms and instruments implemented in EU practice still do not exist in Serbia. Participatory methods were used and as an adequate methodological approach the *Needs assessment method* was chosen as was *Gap analysis* and a combination of techniques (interview, direct observation, survey, consultations with stakeholders according to their position in the decision-making hierarchy, specific knowledge, etc.) with a review of relevant literature, studies, and case studies, all in the context of supporting a development-planning process for forest-based companies.

The third phase involved field research (interview and survey) among different interest groups on the local level (representatives of PE "Srbijašume" and PE NP "Đerdap", owners of private companies, private forest owners).

During ***the fourth phase*** the study was written. It aims to link results and give recommendations both for further development and for the possible creation of different programs to support the creation of an appropriate policy/strategy in the field of development planning for forest-based companies in the municipality of Majdanpek.

1.2.3 Target groups and project partners

The project partners are:

- **GTZ-KWD** (financier),
- **FORNET Ltd** (executive body/agency),
- **Local authority/municipality of Majdanpek** (direct user of results).

The main users of the project results besides the local authority are supposed to be the forest-based industry, existing and potential entrepreneurs, and small- and medium-sized enterprises in forestry and the wood-processing industry.

The main target groups are institutions and organizations which were directly observed and analyzed during this project and study. They can be separated into different groups:

1. Local authority – The basic aims of the local economic development in the municipality of Majdanpek (2004/b) are to make changes in the business and ownership structure of DP and NI of the municipality, to decrease the unemployment rate and enhance both the livelihood and standard of living of the citizens . To achieve those aims efficient use of local natural resources, faster processing of the privatization of state companies and strengthening of SME and entrepreneurship in the municipality are planned. Self-organization, upgrading of the local economy, overcoming isolation status, and organized support of the Municipality are also necessary for the achievement of these plans for and aims of local economic development.

2. Forest companies for services (companies for cutting and skidding) – in the last decade organizational changes were made in the business operations of the forestry sector which was based on a centralized model where public enterprises were responsible for the whole production process in forestry and the wood-processing industry; operations were decentralized

whereby some commercial services were separated and privatized. Following a governmental decision, almost 100% of those business activities such as the cutting and skidding of trees are performed by small- and medium-sized private companies. Those companies are an important part of production value chains as they have a great impact on wood prices because of produced wood asssortments structure and obsolete equipment and mechanization. Ordinarily the supply of the wood-processing industry with raw materials depends strongly on the performance of those companies.

3. Wood-processing industry – since 2001 almost all wood-processing companies in Serbia have been privatized. The wood-processing industry depends on the level of processing and helps increase the value of forest wood products. This industry and these companies have a great role in the national economy through the employment they offer and the exportation to foreign countries. The potential and capacities of these companies, and their possible finished products, are very important for the local and the national economy.

4. Other companies – Serbia has great potential in the export of non-wood forest products (mushrooms, medicinal herbs, blueberry and forest fruits). The importance of this sub-sector is connected to possibilities for economic diversification in forestry. First of all, it might help reduce the pressure on forests where wood is the basic product and source of income. Secondly, It is important because only small initial investments are necessary to attract new entrepreneurs and start a business where the possibility of engaging women, the older population and youth is considerable (collecting and processing activities don't require great physical efforts). Such companies could contribute significantly to rural development and to dealing with gender issues (employment of women).

5. PEs for forest management „Srbijašume" and NP „Đerdap" – these companies are responsible for forest management in state forests and also partly in private forests (technical support--tree marking and dispatch). They provide public services and commercial activities related to forest resources but they are a very important part of the value added chain in forestry because besides the preparation of planning documents they also own state forests that prevail in the municipality of Majdanpek. Based on the Law on Forests (1991), those companies have the exclusive right to use state forests and to perform technical support in private forests; in other words, they have monopoly status.

1.3 Project relevance

The project and study are significant in that forests in Serbia are recognized as important national natural resources with great potential to contribute to local economic development especially in rural areas rich with forests. Because of the multifunctional character of forests (production, protection, sports-recreational, tourism, cultural-educational) and their multipurpose use (wood production, non-wood forest product production, hunting-productive, protection from erosion, water, noise), forest resources have great potential to satisfy various needs. The project is relevant also in reference to national and local strategic documents where it is possible to recognize the role of forestry in rural, regional and sustainable development in Serbia generally and in the municipality of Majdanpek in particular, and also in terms of environmental protection.

1.3.1 National and local project relevance

It is usually stated that the main economic sectors in Serbia are or should be based on the utilization of natural resources such as agriculture, forestry, and water management. But it is also recognized that this is a statement from a previous period and that natural resources do not in fact have appropriate status in national strategic development documents. Besides their previously-mentioned economic value, forests and forestry have a significant role in ensuring the survival and satisfying the basic needs of the rural population during periods of crises (war, transition period). Moreover, forestry is important for economic and social development because forest utilities are various and forests are ecosystems with multifunctional benefits for society. Forests provide tangible benefits such as wood products and non-wood products, and, in a broader context, intangible benefits such as esthetic, spiritual, medical, cultural, and educational benefits. Some effects are visible and measurable and consequently easy to recognize and respect. However, forests have other roles and functions as well, such as environmental and biodiversity ones, but, because their effects are not measurable in the short-term, their significance is not sufficiently emphasized. These immeasurable and intangible benefits are, though, gaining more and more importance over time. The value of forest resources depends on the individuals and groups who evaluate their significance and make decisions. Ultimately, it can be expected that these benefits will become more important in the near future not only for economic development but for social development also.

According to the classification of rural areas (Bogdanov N., 2007) Majdanpek belongs to region 3 – a hilly-mountain region of rural areas. About 20% of the population of Serbia is in this region and the average density of the population is the lowest compared to other rural areas (46 inhabitants per km²). From 1991-2002, this region experienced a high rate of depopulation (-7,5%). Every third inhabitants has not completed primary school and the proportion of the population with secondary school and higher education is below the average of other rural areas. Because the education structure is related to the age structure of the population, the activity rate and unemployment rate in this region are the most unfavorable in Serbia. Decreasing possibilities for employment and negative performances of the labor market are main characteristics of this region. The employment structure in different sectors shows a very high dependence on the primary production sector, a significant portion of which is related to agriculture production and mining. Employment in the tertiary sector is significantly lower than in other regions.

This region is characterized by significant forest resources and a local population that is familiar with forest wood and non-wood products but also with low economic production, unemployment, low population density, and a lack of infrastructure. Use of local natural resources by the local population is often without a serious and systematic approach or planning of production and utilization. Inadequate knowledge about sustainable management and utilization of natural resources is one main reason for this, and leads to a lack of direct and indirect state support.

Defining main directions in raising awareness and increasing knowledge of the local population about the potential for economic diversification and increasing income from forestry has long-term effects on the local economy.

1.3.2 Economic and social relevance of the project

Forestry and wood industry directly contribute around 3,1% to national employment (62 829 employees, excluding the paper industry and the cellulose industry). The total value of the primary production sector of agriculture, forestry and water management (specific data are not available) contribute up to 8% to Serbian GDP. Some estimations are that the contribution of

forestry is 0,54% and of the wood-processing industry is 2,47% (in total 3%). Those data are not representative for several reasons. Official statistics in Serbia do not register the entire production of the wood industry separately and there are many small processing practices that are not under state control and not involved in official statistical data. Also the value and contribution of wood products have decreased. An additional issue is the lack of data in official statistical data about the value of non-wood forest products. However, their value can be measured or estimated relatively easily.

The quality of forests in Serbia is not at optimal level but they are a valuable resource for the wood-processing industry. The natural diversity of plant and animal species in Serbia is a great advantage, as a precondition for the possible sustainable production and trade of forest products (wood and non-wood). Production capacities of blueberries, mushrooms, medicinal herbs, and cork are great and this sub-sector can significantly contribute to the national and local economy (2006/a).

Map M-3 gives a comparative review of forest areas in the municipalities of Majdanpek and Sremska Mitrovica that has been used as an example of a municipality with much less forest area than Majdanpek but that represents a model and a norm in forest management and achieved incomes from forests in Serbia.

M-3. IMPORTANCE OF FORESTS: COMPARATION OF MUNICIPALITIES MAJDANPEK AND SREMSKA MITROVICA DUE TO FOREST COVER

For the rural population, especially for poorer areas, forests have a very important role. Most households, but particularly those in central and eastern Serbia, depend almost totally on forests for their fuel needs so the forests are important in terms of household income. More than 90% of the energy needs in those communities are, and will probably continue to be, met by fuel wood. An increasing number of urban population is proportional to their needs and demands for recreational activities and forest areas compatible for that use. Serbian forest resources have great potential both for meeting these demands and for fulfilling this forest function. As well, there is huge potential for eco-tourism and for mountain sports activities.

Forest ecosystems in Serbia has a varied and important diversity of plant and animal species; thus Serbia has great potential as a primary gene pool with national and international relevance.

1.3.3 Project relevance in the context of existing national strategic documents and programs

Although forestry in Serbia had a great tradition until 2003, there was no strategic document for the development of the forestry sector.. In July, the Serbian parliament adopted the Forestry development strategy of Serbia. One of the strategy's objectives is to increase the contribution of the forestry sector to the economic and social development of Serbia and thereby develop forestry as a branch of the Serbian economy. A specific objective of this strategy is the enhancement of the status and conditions of private forests and the sustainable development of the private forestry sector within rural development through building an efficient support system for private forest owners and establishing small- and medium-sized enterprises in forestry and related sectors. Concerning the wood-processing industry, one objective is the creation of a sustainable and economically efficient sector of the wood-processing industry which will be competent on the international market and thus contribute to the improvement of the forestry sector, environmental protection and the development of the national economy (2006/a).

In terms of small and medium enterprises in the forestry and wood-processing industry within the municipality of Majdanpek, this project and study will support governmental efforts to promote the private forestry sector and create conditions and an environment for a more significant contribution of forestry to the national economy through local-level initiatives. In this sense this project correlates directly with the national strategic objectives of the Forestry development strategy in Serbia.

Other national strategic documents where the relevance and importance of this project and study are recognized are explained below.

According to the ***Strategy for regional development 2007-2012,*** the general objective related to industrial development and growth in Serbia is to create a modern, developed, competitive industrial structure which will progressively integrate with the European economy. This strategy stresses differences in levels of development between different parts of Serbia and the phenomenon of newly devastated areas (Bor, Majdanpek, Pirot, Vranje, Nis) where existing institutional solutions and mechanisms have no great impact on decreasing the negative effects of free markets. Small and medium enterprises in those undeveloped areas did not bring about structural changes and overall economic growth followed by increased employment opportunities, productivity and competitiveness in the region and thereby a stronger economy. .Further, limitations on and barriers to faster growth in the development of the SME sector (incomplete legislation and administrative regulation, poor institutional infrastructure and limited possibilities for financial support) are more evident in undeveloped areas with scanty infrastructure according to the strategy's assessment (2007/b).

The main objective and task of the ***Strategy for the development of small and medium enterprises and entrepreneurship in the Republic of Serbia 2003-2008*** was to create a framework for a sustainable, internationally competitive and export-oriented sector of SMEs and entrepreneurship and thus provide economic and social betterment for the Republic of Serbia. The main elements and strategic directions according to the strategy are: support to SMEE in preferential sectors (processing of agriculture products, industry production, tourism, e-business); strengthening of institutional support according to the interests of SMEE on all levels (national, regional, local); removal of legislative barriers to business development in order to create a new framework for legislation; implementation of reforms of public services to increase efficiency and decrease administrative and bureaucratic barriers; and increasing competitiveness and export possibilities (2003/a).

The Strategy for competitiveness and innovations regarding SME by 2013 should contribute to the creation of an efficient environment for business activities in the SME sector.

The objective of this strategy is the development of an entrepreneurship economy based on knowledge and innovations that create a strong, competitive and export-oriented SME sector which significantly contributes to improving the standard of living in Serbia and creates an efficient environment for SME sector business activities. Another aim of this document should be the development of an entrepreneurship economy based on knowledge and innovations that could create a strong, competitive and export-oriented SMEE sector and thus contribute to the betterment of the lives of Serbian citizens. Successful implementation of this strategy will provide for the creation of a new SME, and for faster overall growth and development of SMEs with a dynamic transformation of micro companies into SME.

According to the ***Report on development in Serbia 2007,*** for the period from 2001 to 2005 institutional capacities and the environment for growth and strengthening of SMEs and entrepreneurship were significantly upgraded. Overall growth in terms of increasing the number of active companies (mostly small private enterprises) and shops is a result of upgraded general conditions for business activities, as well as incentives and activities, from the national to the local level. Implementation of the Law on economic entities and the establishment of a Serbian business register agency make it easier and faster to establish enterprises. The first positive effects are proven by the initial changes in the structure of the economy vis-a-vis the size and ownership share of economic entities.

In the ***Report on SMEE in 2005,*** the most significant problems in business activities and development of SME in the Bor district are noted as the most non-profitable medium-sized enterprises with no realized profit because of the strong influence of big enterprises on profit creation in the district (a result of strictly profitable business activities of big state enterprises).

The National strategy for economic growth in Serbia 2006-2012 stated that more than three quarters of GDP in the industry sector are realized in the sub-sector of the processing industry. The average downturn trend in the period 2001-2005 was 0,8%, a consequence of the transition process. However, this downturn trend has different effects on specific industry sub-sectors, so the biggest downturn trends are registered in the textile industry, leather manufacturing and related products and footwear, and the wood processing industry (2006/c).

According to the ***Strategy for poverty reduction in Serbia,*** achieving sufficiently higher sustainable economic growth is the basic condition for realizing that objective, and to do so, the achievement of economic and social stability is a precondition. As one of the strategic directions for poverty reduction is increasing possibilities for employment, this underlines the importance of the SMEE sector. The basic method for regional poverty reduction is decentralized development that must extenuate structural changes and regional jerkiness, provide rational use of development factors in all regions, and repress tendencies towards an urban concentration of economic activities and population (2003/b).

This project is relevant and important because of strategic directions and decisions of the Republic of Serbia such as the development of the SME sector, agriculture, rural, regional and sustainable development, but also because of environmental protection according to the National strategy for accession to EU.

Summary

This project and study should identify and review key indicators in the determination of both the sustainability of forest-based companies and their potential contribution to the local economic development in the municipality of Majdanpek. This should be done within the context of possibilities to enhance the diversification of business activities of existing companies and to establish new companies. The territory of the municipality of Majdanpek is situated in Eastern Serbia (Bor district) and is characterized by great mining and forest resources.

The general economic stability of the municipality that existed for a long period before the transition was disturbed in the last decade of the 20th century, and today the municipality of Majdanpek belongs to the group of economically undeveloped municipalities in Serbia. 67,8% of the entire territory of the municipality of Majdanpek is forest area, which significantly exceeds the average forest cover area for Serbia (29,1%) and makes Majdanpek one of the richest municipalities in Serbia. Municipal forest resources and forest-based companies represent significant potential for the local economy and the local population and their relevance and importance are recognized on national, regional and local levels through economic and social components of adopted strategic documents.

Besides the study of potential for the creation of new companies and the enhancement of business activities of existing companies in forestry and the wood-processing industry, priority is given to the definition of a framework by which to involve those companies in the development of the local economy and the, provision of support to overcome problems in the municipality of Majdanpek. The involvement of those companies in the fulfillment of a 10-year vision of municipal development to the point of infrastructural and environmental suitability for integration into modern economic, technological, communication and legal trends is also a priority.

2. Basic socio-economic characteristics of the municipality of Majdanpek

Analysis of socio-economic information could be considered one of the key conditions for development planning--in this case the planning of support for the economic development of the municipality of Majdanpek through sustainable use of local natural forest resources. Analysis of socio-economic information should further enhance development planning capacities in the context of using existing and potential resources to contribute to the sustainable and accelerated development and use of forest resources in the municipality of Majdanpek.

2.1 Purpose and content of socio-economic analysis

Analysis of socio-economic characteristics is a basic component in the development planning process and should reveal the development potential of the municipality, with the aim of enhancing the development of the local economy (2001/a).

Available information on socio-economic parameters for the municipality of Majdanpek was collected by the *indirect method* from secondary sources, and integrated with information collected by the *direct method* in field. It was then subjected to descriptive analysis on the regional context (Bor district) and to comparative analysis (macro-analysis on the Serbian level).

Descriptive analysis in a regional context is comprised of:

- Presentation of existing characteristics indicated in main unbalanced regional situations, effects of previous activities, growth resources with special emphasis on competitive advantages, potential, needs, and economic trends,
- Indications for further development.

Comparative analysis is comprised of:

- macro-regional comparisons of relevant growth indicators that pinpoint inter-regional, intra-regional and macro-regional cleavage (those comparisons give an overview of comparative potential by region and municipality so as to contribute to the optimal allocation of available resources),
- macro-analysis as a framework for connecting different sectors with emphasis on socio-economic connections in and impacts on sectors.

This approach to socio-economic analysis asserts that the planning and decision-making processes are based entirely on optimal mobilization and use of available resources in defining development needs. For that purpose different data are used:

- strategic data relevant for strategic development, and
- operational data.

Because analysis was based on data from previous studies and research, their availability is a necessary precondition for further development planning based on data analysis (2001/a).

In this chapter data are presented, analyzed (descriptive and comparative) and interpreted in 4 indicator groups: demographic data, social data, economic data and infrastructure data. Elements of GAP analysis as part of a NEEDS ASSESSMENT analysis and a combination of techniques (interview, direct observation, questionnaire, consultation with relevant people) as well as a review of relevant literature and studies are used for the analysis of current possibilities and capacities related to indicators in forestry and the wood-processing industry. These possibilities and capacities enable both the forecast of expected development and the planning of realistic development of existing capacities and potential in forestry and the wood-processing industry.

2.2 Demographic characteristics of the population

The population of the region is both the main object and the subject of the development process because the population represents not only laborers and entrepreneurs in production processes but also the main users of products. For a clear picture of the socio-economic conditions of the region it is necessary to analyze the size, space allocation, composition and growth indicators, especially changes in magnitude and possible future trends and tendencies.

Regional demographic analysis is inseparable from analysis of economic and other factors which determine the level of regional development and influence on regional disproportions. Between population censuses in 1991 and 2002, the municipality of Majdanpek was characterized by *three global demographic processes* (2009/a):

- overall depopulation (decreasing number of population),
- natural depopulation (number of people that die in one year is bigger than the number born),
- demographic ageing.

The presentation and analysis of demographic characteristics in the municipality of Majdanpek involved the inhabitants and characteristics of the age structure.

2.2.1 Population characteristics and spatial distribution of population

The territory of the municipality of Majdanpek is 932km² (1,1% of the territory of Republic of Serbia), is situated in eastern Serbia, and has a population of 23,703 inhabitants. With 3 municipalities, Kladovo, Negotin and Bor, Majdanpek belongs to the Borski district (population 146.551) where approximately 2% of the total Serbian population live. There are 14 settlements in the municipality of Majdanpek (12 villages and 2 bigger settlements – Majdanpek and Donji Milanovac) with 25 inhabitants per km² which is far less than the Serbian average (85 inhabitants per km²).

According to the number of inhabitants per settlement, the municipality of Majdanpek, with 1.693 inhabitants per settlement, is above the Serbian average of 1.218 habitants per settlement. Majdanpek has a slightly higher degree of urbanization: 10.500 inhabitants or 44,3% live in villages and the remaining 13.203 habitants or 55,7% live in the two bigger settlements (Serbian average is 56,4%). In terms of the structure of the settlements, 3 villages have fewer

than 500 habitants, 5 have between 500 and 1,000 and 3 have more than 1.000 inhabitants. Most of the settlements in the municipality of Majdanpek have more or less grown in the absolute number of inhabitants in two bigger settlements have dropped 2006/a).

The national structure of the population was relatively stable during that time and most of the population were declared Serbs (81,6%), fewer were Vlahs (11,9%) or Romanians (0,3%) while 6,2% of the population (2007/a) were undetermined

A review of household structure according to the number of household members is in Table T-2.1.

T-2.1. REVIEW OF HOUSEHOLDS ACCORDING TO THE NUMBER OF HOUSEHOLDS MEMBERS

	Total	With 1 member	With 2 members	With 3 members
Borski district	51 160	10 930	13 517	9 795
Majdanpek	8 542	1 797	2 334	1 685

SOURCE: 2007/a

The average number of household members in the municipality of Majdanpek was 2,77; in Boski district that number was 2,86, and the average for Republic of Serbia was 2,97. Most of the households in the municipality of Majdanpek have 2 members.

2.2.2 Natural and mechanical movement of the population

The municipality of Majdanpek, like the Borski district and the Republic of Serbia, is characterized by a decreasing population (overall depopulation) and by natural depopulation (negative trend of natural increase rate). Since 1991 those values for the municipality of Majdanpek have been constantly negative (see Table T-2.2) and below average for the Republic of Serbia. In the period between the 1991 and 2002 censuses, the lowest annual average growth rate in Serbia (2003/b) was in the Zaječarski district (-10,4 ‰) and the Borski district (-9,8 ‰).

T-2.2. NUMBER AND INCREASE/DECREASE IN THE NUMBER OF THE POPULATION

	Population total		Increase/decrease in the population 1991-2002		
	1991	2002	Total	Annual average	Annual average per 1000 inhabitants
Republic of Serbia	7 576 837	7 498 001	- 78 836	- 7 167	- 1,0
Borski district	163 229	146 551	- 16 678	- 1 516	- 9,8
Majdanpek	26 952	23 703	- 3 249	-295	- 11,6

SOURCE: 2007/a

Besides a dissimulative flow in the last decade that caused the emigration of working (and fertile) parts of the population and a decreasing birth rate, ageing of the population had an effect on this area. Negative values of natural increase and future projections are important both for development planning and as an indicator of the lack of economic growth and the loss of employment possibilities in the region.

In the Republic of Serbia a downturn trend in natural increase continued in 2007 (see Table T-2.3).

T-2.3. VITAL EVENTS, 2007

	Live births per 1000 inhabitants	Deaths per 1000 inhabitants	Natural increase per 1000 inhabitants
Republic of Serbia	9,2	13,9	- 4,7
Borski district	7,2	16,5	- 9,2
Majdanpek	6,2	14,1	- 7,9

SOURCE: 2007/a

In Vojvodina all 7 districts experienced a negative natural increase while in central Serbia only 2 of 17 districts had a positive natural increase (Raški and Pčinjski district). Live births and deaths as well as the demographic age of the population and migratory movements are reasons for these changes in the population structure of the municipality of Majdanpek between the two censuses (2003/b).

2.2.3 Age and gender structure of population

The age structure of the population in the municipality of Majdanpek shows a tendency towards balancing the proportions between age groups in the period between the censuses of 1991 and 2002, but changes in the number of respective age groups indicate an ageing population in the municipality of Majdanpek (2009/a).

T-2.4. BASIC POPULATION CONTINGENTS

	Preschool children (under 7)	Children of compulsory education age (7-14)	Working population[3]		Share of working population in total	Share of population aged 65 and over in total
			Male (15-64)	Female (15-64)		
Republic of Serbia	495 327 *(6,6%)*	681 443 *(9,1%)*	2 497 719 *(33,3%)*	2 538 086 *(33,9%)*	67,12%	16,54%
Borski district	9 104 *(6,2%)*	12 784 *(8,7%)*	48 226 *(32,9%)*	48 295 *(32,8%)*	65,86%	18,21%
Majdanpek	1 531 *(6,5%)*	2 342 *(9,9%)*	8 171 *(34,5%)*	8 102 *(34,2%)*	68,65%	15,10%

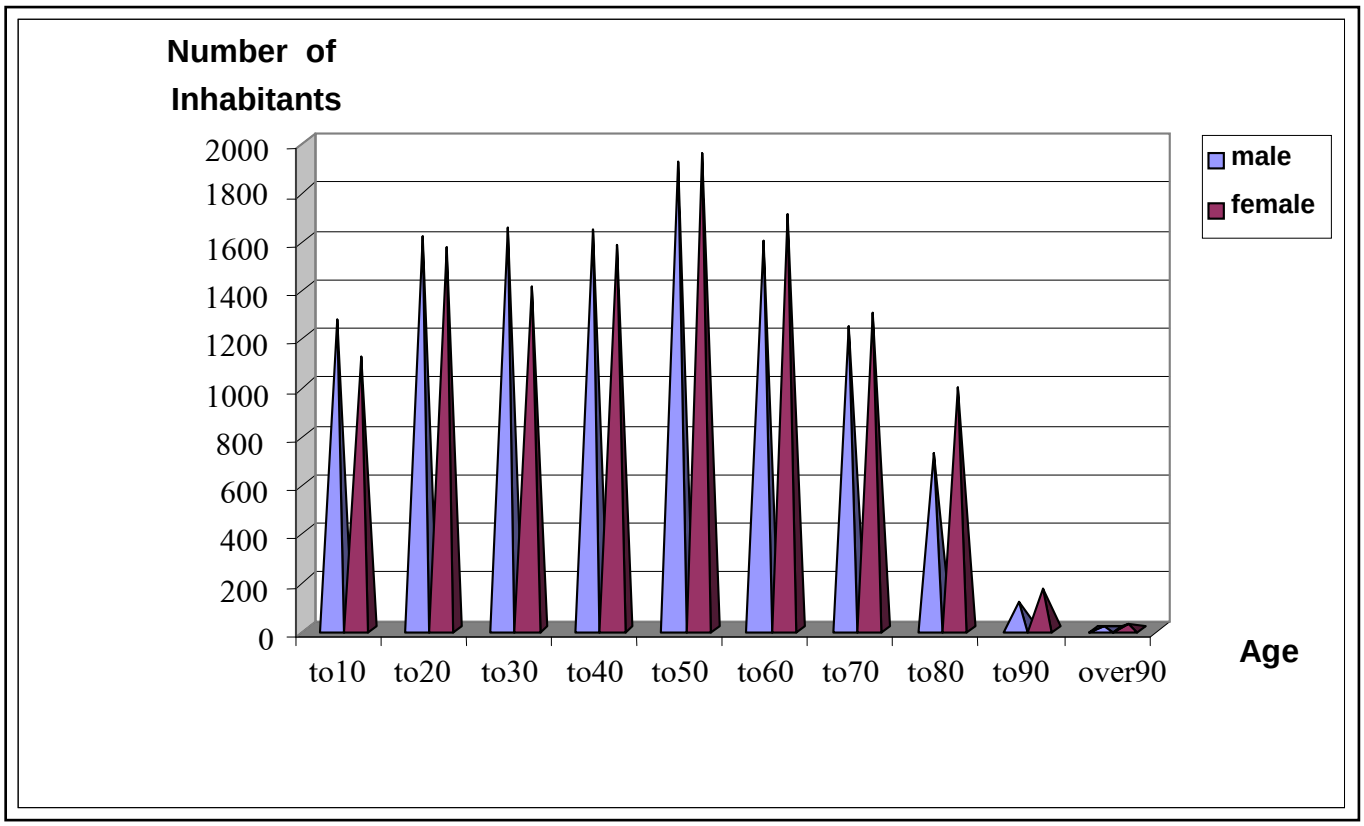
SOURCE: 2007/a

Table T-2.4. shows that according to the contribution of certain age groups, the municipality of Majdanpek varies little from either the Serbian average or the average of the Borski district especially in analyzed groups such as children (preschool and compulsory education age), the working population and the population aged 65 and over.

Population structure G-2.1 is a graphic illustration of age and gender composition showing the number and proportion of male and female in every age group, important information for the assessment of working potential.

[3] Population that is able to work (have working abilities)

G-2.1. POPULATION STRUCTURE



SOURCE: 2007/a

Demographic development depends mostly on younger age categories and provides the most reliable information about the extent to which older generations will be replaced by younger groups in the categories of work and fertility potential. This is important for planning if the municipality of Majdanpek is to have a favorable population structure despite the ageing factor.

The ageing factor is most pronounced in the villages. The proportion of the population younger than 20 is 28,6% and older than 60 is 13,1%. The relative ratio between these two contingents is 48,1% which is above the limit which indicates begging of the ageing process. Observing changes in the population number within certain age groups in the period between the censuses of 1991 and 2002, the population older than 65 years increases their share in the total population from 8,7% to 15,1% while the younger population (up to 19 years) drops from 28,4% to 23,4% (2009/a).

2.3 Social characteristics of the population

Social characteristics have special importance since they influence natural and migratory movements of the population and correlate with the standard of living conditions of local inhabitants.

Social characteristics of the municipality of Majdanpek are defined by several key parameters (2009/a):

- huge number of unemployed people
- small share of youth in total population
- intensive emigration process
- dominant share of working population
- inappropriate education structure of population
- increasing trend of juvenile and adult users of social care services.

A basic characteristic and cause of current demographic movements in the municipality of Majdanpek is the disturbed economic stability. The destimulative economic flow during the 1990's stimulated an emigration of the working and fertile share of population, a decreasing trend in the natural increase, also decreased percentage in the working population and the onset of ageing. Negative tendencies in changes in all structural aspects of the total population at the municipal level are primarily the result of demographic maturity and migratory movements due to unfavorable socio-economic conditions in the observed period.

2.3.1 Active population

According to the criteria concerning the activity of the population, the total population is divided into three main groups: active or working population, people with personal income and dependent people (See Table T-2.6).

T-2.6. POPULATION BY ACTIVITY

	Total population	Active population[4]	People with personal income	Dependent people[5]
Republic of Serbia	7 498 001	3 398 227 *(45,3%)*	1 511 816 *(20,2%)*	2 570 637 *(34,3%)*
Borski district	146 551	64 561 *(44,1%)*	30 323 *(20,7%)*	51 077 *(34,9%)*
Majdanpek	23 703	11 127 *(46,9%)*	4 052 *(17,1%)*	8 407 *(35,8%)*

SOURCE: 2007/a

Compared to data from the 1991 census, a decreasing proportion is evident in the active (by 7,5%) and dependent (by 0,7%) populations as was an increase in the number of people with personal income (by 10%). Compared to the Borski district and the average for the Republic of Serbia, the municipality of Majdanpek does not vary significantly. The employment rate decreased because of the dismissal of surplus workers primarily in the metal industry. However, due to the decline in population the number of employed persons per 1000 inhabitants did not drastically decrease. For the same reason the unemployment rate and number of unemployed persons per 1000 inhabitants showed an increasing trend .

The regional agrarian demographic analysis indicates movement of the agricultural population (especially their active part) and the contribution of this sector to the general economy of region. With overall development, the economic structure of the active population lessens in agricultural

[4] Persons that are employed
[5] Persons that do not have personal incomes and living resources

activities and grows in non-agricultural activities. In absolute numbers, the agricultural contingent of the Republic of Serbia decreased in 1981 from 1,1 million persons or 24,6% to 10,9% of the total population in 2002.

T-2.7. STRUCTURE OF AGRICULTURE POPULATION DUE TO ACTIVITY

	Agricultural population	Active agricultural population	Dependent agricultural population
Republic of Serbia	817 052 *(10,9%)*	529 236	287 816
Borski district	15 929 *(10,9%)*	11 622	4 307
Majdanpek	2 112 *(8,9%)*	1 673	439

SOURCE: 2007/a

The Borski district does not differ from the Republic average although the share of the percentage of the agriculture population of the municipality of Majdanpek in the total population is lower than the Republic average. Data about agriculture population structure due to activity is in Table T-2.7.

2.3.2 Educational structure

Education has strategic importance for economic and social growth. Education directly contributes to economic development through increasing the competencies of the working population which in turn influences the productivity of employees and, through efficient transfer of technology and knowledge from the education system and science to industry, the economy and society, the possibilities for the unemployed population as well. In terms of the development of society, education can enhance the possibilities of every individual to contribute equally and actively to economic and social development.

The educational structure of the population has special importance in demographic research due to its impact on natural and migratory movements of population. In the territory of the municipality of Majdanpek, most of the population has secondary education (34,9%) which is a little bit below the Republic average (41%), followed by primary education (26,5%) which is more than the Republic average (24%). The percentage with higher education and university education (5,1%) is considerably lower than the Republic average (10%). According to the census from 2002, in the municipality of Majdanpek 9,4% of the population is without education; three quarters of that number are women. In Table T-2.8 are detailed data on the educational characteristics of the population in the municipality of Majdanpek and the Borski district.

T-2.8. EDUCATIONAL STRUCTURE OF POPULATION

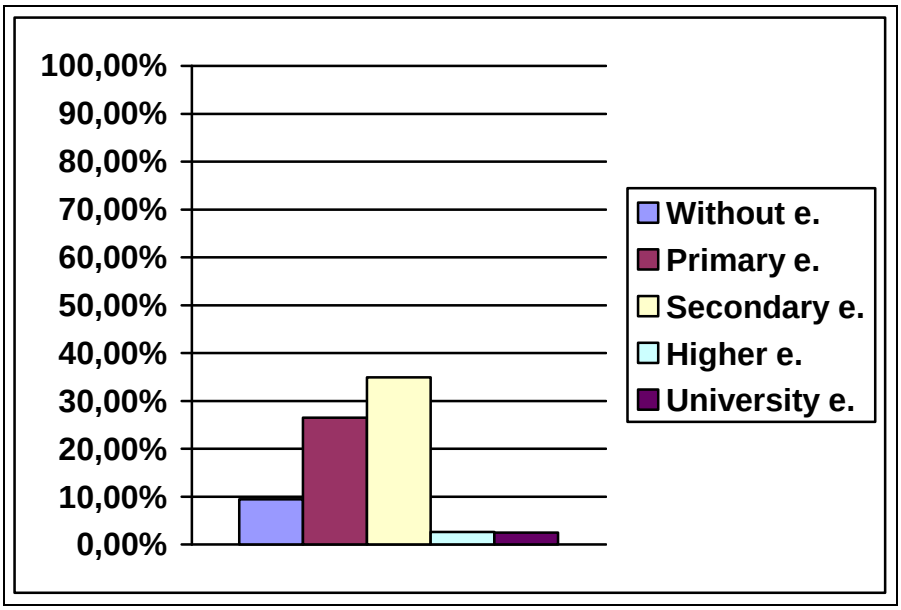
		Total	Without education	Primary school	Secondary school	Higher education	University education
Borski district	Total	124 663	9 870	32 017	37 661	4 241	4 928
	Women	64 262	7 405	16 248	16 302	1 996	2 016
Majdanpek	Total	19 830	1 872	5 255	6 920	524	493
	Women	10 053	1 320	2 724	2 899	238	174

SOURCE: 2007/a

In the period between the censuses of 1991 and 2002, a significant drop in the number of illiterate population is evident but the literacy rate in the municipality of Majdanpek (90,4%) is still below the Serbian average (96,5).

Graph G-2.2. below offers insight into the educational structure in the municipality of Majdanpek.

G-2.2. EDUCATIONAL STRUCTURE



SOURCE: 2007/a

Absent from this analysis are important aspects of details of informal education and adult education activities like seminars, workshops, and lectures. These are very efficient ways of training and developing knowledge and skills in different fields to increase competitiveness and innovations that might contribute significantly to the economic growth and development of the Municipality.

2.3.3 Characteristics of unemployment

Unemployment (see Table T-2.9.), a serious problem in the municipality of Majdanpek, represents a natural phenomenon in the transition process resulting from economic crises, structural changes and the elimination of old, irrational working places. . This problem is of both local and national importance and the unemployment rate in the municipality of Majdanpek (31,3%) is a little bit lower than the national average (32,1%). The process of restructuring mining giants and public enterprises that was not conducted fully has a great influence on this indicator

T-2.9. DATA ON UNEMPLOYMENT FOR 2006

	Total	Seeking employment for the first time		Unskilled		Women		per 1000 inhabitants
		total	%	total	%	total	%	
Majdanpek	2 746	979	35,7	1 222	44,5	1435	52,3	127

SOURCE: 2007/a

The number of people seeking employment for the first time in the total number of unemployed has decreased since 1995 from 71% to 35,7% which is significantly lower than the Republic average (50,5%). The number of women in the total number of unemployed in the municipality of Majdanpek is close to the Republic average (53,9%) as is the number of unemployed per 1000 inhabitants (124 unemployed per 1000 inhabitants in Serbia). The municipality of Majdanpek contributes 18,5% to the total number of unemployed in the Borski district.

The state of the labor market and the structure of the employed population (See Table T-2.10) in the municipality of Majdanpek are not favorable and are characterized by inflexibility, a huge grey economy, relatively low salaries, and request policies and measures oriented towards demand (adjustment of human resources to structural changes) and the supply of labor side.

T-2.10. EMPLOYEES STRUCTURE (2006)

	Employees		Employees in enterprises, institutions, cooperatives and other institutions (state sector)	Private entrepreneurs, sole proprietors and their employees	Number of employees per 1000 inhabitants	
	Total	Women (%)			Total	Employees in enterprises, institutions, cooperatives and other institutions
Republic of Serbia	2 025 627	43,1	1 471 750	553 877	274	199
Borski district	33 569	41,0	28 061	5 508	242	203
Majdanpek	6 885	48,2	4 824	2 061	317	222

SOURCE: 2007/a

The employment issue must not be simplified. It is the basic question of economic development and the way to include the human factor in that development. Employment or unemployment has a significant influence on the socio-economic structure of society and provides the most precise indicator of the volume and depth of the socio-economic transformation of society.

According to the data base from the National Service for Unemployment for July 2008, the municipality of Majdanpek has 2,132 unemployed persons, although the real number is higher (even since the date of the table for 2006). In addition, 1,273 persons are employed abroad. According to their data base, the employment rate is between 60 and 71% so the national service for unemployment has played a great role in solving local social problems, participating in projects for prequalification, and supporting qualification and subsidies for self-employment. Through exchange of information and reaching agreements, this service cooperates with the local authority as well as with relevant ministries, funds for pension insurance, funds for health care, funds for development and NGOs.

According to a UN concept, assessment of the level of regional development is based on the HDI (Human development index). The indicator of human development is comprised of 3 basic components: life expectancy, education level (measured by the literacy rate and a combined indicator of registration in primary, secondary and tertiary education) and income per inhabitant. HDI for Serbia calculated by UNDP methodology for 2004 is 0,811, a value that indicates a high level (above 0,800) of human development and places Serbia at 56 in the world (about level with Bulgaria and Romania but above B&H, Albania and Macedonia).

A trend analysis of HDI in Serbia shows a constant increase in that value from 2001 to 2004, indicating significant enhancement of the quality of life largely because of the increasing

education index and GDP per capita. Regional analysis of HDI between districts in Serbia is hugely uneven and the Borski district has one of the lowest HDI (0,728) for 2004 in Serbia.

Related to long-term solutions to problems of unemployment, improved standards and the livelihood of inhabitants are environmental protection problems in the municipality of Mjadnpek; there the primary goal is the creation of an "infrastructural environment for investitures'' attraction, SME development, overall economic development and especially production activities.

2.4 Economic indicators

According to the categorization of undeveloped areas, the municipality of Majdanpek is in the group of economically undeveloped areas (there are areas with special development problems). The criteria for categorization were national income per inhabitant, unemployment rate, infrastructure condition, housing conditions, the number of vulnerable groups (children, older persons, refugees, women).

The deep economic crisis during the 1990s started the transition process in areas besides the traditionally undeveloped south of Serbia; new undeveloped areas were created: eastern Serbia, parts of central Serbia, regional mining centers and traditional industrial centers became new transitional poverty zones. A monostructural economy (copper mine and processing industry of Majdanpek) that existed for a long time caused many problems that have a great influence on the position of the municipality of Majdnapek in the regional and national economies. The industry giant's collapse and unadjusted economic structure to amortize the surplus of employees caused a decrease in the value of social products and in national income (total and per inhabitant).

The economic structure of the population is most important as an indicator of social and economic development of the country. Economic development indirectly changes the economic structure of the population while the movement and the structure of the working population influence the level and dynamism of economic development.

2.4.1 Main economic indicators

The Municipality of Majdanpek constitutes 26,6% of the territory of the Borski district and 16,2% of the total population of the district. In the Borski district 17,8% work in the district and 18,5% of the total number of unemployed are from the municipality of Majdanpek. The economy of the Borski district is comprised of 704 enterprises; 692 are small and medium and 12 are big; 60 of them are state enterprises and 554 are privately owned.

The Borski district contributes only 0,9% to the total number of SME in Serbia. According to the total number of enterprises in the Borski district, the municipality of Majdanpek contributes 7,2% while the SME sector contributes 6,8%. A comparative review of municipalities in the Borski district is given in Table T-2.11.

T-2.11. COMPARATIVE REVIEW OF ECONOMIC INDICATORS FOR MUNICIPALITIES IN BORSKI DISTRICT

	Area (km²)	Number of population	Number of employees	Number of unemployed	NI/Inhab.	%NI process. ind.	%NI agricult.
Bor	856	55 817	16 301	6 908	15,4	38,4	47,6
Kladovo	630	23 613	4 436	2 854	55,4	-1,2	45,6
Majdanpek	**932**	**23 703**	**6 558**	**2 988**	**14,0**	**88,6**	**79,8**
Negotin	1089	43 418	9 549	3 416	80,3	1,5	66,9
Borski district	3 507	146 551	36 844	16 166	41,0	10,9	60,2

SOURCE: 2006/b

The number of registered enterprises in the municipality of Majdanpek is 51 and the number of entrepreneurs is 420 (2006/b). This number does not jar with the contribution of these companies to the National income. According to this indicator, registered companies contribute less than 1/3 to NI and thus employ only 30% of the total number of employees.

The local economy of the municipality of Majdanpek creates 14,4% of the total income, 1,4% of the profit and 31,2% of the total loss of the Borski district. Concerning national income, the municipality of Majdanpek contributes to the Borski district by 5%, and the NI per inhabitant in 2003 was 12% of the level of the Republic of Serbia (41% in the Boski district). According to the last official data for 2003, the national income per inhabitant was 12.349,58 CSD, and for 2004 the total NI of the municipality (2009/a) was negative (-87,971,00 CSD).

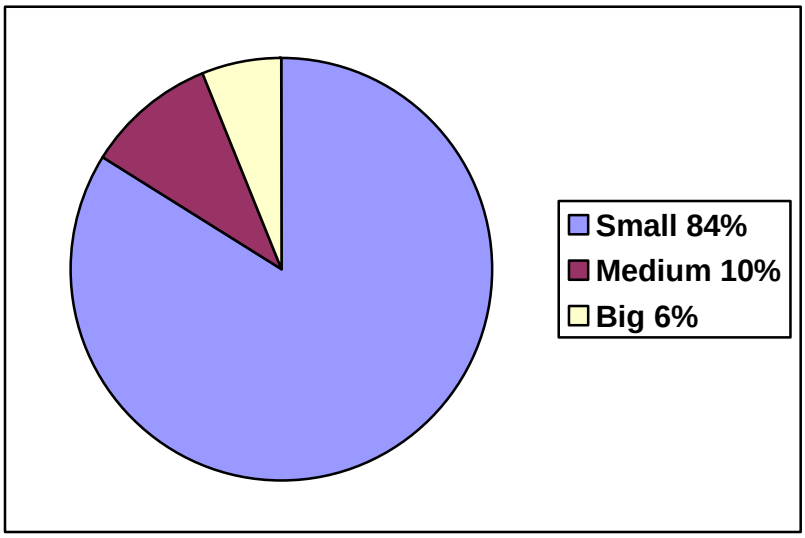
According to the most indicators the municipality of Majdanpek belongs to the group of undeveloped and devastated municipalities in Serbia. Characteristics of the economic situation are unfavorable economic and ownership structure, inadequate and insufficiently developed infrastructure and institutional preconditions for local economic development, poorly developed SME and private sector, negative value of municipal NI, low level of investment, unemployment growth, unsatisfactory level of self-organization in local economy, isolation status, unorganized supply, debt problems, lack of market, management and marketing skills and a resulting high level of social tension.

2.4.2 Enterprise structure according to size, ownership and sectors

Mining is the main industry in the municipality of Majdanpek. The big mining giant Copper mine Majdanpek which once employed over 3000 workers now has around 1500 and is in the process of privatization.

In the structure of existing enterprises according to size, Graph G-2.3 shows that small enterprises dominate at 84%, followed by mid-sized at 10%, and large at 6%.

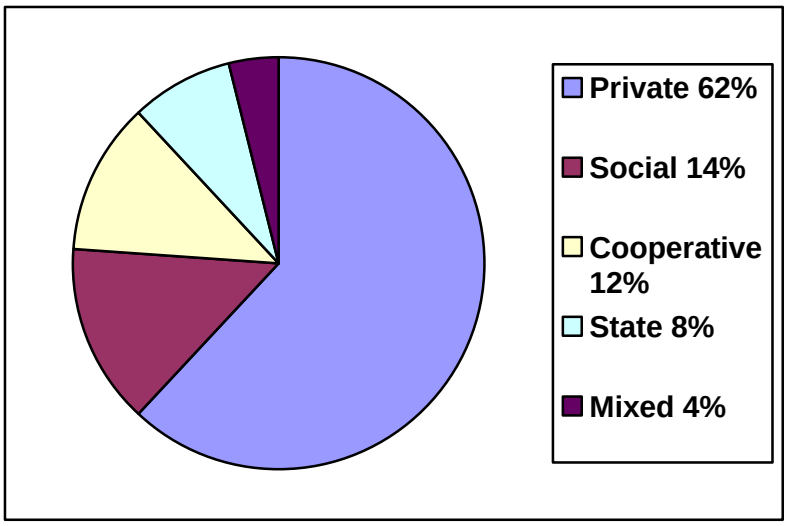
G-2.3. STRUCTURE OF ENTERPRISES ACCORDING TO SIZE



SOURCE: 2006/b

Graph G-2.4. shows that privately owned enterprises dominate (62%), followed by social enterprises (14%), cooperative (12%), state (8%) and mixed companies (4%).

G-2.4. STRUCTURE OF ENTERPRISES DUE TO OWNERSHIP

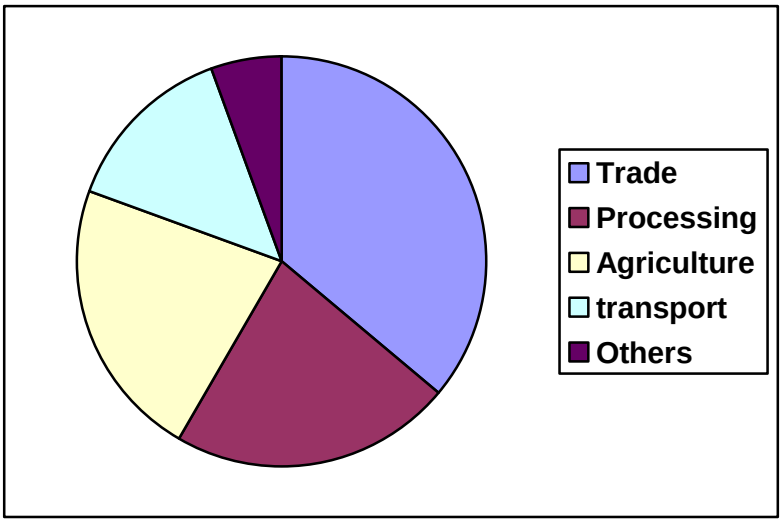


SOURCE: 2006/b

Ownership structure in the municipality of Majdanpek has changed over time such that the NI realized in socially and state-owned companies in favor of increasing the NI in private and mixed-owned companies. Social ownership with 50% participation in 1999 decreased to 29% in 2001. Private ownership was at 22% in 1999 and in 2001 that percent increased to 28%. The share of mixed ownership increased from 26% in 1999 to 38% in 2001. The share of state companies, although small, also grew during that time. Cooperative enterprises had the smallest share in achieved municipal NI.

The majority of the companies are from the trade sector (25,5%), followed by the processing industry and agriculture (each 15,7%), traffic (9,8%), building, ore and stone extraction (each 5,9%), while companies from other sectors together constituted 24,3% of the total number of active companies in the municipality of Majdanpek. A review of these data is in Graph G-2.5.

G-2.5. STRUCTURE OF COMPANIES IN TERMS OF SECTORS



SOURCE: 2006/b

In the economic structure of the municipality measured by the contribution of social products, social products during the period were dominated by the industry sector (80% in 2000). Data after this shows that share decreasing but still the industry sector dominated the municipal economy with more than 50%. The proportion of transport in SP is around 7% and during the time had a growing trend (from 5,32% in 1999 to 9,81% in 2002). Trade also grew during the time as did services and the building sector.

2.5 Infrastructural indicators

The infrastructure of the municipality of Majdanpek is a more or less developed area with huge potential for further development but with great limitations such as bad explanation characteristics, an unresolved issue of water supply, and telecommunication problems which are a barrier to development.

The road network infrastructure in the municipality of Majdanpek has a strong basis but because the technical level of road network is low due to a lack of material and financial means for maintenance, there is evident degradation of the existing road network. Quality (% of modern road cloak), development and engagement (number of inhabitants per km of road) of the network of main, regional and local roads are below the Serbian average. The municipality of Majdanpek is crossed by an important railroad from Belgrade to Zaječar, but this type of transport is not aligned with the technical and organizational needs.. Along the border of the

municipality are 54 km of the Danube River; this provides an important competitive advantage and the possibility for development of river traffic and, thereby, tourism.

Electricity is not available everywhere in the municipality of Majdanpek. .Furthermore, obsolete and insufficient investments in the maintenance and development of the power system threaten the quality and irregular supply; thus it is not equal to the needs of industry and the inhabitants

The telecommunications network in the municipality is unsatisfactory in terms of the density and capacities of the existing switchboard.

The equipment of the municipality of Majdanpek for the *communal infrastructure* is also unsatisfactory for the water supply, unfledged canalization network and system to percolate waste water and landfill.

Summary

Analysis of socio-economic indicators in the municipality of Majdanpek represents a guideline for development planning and, in this case, for planning of support to the economic development of the municipality of Majdanpek. Socio-economic analysis should improve capacities for development planning and, in the context of using existing and potential forest resources, contribute to the sustainable and accelerated growth and utilization of forest resources in the territory of the municipality of Majdanpek.

The municipality of Majdanpek in the period between the censuses of 1991 and 2002 is characterized by 3 global demographic processes: overall depopulation (decrease of number of inhabitants), natural depopulation (number of deaths is higher than number of live births) and demographic ageing. The number and structure of inhabitants show that 55,7% of the municipal population (13.203) live in two administrative centers and 44,3% (10.500) live in villages. Most of the villages record a smaller or bigger increase in the absolute number of inhabitants while the two administrative centers record a decrease in the number of inhabitants. The municipality of Majdanpek has the lowest average annual population growth rate in Serbia -11,6‰ and in the period between the two censuses, the population older than 65 years increased their share of the total population from 8,7% to 15,1% while the share of the younger population (up to 19 years) decreased from 28,4% to 23,4%.

The social characteristics of the municipality Majdanpek are determined by several key parameters: a large number of unemployed people (unemployment rate in the municipality of Majdanpek is 31,3% slightly below the national average of 32,1%), an intensive migration process; a dominant proportion of working population; and an inappropriate education structure.

The main force underlying the current demographic flows in the municipality of Majdanpek is the disturbed economic stability. The restructuring process of the mining giant has not been fully implemented so as state and social companies and thus have governing influence on this indicator. The economic municipal structure is characterized by small enterprises that are privately owned by the trade and processing sector. Infrastructure factors (water supply, electrical, telecommunication) represent limits and barriers to the development of the municipality of Majdanpek.

3. Forestry and forest potentials of Majdanpek municipality

The presence and distribution of forests and other wooded land in the municipality of Majdanpek points to the importance of forest resources for the local population and economy of the region. The status of forest resources, forest management planning and organizations that manage the forests in the municipality of Majdanpek, as well as basic indicators of forest products, will be presented here

3.1 Forest conditions in Majdanpek municipality

Table **T-3.1** shows the basic characteristics of forest resources in the territory of the Majdanpek municipality.

T-3.1: BASIC CHARACTERISTIC OF FOREST IN MAJDANPEK MUNICIPALITY[6]

INFORMATION	VALUE
Total area of municipality (*ha*)	93.200
Population	23.703
Number of settlements	14
Forest area (*ha*)	63.150
Forest cover (%)	**67,8**
Forest area per capita (*ha*)	2,66
Total standing volume *(m^3)*	10.620.895
Average standing volume per hectare *(m^3/ha)*	168,2
Total (Annual) volume increment *(m^3)*	195.215
Average(Annual) volume increment per hectare *(m^3/ha)*	3,1

SOURCE: 1999; 2001; 2004.

The total area of forests and other wooded land in the municipality of Majdanpek is 63.150 ha, ie 67% of the total territory of the municipality. The Majdanpek municipality is one of the richest municipalities with forests in Serbia, and its area is higher than the average of the Republic, which is 29.1%.

[6] Due to the lack of a unique data base for forest area in the municipality of Majdanpek, and for growing stock and annual increment, the result is the sum of those values for private forests and for the state forests in the municipality that are managed by state companies for forest management. Due to the unmatched administrative division of space and forest area, the mentioned management units managed also with areas of forests that belong to bordering municipalities (Bor, Kladovo, Žagubica, Negotin) and are included in the review here. As well, some bordering management units are managed with parts of forests that belong to the municipality of Majdanpek but for the specifics of the data review are not included here.

The total growing stock volume[7], is about 10.620.000 m^3, i.e. about 168 m^3/ha (the average volume in Serbia is 161 m^3/ha). The total annual increment[8] is about 195.000 m^3 per year, on average 3.1 m^3/ha (the average is 4.0 m^3/ha in Serbia).

Forest area by ownership in the Majdanpek municipality is shown in Table **T-3.2**.

The dominant categories of forests by ownership are the state forests, which occupy 65.8% of the total area of forests, i.e. 41,554 *ha*. The total area of private forests is about 21,600 *ha*, covering 34.2% of the entire area.

T-3.2: FOREST AREA BY OWNERSHIP IN MAJDANPEK MUNICIPALITY

No.	OWNERSHIP	AREA	
		(*ha*)	(%)
1.	State forest	41.554	65,8
2.	Private forest	21.596	34,2
∑	**Total area**	**63.150**	**100,0**

SOURCE: 1999; 2001; 2004.

Data for **standing volume** and **annual volume increment** by ownership are shown in Table T-3.3. Approximately 8,550,000 m^3/ha are concentrated in the state forests, an average of 205.8 m^3/ha, which is about 81% of the total wood volume. In state forests, about 162,000 m^3/ha volume of increment are created per year, on average 3.9 m^3/ha, which is about 83% of the total increment.

T-3.3: GROWING STOCK AND ANNUAL VOLUME INCREMENT BY OWNERSHIP (2008)

No.	OWNERSHIP	STANDING VOLUME			ANNUAL VOLUME INCREMENT		
		(m^3)	(%)	m^3/ha	(m^3)	(%)	m^3/ha
1.	State forest	8.553.847	80,5	205,8	161.690	82,8	3,9
2.	Private forest	2.067.048	19,5	95,7	33.525	17,2	1,6
∑	**Total**	**10.620.895**	**100,0**	**168,2**	**195.215**	**100,0**	**3,1**

SOURCE: 1999; 2001; 2004.

Around 2,000,000 m3 of wood volume with average 95.7 m3/ha is concentrated in private forests while the volume increment is about 33,000 m3 or 3.0 m3/ha.

[7] Total growing stock volume is the volume of trees in the forest in the stand - vital condition.

[8] Total annual increment is the increase created by the growth of trees in the amount of wood volume in a one-year period..

3.2 Forest management planning in the Majdanpek municipality

According to the Forest Law from 1991, users of state forests are **the state enterprises for forest management**, while private forests are managed by the forest owners themselves (1991).

The Forest Law declares that: "... the forest, as well as of general interest, must be maintained, regenerated and used to: maintain and increase its value and general useful functions, and durability, and ensure the protection of and permanently increased increment and yield "(Article 2). This law further states that the **forest areas** are formed "... for the rational enforcement of forest management, forest land and other potential of the forest in that territory" (Article 5) (1991).Accordingly, the operations of forest management must be implemented equally in all forests, regardless of ownership (Nonić at al, 2008).

According to the general division of space in the forest area, which is defined by the Forest Law, 27 forest areas and 5 national parks have been established. All state forests in the forest areas are managed by forest districts which are part of the Public Enterprise (PE) for forest management (originally PE "Srbijašume", and since 2003, PE "Vojvodinašume", which was founded on the territory of the province of Vojvodina). Forests in national parks are managed by the PE of these national parks.

According to the Law, private forests that are located in the forest areas are under the jurisdiction of forest districts, and the professional and technical tasks performed by state enterprises that manage the state forests. In private forests in the national parks, professional and technical tasks are performed by state enterprises of national parks (1991).

TYPICAL BEECH FOREST IN VICINITY OF MAJDANPEK

3.2.1. Forest management planning of state forest in Majdanpek municipality

Characteristics of municipalities, the established administrative partition, and the declaration of the National Park Đerdap in the territory of the municipality have caused complications in the forestry territorial organization and institutional capability.

Because of that, parts of the territory of the municipality are included in the composition of the forest areas Sevrni Kučaj and Timok, and the rest of the state forests in the municipality belong to National Park Đerdap.

Management of state forests in the municipality is under the jurisdiction of the following users:

- Public Enterprise ”Srbijašume”, :
- Forest estate ”Severni Kučaj – Kučevo”, through the Forest subestate Majdanpek,
- Forest estate ”Timočke šume – Boljevac”, through the Forest subestate Donji Milanovac;
- Public enterprise National park Djerdap, through the management unit Donji Milanovac.

Located In the territory of the municipality the education center **”**Majdanpečka domena**”** is managed by the Faculty of Forestry, Belgrade University.

A review of the status of resources by users in the state-owned forests is given in Table T-3.4.

T-3.4: STATE FORESTS IN MAJDANPEK MUNICIPALITY CATEGORIZED BY USERS

No	FOREST USER	FOREST AREA		STANDING VOLUME		ANNUAL VOLUME INCREMENT	
		(*ha*)	(%)	(m^3)	(%)	(m^3)	(%)
1.	FE Severni Kučaj: FS Majdanpek	16.822	40,5	3.874.647	45,3	72.265	44,7
2.	FE Timočke šume: FS Donji Milanovac	7.192	17,3	1.202.991	14,1	24.166	14,9
3.	PE NP Đerdap: MU Donji Milanovac	15.580	37,5	3.136.319	36,7	58.556	36,2
4.	Faculty of Forestry: Education center Debeli Lug	1.960	4,7	339.890	4,0	6.703	4,1
∑	**State forest total**	**41.554**	**100,0**	**8.553.847**	**100,0**	**161.690**	**100,0**

SOURCE: Internal document of State Enterprises (2008)

The most important aspects of forest management will be later shown separately and in detail for each of these users.

3.2.1.1. State Enterprise ”Srbijašume”

The Public Enterprise ***”*Srbijašume*”*** for forest management was established in 1991, based on the Law on Forests which was adopted in the same year. The company was founded for the purpose of management of all state forests, which are divided into forest areas (27 forest areas, with a total area of state forest of 1,338,000 ha).

However, in 1999 the forest area in the territory of Kosovo and Metohija was placed under the jurisdiction of UNMIK, and in 2003, the forest areas in the territory of Vojvodina were placed under the jurisdiction of "Vojvodinašume”, an established public company for forest management.

Today PE Srbijašume manages state forests that are included in the territory of 17 forest areas, with a total of 775,000 ha which represent 77% of state forests.

The basic activities of SE Srbijašume integrate the professional assignments related to public forest management, professional and technical jobs in private forests, management of entrusted protected natural resources, management of hunting and fishing grounds, specific administrative functions, and commercial activities related to the listed activities.

Authorities of the company are the Board of Directors, General Manager and the Supervisory Board. Functionally, the organization has three levels:

- General direction;
- Forest estates;
- Forest subestates.

General direction performs the strategic tasks, while the forest districts operate as profit centers. Forest estates were established in each forest area. Basic business units are Forest subestates which perform operational tasks in the part of the territory where they have jurisdiction.

In most cases the jurisdiction of one Forest subestate includes forest and other wooded land in the territory of one administrative municipality, but the municipality of Majdanpek is an exception. Furthermore, the forests in Majdanpek municipalities are under the jurisdiction of two separate Forest subestates, FE Severni Kučaj - Kucevo and FE Timočke šume – Boljevac.

3.2.1.1.1. Forest estate "Severni Kučaj" - Kučevo – Forest subestate Majdanpek

State forests in the Severni Kučaj forest area are managed by Forest estate "Severni Kučaj", situated in Kučevo. According to the valid forest management plan for the Severni Kučaj forest area, in 1999 the total area of forests under state ownership was 61,565 *ha* in the municipalities of Kučevo, Žagubica, Petrovac, Požarevac, Veliko Gradište, Malo Crniće, Golubac and Smederevo.

Under the jurisdiction of Forest subestate Majdanpek, which manages forests with a total area of 16.822 *ha*, are the following management units[9] (1999):

- Pek – Grabova reka;
- Ujevac;
- Ravna reka;
- Todorova reka;
- Mali Pek.

Generative origin forests (high forests) occupy about 14,400 ha, i.e. approximately 86% of the total area which controls the Forest subestate Majdanpek; vegetative origin forests (coppice forests) cover 600 ha, which is about 4%, while the artificially raised stands occupy an area of 700 ha, i.e. about 4% of the surface.

The area of shrubs, brush lands, other wooded land and other non-forest land is only about 1060 ha, i.e. about 6 %.

[9] Management units are natural territorial units, and may include the entire complex or part of the forest, which is managed by a single owner or user (1991).

A review of forests and other wooded land in the state forests classified by management units under the jurisdiction of the Forest subestate Majdanpek is shown in Table T-3.5.

T-3.5: STATE FORESTS CATEGORIZED BY FOREST TYPE - FS MAJDANPEK

MANAGEMENT UNIT	HIGH FORESTS *(ha)*	COPPICE FORESTS *(ha)*	ARTIFICIALLY RAISED STANDS *(ha)*	OTHER[10] *(ha)*	TOTAL *(ha)*
Pek–Grabova Reka	1.559,03	0,00	1,44	101,6	**1.662,07**
Ujevac	1.124,99	142,87	3,38	47,17	**1.318,41**
Ravna reka	5.187,77	256,71	387,34	189,68	**6.025,14**
Todorova reka	2.619,99	29,88	46,84	42,94	**2.739,65**
Mali Pek	3.951,09	183,89	254,55	678,37	**5.077,10**
FS Majdanpek	**14.442,87**	**613,35**	**693,55**	**1059,76**	**16.822,37**

SOURCE: 1999.

The annual volume increment and standing volume structure in state forests categorized by forest origin is shown in Table **T-3.6**.

T-3.6: ANNUAL VOLUME INCREMENT AND STANDING VOLUME STRUCTURE CATEGORIZED BY ORIGIN – FS MAJDANPEK

No.	ORIGIN	STANDING VOLUME			ANNUAL VOLUME INCREMENT		
		(m^3)	(%)	m^3/ha	(m^3)	(%)	m^3/ha
1.	High forests	3.766.770	97,2	260,8	69.279	95,9	5,5
2.	Coppice forests	74.504	1,9	121,5	1.765	2,4	3,1
3.	Artificially raised stands	33.373	0,9	48,1	1.221	1,7	7,1
∑	**Total**	**3.874.647**	**100,0**	**241,1**	**72.265**	**100,00**	**4,5**

SOURCE: 1999.

The highest wood volume is concentrated in the high forests at about 3,770,000 m^3, i.e. 97% of the total wood volume in forests. The average volume concentrated in the high forests is about 261 m^3/ha. In the forests of generative origin (origin from seed) achieved, the annual increment is about 69,000 m^3, i.e. about 96% of the total increment. The average increment is 5.5, m^3/ha per year.

Only about 75000 m^3, i.e. about 1.9%, of the growing stock volume is concentrated in the coppice forests; the average volume in the same forests is 121.5 m^3/ha. A coppice forest makes a volumetric increment of only 1775 m^3 per year, i.e. about 2.4% of the total increase. The average increment is 3.1 m^3/ha per year.

About 34,000 m3, i.e. below 1%, are concentrated in artificially raised stands, with an average volume of 48.1 m3/ha. In these stands the volumetric increment is 1220 m3, which is about 1.7% of the total increment. The average increment in the artificially raised stands is 7.1 m3/ha.

[10] Category 'Other' includes: Shrubs, brushland, other wooded land and other non-forest land.

The structure of the volume of the growing stock and the annual volume increment categorized by the main tree species in the forests that are managed by the Local forest office of Majdanpek, are presented in Table T-3.7.

The dominant species of trees by volume (67%) is beech, which generates the highest volume increment (68% of total increment). After the beech, the largest volume (11%) and volumetric growth (10%) is produced by sessile oak. Other broadleaves (hornbeam, lime, sycamore, common ash, etc. ...) participate in the total volume and volume increment with more than 20%: the participation of conifers is only 1% by volume and 2.3% by volume increment.

T-3.7: ANNUAL VOLUME INCREMENT AND GROWING STOCK VOLUME STUCTURE CATEGORIZED BY MAIN TREE SPECIES – FS MAJDANPEK

SPECIES	STANDING VOLUME		ANNUAL VOLUME INCREMENT	
	(m^3)	%	(m^3)	%
Beech	2.609.398	67,3	49.090	67,9
Sessile oak	424.174	10,9	6.978	9,7
Other broadleaves	802.893	20,7	14.524	20,1
Total broadleaves	**3.836.465**	**99,0**	**70.592**	**97,7**
Total conifers	**38.182**	**1,0**	**1.673,03**	**2,3**
TOTAL	**3.874.647**	**100,0**	**72.265**	**100,0**

SOURCE: 1999.

Many influences of forests on the environment are defined as forest functions. Conditionally, it is possible to divide them into three main groups: production, generally useful, and social functions.

The production forest functions include: production of technical and firewood timber, game, production of forest seeds and non-wood forest products (medicinal plants, stone, gravel, tar, mushrooms, forest fruits, etc...). Generally useful forest functions include: protection of soil and water, hydrological, climatic, hygienic-health and others, while the social forest functions include: tourism and recreation, education, scientific research, defense and others.

Since the forest functions are planned in reference to different objectives of management in some parts of the forest complex there are spatial distribution of the forest complex according to the primary purpose of some forest parts.

Table T-3.8 presents an overview of the area of forests that are managed by FS Majdanpek, according to **primary purpose**.

T-3.8: STATE FOREST AREA CATEGORIZED BY PRIMARY PURPOSE – FS MAJDANPEK

No.	PRIMARY PURPOSE	AREA	
		(*ha*)	(%)
1.	Production of technical wood	15.329,54	95,4
2.	Land protection	419,84	2,6
3.	Permanently protected forest	238,38	1,5
3.	Strict nature reserves	79,64	0,5
∑	**Total area**	**16.067,40**	**100,0**

SOURCE: 1999.

Of the largest area of forests that are managed by FSE Majdanpek, more than 15,000 *ha*, about 95%, of the area is for the technical production of wood, and other forest purposes: protection of the land, permanent protection of forests and strict nature reserves which occupy approximately 720 *ha*.

In forests with the production of technical wood as the primary purpose, around 3,816,000 m^3 are concentrated: for wood volume (Table T-3.9.), an average of 249 m^3/ha, with approximately 71,100 $m^{3\ of}$ annual volume increment, an average of 4.6 m^3/ha.

In the forests whose purpose is the protection of the land around 58,000 m^3 are concentrated, i.e. 139.1 m^3/ha, and annual increment is around 1258 m^3 or an average of 3.0 m^3/ha.

Forest resources can be considered as a business object only if there is an appropriate network of forest roads which allow for the management of forests.

T-3.9: ANNUAL VOLUME INCREMENT AND STANDING VOLUME STRUCTURE CATEGORIZED BY PRIMARY PURPOSE – FS MAJDANPEK

No.	PRIMARY PURPOSE	STANDING VOLUME			ANNUAL VOLUME INCREMENT		
		(m^3)	(%)	m^3/ha	(m^3)	(%)	m^3/ha
1.	Production of technical wood	3.816.227	98,5	248,9	71.097	98,3	4,6
2.	Land protection	58.420	1,5	139,1	1.258	1,7	3,0
∑	**Total**	**3.874.647**	**100,0**	**241,1**	**72.265**	**100,0**	**4,5**

SOURCE: 1999

Accessibility and openness of forest areas is one of the basic preconditions for intensive cultivation of forests and complex use of wood mass and other forest products. Openness of forest areas depends on the application of modern machinery in forest management. The external openness of forest areas and connection to consumer centers are determined by the arrangement of travel routes from public roads, railway tracks and waterways.

The most important factors for the external openness of forests which are managed by the Forest subestate Majdanpek (1999) are as follows:

- The Danube River, on the north area border;
- Railroad: Požarevac – Kučevo – Majdanpek – Bor, which passes through the largest forest complex
- Main road: Požarevac – Veliko Gradište – Golubac – Dobra – Donji Milanovac;
- Main road: Požarevac – Kučevo – Majdanpek – Negotin, that passes through the best forest areas;
- Regional road: Debeli Lug – Leskovo – Jasenovo – Žagubica;
- Regional road: Donji Milanovac – Kapetanske livade - Majdanpek;
- Regional road: Debeli Lug – Jasikovo – Vlaole – Gornjane – Krivelj – Bor;

The internal openness of forests is determined by the total length of roads in a forest area relative to the total area of the same area. Display open areas managed by Forest subestate Majdanpek are shown in Table T-3.10.

T-3.10: INTERNAL OPENNESS OF FOREST AREA - FS MAJDANPEK

FOREST MANAGEMENT UNIT	CATEGORIES OF ROADS	LENGTH *(km)*	TOTAL LENGTH *(km)*	FMU ARAEA *(ha)*	OPENNESS *(m/ha)*
Pek–Grabova Reka	Truck (hard) road	4,61	19,8	1.662,07	11,9
	Tractor (soft) road	5,17			
	Public road	10,00			
Ujevac	Public road	7,40	13,0	1.318,41	9,8
	Tractor (soft) road	5,61			
Ravna reka	Public road	31,52	50,5	6.025,14	8,4
	Tractor (soft) road	18,99			
Todorova reka	Public road	12,980	25,6	2.739,65	9,3
	Tractor (soft) road	12,620			
Mali Pek	Public road	22,86	42,3	5.077,10	8,3
	Tractor (soft) road	19,47			
LO MAJDANPEK	Public road	**79,37**	**151,2**	**16.822,37**	**9,0**
	Tractor (soft) road	**61,86**			
	Public road	**10,00**			

SOURCE: 1999

The structure of the **planned decade yield**[11] in forests that are managed by FSE Majdanpek is shown in Table T-3.11. The total major yield, which includes the completion of the main cutting (cutting renewal), is 266,576 m^3, of which the beech cutting is 167,101 m^3, and the oak cutting 48,446 m^3.

The implementation of cutting and other broadleaves in the amount of 51,029 m^3 is also planned. The main yield of conifers is not planned, primarily because of the age of the coniferous culture area.

The total previous yield, which includes selective cuts, is 247005 m^3; beech is in the amount of 170,311 m^3, oak trees in the amount of 33,387 m3, and other deciduous trees in the amount of 43,151 m^3. The previous conifer yield is only 156 m^3 over ten years.

T-3.11: PLANNED DECADE YIELD - FSE MAJDANPEK

SPECIES	MAIN YIELD *(m^3)*	PREVIOUS YIELD *(m^3)*	TOTAL YIELD *(m^3)*
Beech	167.101	170.311	337.412
Oak	48.446	33.387	81.833
Other broadleaves	51.029	43.151	94.180
Total broadleaves	**266.576**	**246.849**	**513.425**
Total conifers	**0**	**156**	**156**
TOTAL	**266.576**	**247.005**	**513.581**

SOURCE: 1999.

The total yield is 513,581 m^3 over ten years, which means that the capacity of the planned cutting on the territory which is managed by FSE Majdanpek is about 52,000 m^3 per year.

[11] The planned yield is the planned volume of cutting.

3.2.1.1.2. Forest estate Timočke šume – Forest subestate Donji Milanovac

State forests in the Timok forest area are managed by the Forest estate "Timočke šume" situated in Boljevac. According to the 2004 forest management plan for Timočki forest area, the total area of forests in the municipalities of: Boljevac, Bor, Zaječar, Knjaževac, Negotin, Kladovo and Majdanpek (part of Donji Milanovac)under state ownership is 82,650.82 *ha*

The jurisdiction of the Forest sub-estate Donji Milanovac that manages a total forest area of 7192 ha is held by the following Management units (2004):

- Miroč;
- Deli Jovan I;
- Crni Vrh II;
- Boljetin – Pecka bara.

The statement of forest area and forest land in the state by management units under the jurisdiction of the Forest sub-estate Donji Milanovac is given in Table T-3.12.

The highest representations in the total area, which are managed by Donji Milanovac, have high forests about 80%, or 5750 *ha.*

Coppice forests are on 700 *ha*, which is only about 10% of the area, while the artificially raised stands are represented on 92 *ha*. Shrubs, brushlands, other wooded land and other non-forest land in the total area involves only 9%.

T-3.12: STATE FORESTS CATEGORIZED BY FOREST TYPE - FS DONJI MILANOVAC

FOREST MANAGEMENT UNITS	HIGH FORESTS *(ha)*	COPPICE FORESTS *(ha)*	ARTIFICIALLY RAISED STANDS *(ha)*	OTHER *(ha)*	TOTAL *(ha)*
Miroč	2.771,28	166,55	28,75	88,25	**3.054,83**
Deli Jovan I	1.535,14	101,97	9,69	176,18	**1.822,98**
Crni Vrh II	63,47	396,37	45,98	273,58	**779,40**
Boljetin - Pecka bara	1.382,48	30,92	7,41	114,56	**1.535,37**
FS DONJI MILANOVAC	**5.752,37**	**695,81**	**91,83**	**652,57**	**7.192,58**

SOURCE: 2004

Table T-3.13 shows the structure of standing volume and annual volume increment by origin for the area which is managed by the Donji Milanovac. In high forests 1,168,000 m^3 of wood volume are concentrated, an average of 203.1 m^3/ha, about 97% of the total wood volume. In the annual guide about 23,500 m3/ha are wood mass, i.e. about 4.1 m^3/ha or 97.2% of the total increment.

T-3.13: STUCTURE OF STANDING VOLUME AND ANNUAL INCREMENT BY ORIGIN– FS DONJI MILANOVAC

No.	ORIGIN	STANDING VOLUME			ANNUAL VOLUME INCREMENT		
		(m^3)	(%)	m^3/ha	(m^3)	(%)	m^3/ha
1.	High forests	1.168.410	97,1	203,1	23.496	97,2	4,1
2.	Coppice forests	32.187	2,7	46,3	609	2,5	0,9
3.	Artificially raised stands	2.395	0,2	26,1	61	0,3	0,7
∑	**Total**	**1.202.991**	**100,0**	**174,4**	**24.166**	**100,0**	**3,5**

SOURCE: 2004

In coppice forests around 32,000 m^3 are mainly concentrated, i.e. about 46 m^3/ha. Volume increment in them is only 609 m^3, per year, on average about 0.9 m^3/ha. Participation of volume and increment for artificially raised stands in the total values related to this area are only 0.2% or 0.3%.

The dominant species of trees by volume (52.5%) is beech, which generates the highest volume increment (52.4% of total increment). After the beech, the largest volume (14%) and volumetric growth (11%) are produced by sessile oak. Other broadleaves (wild cherry, Hungarian oak, etc.) participate in the total volume and volume increment with more than 33%, and the participation of conifers is only 0.2% of total growing stock.

T-3.14. STANDING VOLUME AND ANNUAL VOLUME INCREMENT BY TREE SPECIES - FS DONJI MILANOVAC

TREE SPECIES	STANDING VOLUME		ANNUAL VOLUME INCREMENT	
	(m^3)	%	(m^3)	%
Beech	631.743	52,5	12.674	52,4
Sessile oak	170.031	14,1	2.754	11,4
Other broadleaves	398.810	33,2	8.681	35,9
Total broadleaves	1.200.583	99,8	24.109	99,8
Total conifers	2.408	0,2	57	0,2
TOTAL	**1.202.991**	**100,0**	**24.166**	**100,0**

SOURCE: 2004

Forest review by primary function is shown in Table **T-3.15**. The largest area, 6171 ha (89%), occupies the forest with productive primary function. Protective forests cover an area of 542 ha (7.9%), while forests under permanent protection, without management treatments, occupy 185 ha, or 2.7% of the total area.

T-3.15. STATE FORESTS BY PRIMARY FUNCTION – FS DONJI MILANOVAC

No.	PRIMARY FUNCTION	AREA	
		(ha)	(%)
1.	Production of technical wood	6.171,28	89,4
2.	Land protection	542,55	7,9
3.	Permanently protected forest	185,6	2,7
∑	**Total area**	**6.899,43**	**100,0**

SOURCE 2004

According to the participation of the surface, in the forests with the function to produce technical wood 99% of the total wood volume (Table T-3.16.) is concentrated, i.e. 1,186,000 m^3, or 192.2 m^3/ha. Both this purpose and 99% of the total volume increment, i.e. 23,870 m^3 or 3.9 m^3/ha, are achieved,.

T-3.16. STANDING VOLUME AND ANNUAL VOLUME INCREMENT BY PRIMARY FUNCTION - FS DONJI MILANOVAC

NO.	PRIMARY FUNCTION	STANDING VOLUME			ANNUAL VOLUME INCREMENT		
		(m^3)	(%)	m^3/ha	(m^3)	(%)	m^3/ha
1.	Production of technical wood	1.185.907	98,6	192,2	23.870	98,8	3,9
2.	Land protection	16.271	1,4	30,0	282	1,2	0,5
3.	Permanently protected forest	913	0,0	5,0	13	0,0	0,1
∑	**Total**	**1.202.991**	**100,0**	**174,4**	**24.166**	**100,0**	**3,5**

SOURCE 2004

The most important factors for the external openness of forests which are managed by the Local forest office (2004) are as follows:

- The Danube River on the north area border;
- Main roads: Požarevac – Veliko Gradište – Golubac – Dobra – Donji Milanovac; Kladovo – Donji Milanovac – Smederevo – Beograd; Bor – Zagrađe – Mosna;
- Regional roads: Donji Milanovac – Kapetanske livade - Majdanpek; Negotin – Štubik – Plavna - Klokočevac;
- Local roads: Donji Milanovac- Miroč – Brza Palanka;Tri Štubeja – Ciganско groblje – Crni Vrh.

A review of the internal openness of this area is given in Table **T-3.17.**

T-3.17. INTERNAL OPENNESS OF AREA – FSDONJI MILANOVAC

FOREST MANAGEMENT UNIT	CATEGORIES OF ROADS	LENGTH *(km)*	TOTAL LENGTH *(km)*	FMU AREA *(ha)*	OTVORENOST *(m/ha)*
Miroč	Truck (hard) road	18,0	74,1	3.054,83	24,0
	Tractor (soft) road	52,6			
	Public road	3,5			
Deli Jovan I	Truck (hard) road	8,0	27,5	1.822,98	15,6
	Tractor (soft) road	19,5			
Crni Vrh II	Truck (hard) road	7,0	32,0	779,40	20,8
	Tractor (soft) road	25,0			
Boljetin - Pecka bara	Truck (hard) road	0,0	2,0	1.535,37	8,0
	Tractor (soft) road	2,0			
FS Donji Milanovac	**Truck (hard) road**	**33,0**	**135,6**	**7.192,58**	**18,8**
	Tractor (soft) road	**99,1**			
	Public road	**3,5**			

SOURCE: 2004

The structure of the planned yield in the forests that are managed by the Donji Milanovac is shown in Table T-3.18.

T-3.18. PLANNED DECADE YIELD – FS DONJI MILANOVAC

SPECIES	MAIN YIELD (m^3)	PREVIOUS YIELD (m^3)	TOTAL YIELD (m^3)
Beech	80.284	85.590	165.874
Oak	10.233	17.708	27.941
Other broadleaves	2.038	5.091	7.129
Total broadleaves	**91.555**	**108.389**	**199.944**
Total conifers	**60**	**158**	**218**
TOTAL	**92.615**	**108.547**	**200.162**

SOURCE: 2004

The total decennial main yield was 92,615 m^3; for beech it was 80,284 m^3, oak 10,233 m^3, other broadleaves 2038 m^3, and all conifers, 60 m3. The total previous yield was 108,547 m^3; for beech it was 85,590 m^3, oak 17,708 m^3, other broadleaves 5091 m^3 and conifer 158 m^3. The decennial total yield in the forests that are managed by the Donji Milanovac was 200,162 m^3, which means that the planned cutting per year in this area is about 20,000 m^3.

3.2.1.2. Public Enterprise National park Djerdap

The area of Djerdap was declared a National Park in 1974., and since 1989 its management has been under the jurisdiction of the Public Enterprise for the protection and development of National Park Djerdap, a status confirmed and regulated by the still valid 1993 National Park Law.

A Public company within the framework of the protection and improvement of natural values of National Park Djerdap works on prevention of activities that can damage the main characteristics and other properties of the National Park, protection, preservation and improvement of bio-geographical areas, ecosystems and the diversity of the original flora and fauna, the genetic fund and its regeneration. According to the Forest Law, this public enterprise plans the forest management in the state forests in the area of the National Park.

The head office of this Public company for Djerdap National Park is located in Donji Milanovac, and operational tasks are performed in the operating units Donji Milanovac, Dobra i Tekija.

The total area of the National Park, which is located in the territory of the political municipalities of Majdanpek, Golubac and Kladovo, is 63,608 *ha* (Table T-3.19.). Forest area in the National Park comprises 45,244 *ha*, while the area of state forest, which controls the public enterprise of National Park Djerdap, is 38,226 *ha*.

T- 3.19. NATIONAL PARK AREA BY POLITICAL MUNICIPALITIES

MUNICIPALITY	TOTAL AREA		STATE FORESTS	
	(ha)	%	*(ha)*	%
Majdanpek	29.467	46,3	17.204	45,0
Golubac	18.115	28,5	12.269	32,1
Kladovo	16.024	25,2	8.753	22,9
TOTAL	**63.608**	**100**	**38.226**	**100**

SOURCE: 2001

About 45% of the total area of forest in the National Park, 17,204 *ha*, is located in the municipality of Majdanpek. These forests are under the operational competence of the MU Donji Milanovac; however, one part of the area (about 1500 *ha*) is under the jurisdiction of MU Tekija, which is responsible also for national forest park in the municipality of Kladovo, so characteristics of these forests because of the way of data presentation does not match the division of forest space with the administrative divisions of the political municipality and they are not included in the area under forest municipalities Majdanpek.

The operational unit Donji Milanovac is responsible for the following forest management units:

- Boljetinka;
- Boljetinska Reka;
- Zlatica;
- Porečke šume;
- Crni vrh;
- Pecka Bara.

A review of forests and other wooded land in state-owned forest management units under the jurisdiction of Operational Unit Donji Milanovac is shown in Table **T-3.20**.

T-3.20. STATE FORESTS CATEGORIZED BY FOREST TYPE - MU DONJI MILANOVAC

FOREST MANAGEMENT UNITS	HIGH FORESTS *(ha)*	COPPICE FORESTS *(ha)*	ARTIFICIALLY RAISED STANDS *(ha)*	OTHER *(ha)*	TOTAL *(ha)*
Boljetinka	513,99	2.057,34	19,74	387,14	2.978,21
Boljetinska reka	3.572,61	573,75	5,41	2,32	4.154,09
Zlatica	2.799,06	131,19	5,11	0,00	2.935,36
Porečke šume	527,51	1.587,97	22,15	2,92	2.140,55
Crni vrh	1.424,69	331,82	9,53	53,50	1.819,54
Pecka bara	0,00	1.134,71	22,70	395,10	1.552,51
OU Donji Milanovac	**8.837,86**	**5.816,78**	**84,64**	**840,98**	**15.580,26**

SOURCE: 2001

High forests occupy an area of 8837 ha, i.e. 56%, while the coppice forests are on 9929 ha, i.e. 37%; artificial raised stands are on only 85 ha, and other land covers about 840 ha, i.e. about 6%. The volume structure and volume increment are shown in Table T-3.21.

T-3.21. STUCTURE OF STANDING VOLUME AND ANNUAL INCREMENT BY ORIGIN - MU DONJI MILANOVAC

No.	ORIGIN	STANDING VOLUME			ANNUAL VOLUME INCREMENT		
		(m^3)	(%)			(m^3)	(%)
1.	High forests	2.264.913	72	256,3	37.680	64	4,3
2.	Coppice forests	864.874	28	148,7	20.686	35	3,6
3.	Artificially raised stands	6.533	0	77,2	190	0	2,2
∑	**Total**	**3.136.319**	**100**	**212,8**	**58.556**	**100**	**4,0**

SOURCE: 2001

The forests of the National Park which is located in the municipality of Majdanpek are concentrated on 3,130,000 m^3, an average of 212.8 m^3/ha; the annual increment is about 59,000 m^3, an average of 4.0 m^3/ha. The high forests are concentrated on 2,265,000 m^3, i.e. 72% of the area. The average volume in the high forests is 256.3 m^3/ha. Volumetric increment in the high forests is annually about 38,000 m^3, an average of 4.3 m^3/ha.

ICoppice forests are concentrated on 865,000 m^3, i.e. 28% of the total volume. The average volume in the coppice forests is 149 m^3/ha. Annual volumetric increment in the coppice forests is about 21,000 m^3, an average of 2.2 m^3/ha. Artificially raised stands are concentrated on only 6500 m^3, an average of 77.2 m^3/ha, and the annual increment is only 190 m^3, an average of 1.44 m^3/ha.

The dominant species of tree by volume (64%) is beech, which generates the highest volume increment (69% of total increment). After the beech, the largest volume (20%) and volumetric growth (17%) are produced by sessile oak. Other broadleaves (wild cherry, Hungarian oak, etc.) participate in the total volume and volume increment by more than 16%, and the participation of conifers is only 0.1% of the total growing stock.

T-3.22. STANDING VOLUME AND ANNUAL VOLUME INCREMENT BY TREE SPECIES – MU DONJI MILANOVAC

TREE SPECIES	STANDING VOLUME		ANNUAL VOLUME INCREMENT	
	(m^3)	%	(m^3)	(m^3)
Beech	1.994.436	63,6%	40.451	69,1%
Sessile oak	624.455	19,9%	9.884	16,9%
Other broadleaves	513.391	16,4%	8.095	13,8%
Total broadleaves	**3.132.282**	**99,9%**	**58.431**	**99,8%**
Total conifers	**4.036**	**0,1%**	**125**	**0,2%**
TOTAL	**3.136.319**	**100**	**58.556**	**100,0**

SOURCE: 2001

Table T-3.23 represents the survey area according to forest use. The largest area of about 88% is for land protection, about 8% of which is strict nature reserves, and 3% is forest which has the function of extraordinary landscape, About 1.6%, consisting of reserves, is for scientific research, while the portion for recreational centers is approximately 0,3%. This points to the limited possibilities of forests in the area of national parks. Their function is primarily protective.

T-3.23: STANDING VOLUME AND ANNUAL VOLUME INCREMENT BY PRIMARY FUNCTION – MU DONJI MILANOVAC

No.	PRIMARY FUNCTION	AREA	
		(ha)	(ha)
1.	Land protection	13.634,1	87,5%
2.	Scientific research areas	4,2	0,0%
3.	Recreational-touristic center	54,4	0,3%
4.	Extraordinary landscape	485,1	3,1%
5.	Strict nature reserve	1.154,2	7,4%
6.	Scientific research reserve	248,3	1,6%
∑	**Total**	**15.580,3**	**100,0%**

SOURCE: 2001

According to participation in the area, the largest volume (see Table T-3.24), about 2,903,000 $m^{3,}$ is concentrated in the forests with the land protection function of 93%, and about 93% volume increment. The average volume of wood in the forests of this use is 212.9 m^3/ha, and the increment about 4.0 m^3/ha.

T-3.24: STANDING VOLUME AND ANNUAL VOLUME INCREMENT BY PRIMARY FUNCTION – MU DONJI MILANOVAC

NO.	PRIMARY FUNCTION	STANDING VOLUME			ANNUAL VOLUME INCREMENT		
		(m^3)	(%)	(m^3/ha)	(m^3)	(%)	(m^3/ha)
1.	Land protection	2.902.922,0	92,6%	212,9	54.476,6	93,0%	4,0
2.	Scientific research areas	1.926,3	0,1%	456,5	29,8	0,1%	7,1
3.	Recreational-touristic center	7.117,4	0,2%	130,9	198,5	0,3%	3,6
4.	Extraordinary landscape	8.011,8	0,3%	16,5	217,1	0,4%	0,4
5.	Strict nature reserve	157.458,5	5,0%	136,4	2.492,6	4,3%	2,2
6.	Scientific research reserve	58.883,8	1,9%	237,2	1.143,3	2,0%	4,6
∑	**Total**	**3.136.319**	**100,0**	**212,8**	**58.556**	**100,0**	**4,0**

SOURCE: 2001

The structure of the planned 10-year yield in forests of the National Park in the territory of Majdanpek municipality is shown in Table T-**3.25.**

T-3.25: PLANNED 10-YEAR YIELD – MU DONJI MILANOVAC

SPECIES	MAIN YIELD (m^3)	PREVIOUS YIELD (m^3)	TOTAL YIELD (m^3)
Beech	13.431	169.887	183.318
Oak	82.507	55.891	138.398
Other broadleaves	14.353	54.352	68.705
Total broadleaves	**110.291**	**280.130**	**390.421**
Total conifers	**791**	**368**	**1.159**
TOTAL	**111.082**	**280.498**	**391.580**

SOURCE: 2001

The total main decennial yield is 111,000 m^3; for the beech it is 13,4000 m^3, oak 82,500 m^3, 14,300 m^3, and for other broadleaves and all conifers 800 m^3. The total previous yield was 280,500 m^3; for beech 170,000 m^3, oak 56,000 m^3, other broadleaves 54,000 m^3 and conifers 400 m^3. The total decennial yield in the forests managed by the Donji Milanovac is 200,162 m^3, which means that the planned cutting per year in this area is about 20,000 m^3.

The total yield is 391,600 m^3 over ten years, which means that the capacity of the planned cutting in the territory, which is managed by NP Djerdap – MU Donji Milanovac, is about 39,000 m^3 per year.

The most important factors regarding external forest openness in the National Park in the municipality of Majdanpek are:

- the Danube River on the north area border;
- Main road: Kladovo – Donji Milanovac – Smederevo – Beograd;
- Regional road: Donji Milanovac – Kapetanske livade – Majdanpek;
- Local road: Donji Milanovac- Miroč – Brza Palanka;
- Local road: Tri Štubeja – Cigansko groblje – Crni Vrh;

An internal openness forest area in the National Park in the municipality of Majdanpek is presented in Table T-3.26.

T-3.26 INTERNAL OPENNESS OF AREA – MU DONJI MILANOVAC

FOREST MANAGEMENT UNIT	CATEGORIES OF ROADS	LENGTH *(km)*	TOTAL LENGTH *(km)*	FMU AREA *(ha)*	OTVORENOST *(m/ha)*
Boljetinka	Public road	12,0	61,1	2.978,21	20,5
	Tractor (soft) road	49,1			
	Truck (hard) road	0,0			
Boljetinska Reka	Public road	8,4	56,9	4.154,09	13,7
	Tractor (soft) road	41,2			
	Truck (hard) road	7,3			
Zlatica	Public road	10,1	66,1	2.935,36	22,5
	Tractor (soft) road	40,8			
	Truck (hard) road	15,2			
Porečke šume	Public road	21,0	44,1	2.140,55	20,6
	Tractor (soft) road	23,1			
	Truck (hard) road	0,0			
Crni Vrh	Public road	22,2	45,6	1.819,54	25,1
	Tractor (soft) road	13,5			
	Truck (hard) road	9,9			
Pecka Bara	Public road	13,4	21,9	1.552,51	14,1
	Tractor (soft) road	8,5			
	Truck (hard) road	0,0			
OU Donji Milanovac	**Public road**	**87,1**	**295,7**	**15.580,26**	**19,0**
	Tractor (soft) road	**176,2**			
	Truck (hard) road	**32,4**			

SOURCE: 2001

3.2.1.2. Education center „Debeli Lug“-Faculty of Forestry*, University of Belgrade*

Majdanpek Domain is part of the forest complex of the Homoljske mountains. Part of the domain of forest area, 7.500 ha, was given by Queen Natalija Obrenovic to Belgrade University in 1903,

Because of the necessity for practical work by students, the watershed Crna Reka with a total surface of 2000 ha was given to the Faculty of Forestry in 1947, and in 1956 test land of the Faculty was formed in order to manage and economize these forests[12]. Since 1990, this part of the University domain has had the name “Education center- Debeli Lug”.

The total surface of the teaching base at Debeli Lug is 1,960 ha (see Table **T-3.27)**; it compromises one management unit, Crna Reka – Pek. Around 1,600 ha are represented by

[12] Besides the watershed of Crna Reka River, in 1956 the management unit Goč- Gvozdac, with a total area of 3.700 ha, was also given to theForestry Faculty .

high forests, and artificially planted stands cover an area of 220 ha. Forest land, shrubs and brush wood cover only 125 ha, while coppice only 9 ha.

T-3.27: OVERVIEW OF FOREST AREA UNDER STATE OWNERSHIP – EC DEBELI LUG

FOREST MANAGEMENT UNIT	HIGH FOREST *(ha)*	COPPICE *(ha)*	ARTIFICIALLY PLANTED FOREST *(ha)*	OTHER *(ha)*	TOTAL *(ha)*
Crna reka – Pek	**1.602,35**	**9,32**	**223,67**	**124,9**	**1.960,27**

SOURCE: 2001/b;

The structure of wood volume and volume increment is given in Table **T-3.28**. The total wood volume in the forests of the education center at Debeli Lug is around 340.000 m^3, on average around 173 m^3/ha. The total increment is around 6.700 m^3, on average 3,7 m^3/ha. The high forest is concentrated on 320.000 m^3, i.e. 94,3 % of the total volume, and there the average volume is around 200 m^3/ha.

Yearly increment in high forests is around 5.900 m^3, on average 3,7 m^3/ha. Artificially planted forests are concentrated on around 18.00 m^3, i.e. around 5 % of total volume, on average 82 m^3/ha .Their yearly increment is only around 760 m^3, on average 3,4 m^3/ha.

T-3.28: STRUCTURE OF STANDING VOLUME AND VOLUME INCREMENT BY ORIGIN IN EC DEBELI LUG

	ORIGIN	STANDING VOLUME			VOLUME INCREMENT		
		(m^3)	(%)	m^3/ha	(m^3)	(%)	m^3/ha
1.	High forests	320.645,4	94,3	200,1	5.922,95	88,4	3,7
2.	Coppice	1.026,6	0,3	110,2	23,18	0,3	2,5
3.	Artificially planted forests	18.218,8	5,4	81,5	757,04	11,3	3,4
∑	**Total**	**339.890,8**	100,0	**173,4**	**6.703,17**	100,0	**3,7**

SOURCE: 2001/b

The most dominant tree species in the area of the Majdanpek Domain is beech (see Table **T-3.29**), which in total wood volume represents 73% and in total increment 70%. Following beech is oak with a share in the volume and increment of around 13%. The proportion of other deciduous trees is around 9% in volume and volume increment, while that of conifers is around 5% in volume and 9% in volume increment.

T-3.29: STANDING VOLUME AND VOLUME INCREMENT BY TYPE OF TREE SPECIES – EC DEBELI LUG

SPECIES	STANDING VOLUME		VOLUME INCREMENT	
	(m^3)	**%**	*(m^3)*	**%**
Beech	246.244,0	72,4	4.629,66	69,1
Oak	45.105,8	13,3	839,31	12,5
Other deciduous trees	32.780,0	9,6	622,26	9,3
Total deciduous trees	**324.129,8**	95,4	**6.091,23**	90,9
Total coniferous	**15.761,0**	4,6	**611,81**	9,1
TOTAL	**339.890,8**	100,0	**6.703,04**	100,0

SOURCE: 2001/b

Table **T-3.30** describes the forest area in EC Debeli Lug according to purpose. Most of the area of 1,840 *ha* (94 %) compromises forests with basic production purpose. Protective forests cover an area of 105 *ha* (5,3 %), while strict nature reserves cover 15 *ha*, or less than 1 % of the total area.

T-3.30: AREA UNDER FOREST BY PURPOSE – EC DEBELI LUG

No.	PURPOSE	AREA	
		(*ha*)	(%)
1.	Production of technical wood	1.840,4	93,9%
3.	Soil protection	104,6	5,3%
4.	Strict nature reserves	15,3	0,8%
∑	**Total area**	**1.960,3**	**100,0%**

SOURCE: 2001/b

Proportionally to share by area, in forests with the function of production of technical wood, 97% of total wood volume (see Table **T-3.31**.) is concentrated, i.e. around 331.000 m^3, or 179,7 m^3/ha. In forests with this purpose 99% of total wood increment, i.e. around 6.600 m^3, or 3,6 m^3/ha is realized.

T-3.31: STRUCTURE OF STANDING VOLUME AND VOLUME INCREMENT BY PURPOSE TB DEBELI LUG

Br.	PURPOSE	STANDING VOLUME			VOLUME INCREMENT		
		(m^3)	(%)	m^3/ha	(m^3)	(%)	m^3/ha
1.	Production of technical wood	330.797	97,3	179,7	6.621,	98,8	3,6
3.	Protection of soil	9.093	2,7	87,0	82	1,2	0,8
∑	**Total**	**339.891**	**100,0**	**173,4**	**6.703**	**100,0**	**3,7**

SOURCE: 2001/b

The most important factors concerning the outer openness of forest in the Educational Center Debeli Lug are:

- railway line: Požarevac – Kučevo – Majdanpek – Bor;
- regional road: Debeli Lug – Leskovo – Jasenovo – Žagubica;
- regional road: Debeli Lug – Jasikovo – Vlaole – Gornjane – Krivelj – Bor.

The indoor openness of the area is given in Table **T-3.32**.

T-3.32: INDOOR OPENNESS OF AREA -EC DEBELI LUG

MANAGEMENT UNIT	CATEGORY OF ROAD	TOTAL LENGTH *(km)*	AREA MU *(ha)*	OPENNESS *(m/ha)*
CRNA REKA – PEK	**Public asphalt**	**64,3**	**1.960,27**	**31,0**
	Secondary/ Soft			
	Main/ Hard			

SOURCE: 2001/b

The structure of planned increment in the forests of the Teaching Base Debeli Lug is given in Table **T-3.33**.

T-3.33: PLANNED YIELD - EC DEBELI LUG

SPECIES	MAIN YIELD (m^3)	PREVIOUS YIELD (m^3)	TOTAL YIELD (m^3)
Beech	0	3.597	3.597
Oak	0	773	773
Other broadleaves	0	0	0
Total broadleaves	**0**	**4.370**	**4.370**
Total coniferous	**0**	**104**	**104**
TOTAL	**0**	**4.474**	**4.474**

SOURCE: 2001/b

In forests of the Education center Debeli Lug, the main increments in the current ten-year period are not planned, so the overall increment will be realized through selective cutting. The total ten-year increment is 4.474 m^3; for beech it is 3.597 m^3, oak (Quercus petraea) 773 m^3, and coniferous only 104 m^3.

3.2.2. Private forests

The total area of private forests in the territory of the municipality of Majdanpek is 21.596 *ha* (see Table **T-3.34**), of which 7.418 *ha*, i.e. 34 %, are high forests and 14.178 *ha*, i.e. 66 %, are coppice.

T-3.34: PRIVATE FOREST AREA BY ORIGIN IN THE MUNICIPALITY OF MAJDANPEK

MUNICIPALITY	HIGH FORESTS		COPPICE		TOTAL	
	(ha)	%	*(ha)*	%	*(ha)*	%
Majdanpek	**7.418,0**	**34,4**	**14.178,0**	**65,6**	**21.596,0**	**100**

SOURCE: 1999; 2001; 2004.

The structure of volume and volume income are shown in Table **T-3.35.**

T-3.35: VOLUME AND VOLUME INCREMENT IN PRIVATE FORESTS

MUNICIPALITY	STANDING VOLUME		VOLUME INCREMENT	
	(m^3)	(m^3/ha)	(m^3)	(m^3/ha)
Majdanpek	**2.067.048**	**95,7**	**33.525**	**1,6**

SOURCE: 2008/a; 2008/b; 2008/c.

The total volume of private forests in the territory of the municipality of Majdanpek is around 2.067.000 *ha*, i.e. 95,7 m^3/*ha*, and the total yearly increment is 33.525 m^3, on average 1,6 m^3/*ha*.

The structure of volume in private forests by species of tree is given in Table **T-3.36.**

T-3.36: VOLUME AND VOLUME INCREMENT BY SPECIES OF TREE IN PF

SPECIES	STANDING VOLUME		VOLUME INCREMENT	
	(m^3)	%	(m^3)	%
Beech	1.048.365	50,7	18.367	54,8
Oak	914.480	44,2	13.505	40,3
Other deciduous	104.202	5,0	1.653	4,9
TOTAL	**2.067.048**	**100,0**	**33.525**	**100,0**

SOURCE: 2008/a; 2008/b; 2008/c.

The dominant type of tree in the private forest in the municipality of Majdanpek is beech with a share of 51% by volume and 55% by volume increment. Somewhat less is the share of oak by volume of 44% and 40% by increment. Other deciduous have a share of 5% in volume and volume increment.

As mentioned, private forests throughout Serbia and, therefore, those in the municipality of Majdanpek are managed by the owners who have jurisdiction over the use of their property. According to the Law on forests (1991), owners of forests must:

- plan for managing the forests;
- assign trees before cutting;
- pay the toll on cutting wood[13];
- seal cut wood and give out waybill for transport

Public enterprises for the management of state forests which conduct expert technical work and responsible services within private forests fulfill these obligations. They give the licenses for cutting, assign trees for cutting, give the licenses for transport of wood, organize activities for forest protection among other jobs.

For the structure area, volume and volume increment in private forests, see Table **T-3.37**.

T- 3.37:STRUCTURE OF PRIVATE FOREST BY RESPONSIBLE SERVICES FOR PRIVATE FORESTS (2008)

ORGANIZATION	AREA UNDER THE FORESTS		STANDING VOLUME		VOLUME INCREMENT	
	(*ha*)	(%)	(m^3)	(%)	(m^3)	(%)
FE Severni Kučaj: FSE Majdanpek	12.396	57,4	944.184	45,7	15.988	47,7
FE Timočke Šume: FSE Donji Milanovac	5.194	24,1	738.650	35,7	9.545	28,5
PE Nacionalni park Đerdap: MU Donji Milnovac	4.006	18,5	384.214	18,6	7.992	23,8
Total private forests	**21.596**	**100,0**	**2.067.048**	**100,0**	**33.525**	**100,0**

SOURCE: 2008/a; 2008/b; 2008/c.

[13] Each forest owner who cuts trees on his property must pay the toll for harvested wood in the amount of 3% of the total market value of the trees (according to the price list of PE Srbijašume); the payment goes into the state budget. The goal of this toll is the improvement of forest conditions and forest protection.

FSE Majdanpek conducts expert technical jobs in private forests in the area of seven cadastrals:

- Crnajka;
- Rudna Glava;
- Leskovo;
- Jasikovo;
- Vlaole.

The total area of private forests under the authority of the Forest office of Majdanpek is 12,396 *ha*, the total wood volume is 944.184 m^3, and volume increment is 15.988 m^3.

FSE Donji Milanovac conducts expert technical jobs in private forests in the area of seven cadastrals:

- Golubinje;
- Klokočevac;
- Miroč – deo;
- Urovica;
- Topolnica – deo.

The total area of private forests under the authority of the Forest office of Donji Milanovac is around 5,194 *ha*, the total wood volume is 728.650 m^3, and volume increment is 9.545 m^3.

PE National Park, MU Donji Milanovac conducts expert technical jobs in private forests in the following municipalities:

- Golubinje;
- Donji Milanovac;
- Miroč – deo;
- Boljetin;
- Topolnica – deo;
- Mosna.

The total area of private forests in the territory of the municipality of Majdanpek where expert technical jobs are conducted by the PE National Park Đerdap is 4,006 ha, the total wood volume is 384.214 m^3, and volume increment is7.992 m^3.

Table **T-3.38**. represents the average annual increment in private forests planned by a company which conducts expert technical work.

T-3.38: PLANNED INCREMENT IN PRIVATE FORESTS

SERVICE WHICH PROVIDES EXPERT TECHNICAL JOBS IN PF	DOMINANT (m^3)	FOREGOING (m^3)	TOTAL (m^3)
FE Majdanpek	9.000	1.000	**10.000**
FE Donji Milanovac	4.200	800	**5.000**
PE Đerdap	0	4.500	**4.500**
TOTAL	**13.200**	**6.300**	**19.500**

SOURCE: 2008/a; 2008/b; 2008/c.

The average annual increment in private forests is around 13,200 m^3, while the foregoing is 6.300 m^3. The total planned, average yearly increment in private forests in the municipality of Majdanpek is 19.500 m^3. The same structure of increment in private forests by tree species is not shown in the temporary yearly management plan[14].

3.3. Wood products

3.3.1. Production of technical and fuel wood

Assortments made in the forest are diversified by selling and use value. These assortments represent the material for future means of processing or are for immediate use. The percentage share of technical round and fire wood, in other words wood for chemical use of special interest, is assessed on the basis of the wood quality[15].

Considered technical wood is wood used for its technical characteristics, while wood for heating is used because of its fuel power and wood for chemical use because of its chemical characteristics.

Since technical wood has the highest usage value due to its fuel wood and wood for chemical use, it could be concluded that if there is a higher share of technical wood, the stand is of better quality.. As production of valuable assortments in the total volume of technical wood increases, there is a better quality of stands; this quality depends on the external characteristics of the tree and the internal construction of the wood.

The percentage share of fuel wood in the total volume of trees of higher dimensions is usually determined by wood quality spots inside some stands. Knowing the quality of a stand is important both from the point of view of forest utilization and for the assessment of the wood volume.

The assessment of the value of the stand is manifested in the technical structure of the assortments. As part of the technological structure of assortments the share of technical rough and fire wood is considered. The technological structure represents the input data for the assessment of the type and number of companies which are indirectly in the production line.

[14] Due to a weakness in the Law on forests (1991), there is no formulated programme for managing private forests (article 24). PE Srbijašume is conducting expert technical work on the basis of temporary yearly management plans for private forests. These plans are made by PE and the Forest Directorate adopts them. Following these plans, plans for silviculture, nursery, protection and utilization of private forests, by municipalities and by cadastral municipalities within the scope of one municipality are made. A yearly management plan is valid only for one year when it is adopted.

[15] A stand is a part of the forest which differs from other parts of the forest by type of trees, age, state of growth, method of origin, type of production and method of management.

FROM TRUNK TO INTERMEDIATE GOODS (SEMI-MANUFACTURED GOODS): BEECH TRUNKS AND CUT MATERIAL

Companies that are in the service industry in forestry are usually registered for different types of works. Types of work that these companies provide are: cutting and production of forest assortments, captivation, outputting, transport of wood assortments, doing projects and building forest network, production of charcoal, etc. In addition to these operations, there are companies connected with the production and processing of non-wood products, such as medicinal herbs, mushrooms, offspring, production of essential oils, production of honey, peat etc. Also different operations on the silviculture of the forest can be performed through this industry.

Recently, more attention has been given to companies that are involved in the production of wood for energy purposes. However, the production of materials needed for these companies cannot be viewed independently, since it is within the scope of the technological process of forest utilization. Initiation of facilities for the production of pellets in Serbia is very important since the need for this energy must be satisfied. The number of these facilities will depend on the volume of material (wood residue in the processing of wood, forest residues, wood from energy crops etc.) which that specific area holds.

The next group of companies in the production chain are enterprises for primary and final wood processing. The capacity of the primary wood process is usually determined by materials which come from a specific forest area, since the costs of transport have a major impact on the final costs. For this reason capacities for processing are built near the forest complex.

The production of wood assortments is done by different systems of cutting, making and captivating assortments in forestry. The goal of different systems of cutting is to achieve the greatest economic effect.

During the selection of cutting type and manufacturing, it is necessary to analyze different factors such as types of silviculture, habitant conditions, stand characteristics, place of manufacturing, extent of mechanization etc. Within the scope of all cutting and selective types, different methods of cutting, in keeping with the place and degree of mechanization, can be used.

According to the place of manufacturing we can distinguish:

- the manufacture of assortments in the forest (at stump); and
- the manufacture of assortments at the depository (at forest depository or central depository);

In both cases, depending on what is transported, the first phase can be divided into three variations:

- captivation of part of trunks (assortment method),

- captivation of whole trunks (trunk method),
- captivation of whole trees (tree method).

If material made in the forest is not transported in order to process its capacities, it is designated to indirect usage value. For primary wood processing, assortments are usually transported by truck with or without a side car from a subsidiary depository in the forest to a depository at a sawmill.

Production units are very costly to produce; the costs are also variable and dependent on numerous factors. Expert knowledge, choice of technological scheme and type of operation could in great measure influence the costs and, accordingly, the profit the company makes.

Cutting and making wood assortments is the first phase of the technological process that is done with different types of working instruments. These working instruments can be manual, half-mechanized and mechanized. The level of mechanization depends on different factors. The use of multifunctional machines depends on the characteristics of the terrain, habitant conditions and the amount of wood which is cut in a specific area. In the mount-mountain conditions of Serbia, these resources are still not in use.

The chain saw is the basic tool for cutting operations and manufacturing. Work with a motor chain today is not considered mechanized; some progress, though, has been made in the improvement of this tool.

In Serbia in periodical cuttings the assortment method of cutting and manufacturing is usually used, while in selective cutting the method part of trunks usually dominates. The organizational form of work depends on numerous factors, and when regular cuttings are used, the use of organizational form 1M+1R[16] is usually enforced. In selective cuttings, organizational form 1M is justified since the trees which make up the selection have significantly lower dimensions. The costs of manufacturing and cuttings in stands with a higher share of fuel wood increase significantly. In addition, in mount-mountain regions the incline of the field is considered as is the lower degree of mechanized work, and thus costs of production of a unit of product are higher.

The first phase of transport is conducted in different ways and with different resources. The most common way is by partial or full on land similar to a yard road[17]. In the second phase a truck for transport of round wood and fire wood, and tractors with a side car and semi-side car are usual.

The most important resource for the captivation of assortments is the adapted agriculture tractor. Tractors are very useful for different aggregations. On them can be installed a spinner, hydraulic jaws, a hydraulic crane, devices for pilling the bark and for rifting, and devices for recuperating stumps; they can also be used for lugging beside a side car and semi-side car with different constructions. The use of such tractors in forestry worldwide is common for small private companies.

Based on internal data about users in state forests in the territory of the municipality of Majdanpek, in Table T-3.9. the production of wood in 2008 is shown.

[16] Organizational form 1M+1R means one worker on motor chain and one assistant worker
[17] Yard road is a soft side forest road, which is used for transport of tractors and captivation of wood assortments

T-3.9: PRODUCTION OF WOOD IN 2008 IN THE MUNICIPALITY OF MAJDANPEK

ASSORTMENTS	Technical wood (m^3)	Fire wood (m^3)	Residuals (m^3)	Total (m^3)
FSE Majdanpek	5.214	10.951	2.632	**18.797**
FSE Donji Milanovac	2.901	12.792	2.949	**18.642**
NP Đerdap – MU DM	4.700	14.160	4.900	**24.000**
EC Debeli Lug	1.012	2.596	792	**4.400**
State forest	**13.827**	**40.499**	**11.273**	**65.839**
Majdanpek	449	3.803	505	**4.757**
Donji Milanovac	17	3.744	430	**4.191**
NP Đerdap	450	1475	575	**2.500**
Private forests	**916**	**9.022**	**1510**	**11.448**
Total	**14.743**	**49.521**	**12.783**	**77.287**

SOURCE: Internal data of PE Srbijašume, PE NP Đerdap and Forest Faculty

In 2008 in the municipality of Majdanpek, a total cutting in the amount of 77.287m³ was realized. The total production amount of technical wood was 14.743m³ (19%), of fire wood, 49.521m³ (64%), while 12.783m³ (17%) went to wood residues.

In state forests 65.839 m³ was harvested, of which 13.827m³ represent technical wood and almost 40.499m³, fuel wood. In private forests 11.448m³ was harvested, of which only 916 m³ was technical wood, and almost 9.022m³, fuel wood. In private forests forest residuals of 1.510m³ were recorded, a significantly high share.

According to the data of the Republic's statistics institute, in 2007 in the municipality of Majdanpek 81.164m³ were produced, only 23% of which represented technical wood.

3.3.2. Production of biomass

A constant growth in the number of inhabitants resulted not only in an increased need for food and living space, but also in a greater need for energy.. In order to satisfy their energy needs, humans use a number of natural resources, in some cases to such an extent that they are endangered or threatened with complete extinction.

Sustainable (harmonic) development is a concept which represents the harmonization of needs and possibilities, as the interests of the actors in global development take into account social, political, ecological and economic factors, but also in great measure the elements for the protection of nature and the sustainable use of natural resources.

Natural resources include a diversity of natural elements, materials and phenomena that humans use to satisfy their needs either for processing or for use in a non-processed state. Wood has been used for decades as a source of energy; coal, oil, and natural gas have replaced wood as a major source of energy. Intensive use of fossil fuels inevitably led toward their total exhaustion.

Furthermore, their use leads toward the contamination of the environment, especially of the air because it emits into the atmosphere a huge amount of CO_2 which heightens the greenhouse effect i.e. a rise in temperature and significant climate changes on the global level.

Almost all countries today have policies for environmental protection and the decrease of CO_2 emission; incremental use of renewable resources is one pertinent strategy. In addition,

renewable resources today have strategically importance for many countries which depend on the importation of energy-generating products; among those countries is Serbia, so the use of renewable resources of energy (RRE) has a strategic orientation.

The main goal of the sustainable development of energy today is to satisfy the need for energy in such a way that it does not jeopardize the rights of future generations to satisfy their own needs for energy.

Biomass[18] of wood as an exhaustible but also renewable natural resource today is mostly used for heat, and rarely for electrical energy. Important advantages of its use are:

- regional availability and security in delivery
- short transport lengths, small transport risks,
- neutrality of CO_2 ,
- simplified processing (especially compared to oil),
- low level of contamination, especially with new technologies of burning,
- instigation of the development of local economy

WOOD PEELTS: FUEL ACQUIRED AS PRODUCT OF BIOMASS –FOREST RESIDUE

Biomass has strategic importance for the development of energy and is important also in terms of environmental protection:

- biomass is a renewable, non-toxic energy product;

[18] Biomass makes numerous, different products of plants and animal origin such as, branches, bark of the trees, sawdust, reed, corn, plants of sunflower, pits, animal dung, communal and industrial waste, etc

- the ecological effect of the use of biomass for energy is shown through the decrease in sulphur, carbon and nitrogen oxide, ashes, carbon-hydrogen, aromas in the process of burning of biomass and even more in process of burning of fossil and bio fuels mixture [19];
- the use of bio fuels drastically decreases the danger of the "greenhouse effect"

Different from burning fossil fuels, the burning of wood biomass does not contribute to the increase in CO_2 in the air, since during the process the same amount of CO_2 that was already in the atmosphere and which plants used during their growth is emitted,. In this way, CO_2 circulates in the natural atmosphere..

It is important to stress that wood biomass emerges as a natural resource which most countries have; this is not the case with oil, gas and coal.

3.3.2.1. Wood biomass

Wood biomass used for energy is from:

- forestry: fuel wood, residuals from cutting and silviculture operation "energetic forests" intended siliculture;
- the wood industry: bark, sawdust, chips, residuals, cuttings;
- orcharding: pruned branches and pits.

Energy that could be produced by the use of biomass in Serbia is estimated to be around 2.68 million tons, tons of oil equivalent (1 TOE = 41860 MJ), of which one million tons refers to forest biomass. It is estimated that the yearly energy potential of biomass represents 40% of the energy value of the coal which is produced in coal mines in Serbia.

Energy stability is one of the preconditions for the further development of Europe. High oil prices on world markets again put into focus the growing European dependence on imported energy products, which is a challenge for the EU to answer responsibly.

With this in mind, the European commission declared the basic specifications of their energy policy. The basic elements of their policy are:

- the importance of decreasing the need for energy,
- the increased importance of renewable sources of energy, their local production and sustainable use,
- the increasing diversity of energy sources,
- the instigation of international cooperation.

The policy assumes that these elements could decrease the dependence of Europe on imported energy products, and will activate sustainability and stimulate growth and employment.

In the wider context of an integrated and unifying energy policy and the promotion of renewable resources, the European Commission in December 2005 presented its action plan for the use of biomass (Biomass Action Plan) as one of the measures needed for the implementation of the already-mentioned elements of the energy policy. The plan states that the increment of share

[19] The substitution of fossil fuels with bio fuels is managed through mixing bio diesel and regular diesel, bio alcohol with gasoline; the burning of hard biomass with coal improves energy and the ecological characteristics of the mixture.

used biomass from 69 mega tones of oil equivalence (Mtoe)[20] in 2003 to 150 Mtoe in 2010. It is estimated that the EU currently satisfies 4% of its need for energy using biomass, and implementation of this plan will double the value by 2010. In Annex 1 of this plan, the number of measures that should be implemented in order to achieve the given goal is specified.

Estimates suggest that reaching this value by 2010 will have further benefits:

- a diversified European energy potential, a higher share of energy from renewable sources by 5%, and a decline in dependence on imported energy products;
- a decrease in the emission of CO_2 by 209 million tons per year;
- employment for 300,000 people, mainly in rural areas;
- reduced pressure on the price of oil.

In addition to the plans at the Union level, individual members are also taking important steps towards the proportional growth of renewable resources.

On markets in the EU different types of processed wood biomass intended for burning can be found (Bajić, Danon, 2005):

- chopped fire wood,
- chunkwood, shorter round parts,
- densified wood fuels, chopped up and dry wood which under pressure is packed and formed into shapes i.e. pellets and briquettes,
- fuel chips –from coping up with sharp tools
- *hogged fuel* – chopping with tools which have the form of a hammer or disk.

In our case, mostly classical fuel wood that is not suitable for use in urban conditions is utilized. Pellets cannot be used in bigger quantity in our market. Briquettes are quite popular, especially in Belgrade. They are produced, as part of the activities of sawmills, the parquet industry, producers of joinery, etc. Demand and price are growing but because of limited amounts and unavailable fireplaces, it still does not represent serious competition for fossil fuels and electric energy.

3.3.2.2. Resources, production, and use of wood biomass

It is estimated that the share of wood biomass in the energy balance in Serbia is 14 %, a level which countries who yearly invest huge resources in this field do not have. In our case, however, that is evidence of non-development rather than of concern for the environment. Available wood biomass is usually used as fire wood, while wood biomass left after captivation of forest assortments usually stays in the forest to putrefy. Wood is used mostly in rural households; it is burned in open fireplaces or non-proper burners with little economic efficiency (Aleksic *et al*, 2006).

A better situation is in forest management units and productions plants for the processing of wood. Although in their indirect surroundings they have huge amounts of wood biomass, they usually choose other types of fuel. A study done in 2003 included data that in 2001 the industry for wood and paper used fuel oil in an energy value of 1000 TJ in addition to a huge amount of wood biomass in their surroundings. Clarification lays in the fact that in 80-th in industry were

[20] In the process of making an energy balance sheet, it is common practice that the category of energy repository is shown in tons of oil equivalent (toe). One ton of oil equivalent is 41.868 GJ or 11630 kWh

dominated boilers on coal and fuel oil, which is explained with deficit of resources in 90-th could not be changed. (Aleksic *et al*, 2006).

MODEL OF USE OF FUEL WOOD IN MAJDANPEK MUNICIPALITY

An increase in energy efficiency could be achieved through utilization of all types of forest residue biomass, but mainly of branches which currently are unused, and of small fractions of lignite from the surroundings. Processed fuel made of composite briquettes on a base of sawdust and produced from unused branches of forest biomass and a small fraction of lignite, with a heat power estimated on an average level of 13-16 MJ/kg, will bring maximal utilization of forest residues and a small fraction of lignite, which currently is thrown away.

Serbia has a huge potential of unused wood[21] sources of energy. The estimated value just of wood biomass in Serbia used for fuel is 1,65 millions m^3 yearly, while the energy potential of forest biomass, left to decompose after the production process of wood assortments is estimated annually to be of 15,6 million GJ. However, because of a huge lack of understanding of the pure power from renewable sources the domestic supply of wood biomass could bring, as well as of other uses of that wood, wood still has a low position in satisfying the need for energy .For Serbia, some of these additional uses include growth of investments in forest development which will result in growth in economic activities in forestry, growth of sustainable management of forests, significant decrease in the cost of imported fossil fuel, and also a decrease in the greenhouse effect arising from the use of effective and low emission devices and technology on forest biomass base. With more than 12 million tons of wood residues produced yearly, Serbia has the potential to develop its bio-energetic sector, especially for the production of electric and heat power.

[21] Wood sources include huge volumes of lignin- cellulose biomass coming from the forest, wood industry and agro-industry and which could be used for energy.

3.3.2.3. Estimated value of wood residuals in the municipality of Majdanpek and its surroundings

Based on data for FU Severni Kučaj – Kučevo, FU Timočke šume – Boljevac i NP Đerdap, the value of residuals left in the forest after cutting and manufacturing is estimated to be huge (see Table **T-3.39**).

This value can be important during the estimation of the total volume of available residuals, suitable for the production of wood biomass. Because of the need to supply material, a review is provided of the broader area, i.e. the area of municipalities (forest management units) in the surroundings of the municipality of Majdanpek. It must be stressed that this is an estimation based on planned annual cutting in state and private forests. It is evident that there is a significant volume of forest residuals made in the process of forest utilization and which could be used for the production of wood biomass.

Review of the volume of wood residuals[22] from wood industry facilities active in the municipalities in the surroundings of the municipality of Majdanpek is provided below.

TABLE T-3.39: VOLUME OF RESIDUALS LEFT IN FOREST AFTER CUTTING AND MANUFACTURING IN TERRITORY MANAGED BY FE TIMOČKE ŠUME, FE SEVERNI KUČAJ I NP ĐERDAP

OWNERSHIP	PLANNED ANNUAL CUTTINGS	PERCENTAGE OF WOOD RESIDUALS	TOTAL RESIDUALS
	(m^3)	(%)	(m^3)
FE Timočke forest			
Private forest	73.000	15	11.000
State forest	104.000	12,5	13.000
Total	**177.000**		**24.000**
FE Severni Kučaj			
Private forests	12.000	15	1.800
State forests	39.000	12	4.600
Total	**51.000**		**6.400**
NP Đerdap			
Private forests	10.000	15	1.500
State forests	97.000	12	11.700
Total	**107.000**		**13.200**
Total			
Private forests	**95.000**	**15**	**14.200**
State forests	**240.000**	**12,5**	**29.500**
Total	**335.000**		**43.700**

SOURCE: 1999; 2001; 2004.

[22] Residuals in primary process of wood (sawdust, chunkwood, bark) represent an ecological problem so it is very important that their effective use be lucrative.

The only active and registered facility with wood processing capacities is in the settlement of Mosna in the municipality of Majdanpek. The total input of logs is around 9 000 m^3, and the source of material is the private forests, PE Srbijašume and PE NP Đerdap. The total amount of residuals from wood-processing facilities that could be used as wood biomass is estimated at around 5,000 m^3.

In the municipality of **Kučevo**, as well as ŠIK „Kučevo“ which is out of work, there are several smaller wood-processing facilities with limited potential and old technology. The total input of logs is around 2,500 m^3, with the material base in both state (PE “Srbijašume”) and private forests. The estimated use of wood residuals in wood-processing capacities is around 1,000 m^3.

ŠIK Kučevo, currently in bankruptcy, has the biggest wood-processing potential in the region with a capacity of 50,000 m^3. ŠIK Kučevo is privatized but not working, and it is hard to say when the process of production will start. In addition, it is important to note that within ŠIK there are facilities in Bojniku near Leskovca and Mališevu, with an additional yearly capacity of 20,000 m^3 of trunks, but these facilities are also non-active. In total, ŠIK Kučevo has a wood-processing potential of over 70,000 m3 of trunks. The percentage of use was around 50% but the fact that wood residues were used for their own needs (drying, heating and such) should be taken into account. It is very hard to say how much real contribution ŠIK has made to the external use of wood residuals.

The municipality of **Žagubica** does not have a huge number of wood-processing facilities, but does have significant processing capacity (32.000 m^3). On average in one year in this municipality 13,000 m^3 of trunks are processed (slashed), with an average percentage of use of around 50% and wood residues which amount to approximately 6,000 m^3 (sawdust and skirts). Only part of the wood residuals are used (around 50%), mostly for fuel wood (skirts), and the rest is thrown away. According to processing capacities, state and availability of resources and percentage of use, there are real possibilities for improving the use of wood residues from forests and from wood-processing capacities.

Comparing wood-processing capacities in the municipality of Bor with other nearby municipalities, it can be concluded that there is very intensive activity in this branch of industry. The average input of trunks in this municipality is more than 4,000 m^3, while the volume of wood residuals oriented in processing is near 2,000 m^3; beech is the dominant species and the core material base. The high percent of residuals are indicative of old machinery and a relatively low level of processing technology.

Wood processing facilities in the municipality of **Negotin** are very few and the current capacity of input is under 1,000 m^3 trunks per year. For the entire municipality, the entire amount of wood residuals in the wood industry is around 300 m^3.

Other municipalities which border the municipality of Majdanpek (**Kladovo i Golubac)** do not have active wood processing capacities.

3.3.3. Production of charcoal

Charcoal produced in coal pits is very valuable in metallurgy because of its significant quality (high strength, high caloric value and high content of carbon) but the production process is obsolete.

The process of producing charcoal in coal pits depends on many factors but, mainly because of the way coal is produced, the most important influence is the climate,. The material for the production of charcoal originates in state or private forests. This material is of relatively low quality and for that reason the prices are low. Trunk, branches and other material can be used.

Wood is used in the form of logs, half logs or cylinders, which according to its quality goes into fuel wood. Logs are better since they comprise less bark. Large coal gets a higher price on the market than smaller coal, so it uses pieces from 1 to 1,5 meters long. Charcoal in Serbia is produced by small private companies, which are in eastern Serbia.

Some of the charcoal is used in the domestic market, but a higher share is distributed on the foreign market. Charcoal in our country is usually made in coal pits and its quality depends on the species of tree used in the production process. Beech, because it is the most common species in the forest, is usually used here for production.

Around 30m^3 of tree is needed for one coal pit . The duration of the production process depends on the amount of wood in the coal pit. On average, during the year the wood can be used around ten times per coal pit: the amount of wood for the coal pit during the year averages around 330 m^3. When production of more charcoal is the concern is, work should be organized so that the production in the coal pit is continuous, since with a higher number of coal pits and cycles per coal pit, the cost of production decreases.

Around 90 kg of coal come from 1m^3 of wood. Regarding the dimensions of the tree from which the coal is made, it can be supposed that it gets five times less when conditions are good due to the weight, but it can go till seven times less then the real weight.

The produced charcoal is of good quality and most of it is exported to foreign markets. This charcoal is lively torrefied with release large amounts of heat during combustion and not smoking. Eminent European producers of fero-alloys and similar metals use this charcoal. The charcoal has excellent zeal because of its high porosity (70%-85%) and has a high absorption ability for liquate and gas condition.

COAL PIT BUILT ON THE MAJDANPEK – BOR ROAD: PREPARED BEECH CHARCOAL TREE

As well as regular charcoal, briquettes of charcoal which are made by pressing small fractions of charcoal are also in production. Briquetting is the process of getting to the smaller value of ground material. Ground residuals are pressed and in that way are dissembled into a compact fracture without the use of chemical means for joining. Because glucoses and not tar or pitch

are used for ligaments, briquettes are entirely safe which is important as they are used in the meat industry and for drying in households. The energy value of briquettes is more or less the same as for charcoal. It burns slowly at a high temperature, and without flame. Quality briquette is made of material which has minimal humidity. The hardness, shape and form of a briquette is regulated by the work of the press.

Charcoal has a level of humidity between 8% and 12%, and up to 2% of ash. The charcoal is deposited in sacks and the weight of the sacks depends on moisture and the size of piece. The smaller the fraction of charcoal, the bigger the weight. The number of coal pits which are currently operating in the territory of the municipality of Majdanpek is around 120, 80 of which are in the part that gravitates towards Majdanpek and 40 in the area that gravitates towards Donji Milanovac. For now there is no local association of charcoal producers within the territory of municipality Majdanpek that would have deal with organizing and planning of production, so as trading and marketing activities.

The total volume of charcoal that can be produced in these coal pits in the area of Majndapek is around 2,400 tons and in the territory of the municipality of Donji Milanovac, 1,200 tons, for a total of 3,600 tons. However, none of the coal pits is working to full capacity, so real production is smaller. The amount of trees needed for 80 coal pits is around 26,000 m^3; the other 40 pits in the territory of the municipality of Donji Milanovac need 13,200 m^3, for a total of 39,200 m^3. The amount of trees used for this purpose is smaller. From the total volume of trees needed to produce charcoal, beech is the species most used for this purpose. The market price that can be realized for this product is around 200 $€\cdot t^{-1}$. This price is the result of current market conditions.

According to some data, private companies managing the production of charcoal material get their wood largely from state forests. The production of charcoal uses mostly wood of poor quality which is left after cutting but without putrefaction. The relatively favorable price of this tree has a significant influence on the lowering of production costs.

The number of trees that can be used for this purpose in the territory of the municipality of Majdanpek is, at around 20,000 m^3 , relatively high . This amount of trees can be processed in 60 coal pits if they are working to full capacity. But because of bad weather conditions and problems during the securing of material, this number can be increased by 10 % to 20%, so in fact that number can be around 70 coal pits. Thus the number of coal pits in this area is somewhat higher than the assessed number. In order to determine the optimal number of coal pits for the territory of the municipality of Majdanpek and the optimal number for effective management by one micro company, a higher number of parameters must be analyzed.

Despite the need for this research, it has not been done. Data used for our calculations is the result of estimations and approximations. Revenue that can be earned by the production of charcoal on a basis of **20,000 m^3** is approximately **400,000 €**.

The coal pits are owned by private bodies or by registered companies dealing with this type of production. The average number of coal pits registered to one private company in the territory of eastern Serbia is 6 (Danilović 2008). Profit that can be made by this production of charcoal depends on several factors, but also on the number of coal pits that a company has. With an increase in coal pits costs go down, mainly because of work force efficiency etc. However, the number of coal pits and their grouping should be planned depending on the allocation of available material. The work force that will be hired for these jobs and which will be indirectly included in the process of the production of charcoal in the territory of the municipality of Majdanpek is a mainly physical work force from the area where the coal pits are located. The number of workers that could be hired indirectly for these operations is around 40 to 50.

3.4. Hunting and non-wood forest products

Beside wood products, for the assessment of forest and forestry potentials it is very important also game management which stand is forest, so as presence and utilization of non-wood forest products in municipality of Majdanpek.

3.4.1. Hunting

Structure of hunting grounds in the municipality of Majdanpek is in Table T-3.40.

T- 3.40: HUNTING GROUNDS IN MUNICIPALITY OF MAJDANPEK

HUNTING GROUND	AREA	
	(*ha*)	(*%*)
Severni Kučaj: FE Severni Kučaj	7.170	7,7%
Miroč – Štrbac: FS Donji Milanovac	6.570	7,0%
Đerdap: PE NP Đerdap	29.470	31,6%
Todorova reka: HA Srna – Majdanpek	47.790	51,3%
Ukupno	**90.000**	**100,0%**

SOURCE: 1999; 2001; 2004; http://www.ecolss.com/LU/majdanpek.htm

Hunting ground Severni Kučaj has 21.507ha within municipalities Kučevo and Majdanpek (7.170 *ha*). This hunting ground is managed by Public enterprise „Srbijašume“ – Forest estate Severni Kučaj – Kučevo. This hunting ground is hilly mountain type and species within it are: roe deer, deer and wild boar.

Hunting ground Miroč – Štrbac has a total area of 15.335ha in municipalities of Majdanpek (6.570ha) and Kladovo. This hunting ground is managed by PE „Srbijašume“ – Forest estate Timočke šume – Boljevac through Forest subestate Donji Milanovac since 1994. This is a hilly type of hunting ground and species within it are roe deer and wild boar.

Hunting ground Đerdap has a total area of 63.608ha that is all within national Park and comprised of municipalities' parts: Majdanpek (29.470ha) Golubac and Kladovo. This hunting ground is managed by National Park Đerdap since 1994. Species within it are: deer, roe deer, wild boar, chamois, hare, partridge, pheasant and other. It is important to stress the presence of lynx and bear in this hunting ground as very rare species in Serbia.

Hunting ground Todorova Reka has a total area of 47.798*ha*. This hunting ground is managed by Serbian hunting association through Local hunting association Srna – Majdanpek. Species within this hunting ground are: roe deer, wild boar, rabbit, pheasant and partridge.

Management of hunting grounds are performed by Public enterprises which otherwise are responsible for management of state forests in the territory of the municipality of Majdanpek so as Local hunting association. The municipality of Majdanpek might have indirect benefits of this kind of use of forest resources through other services that follow hunting tourism.

3.4.2. Non-wood forest products

Significant natural resources in terms of immediate use are provided by **non-wood forest products** including forest fruits, medicinal herbs, mushrooms, stone, gravel and other. However, reliable data on the potential of this resource is not evident although the richness of

their presence in the municipality of Majdanpek is evident. In order to determine the detailed status and potential of this resource, it is necessary to conduct further research.

However, these products as stated in *General forest management plan for Severnokučajski forest district* are not appropriate considered and the same in the parts of municipality that belong to the Timok forest district and the area of National Park Djerdap.

Different types of forests in the municipality Majdanpek enable the development of a significant number of fungi, which are growing in oak and beech forests, whereas their optimal conditions. Of edible fungi there is a need to emphasize the importance of boletus and bittern. Beside the rich potential for collecting fungi, unpolluted natural environment offers also opportunities for collecting various forest fruits: wild strawberries, blackberries, raspberries, hawthorne, hazelnut, fiddle, peer and wild herbs.

3.5 Analysis of potentials

The total area of forests and wood land in the municipality Majdanpek is 63.150 ha, i.e. 67.8% of the total territory of the municipality thus it belongs to one of the richest municipalities in Serbia. Forest cover is 67,8% of the total area of the municipality which is much higher than the Serbian average of 29,1%.

The total growing stock volume is about 10.620.000 m^3, i.e. about **168 m^3/ha** (the average volume in Serbia is 161 m^3/*ha*). The total annual increment is about 195.000 m^3 per year, on average **3.1 m^3/ha** (the average is 4.0 m^3/*ha* in Serbia). The dominant categories of forests by ownership are the **state forests**, which occupy 65.8% of the total area of forests, i.e. 41,554 *ha*. The total area of **private forests** is about 21,600 *ha*, covering 34.2% of the entire area.

Characteristics of municipalities, the established administrative partition, and the declaration of the National Park Đerdap in the territory of the municipality Majdanpek have caused complications in the forestry territorial organization and institutional competence. Because of that, parts of the territory of the municipality Majdanpek are included in the composition of the forest districts Sevrni Kučaj and Timok, and the rest of the state forests in the municipality belong to National Park Đerdap.

Management of state forests in the municipality is under the jurisdiction of the following users:

- Public Enterprise ”Srbijašume”, :
    - Forest estate ”Severni Kučaj – Kučevo”, through the Forest subestate Majdanpek,
    - Forest estate ”Timočke šume – Boljevac”, through the Forest subestate Donji Milanovac;
- Public enterprise National park Djerdap, through the Management unit Donji Milanovac.

In the territory of the municipality the education center ***”***Majdanpečka domena***”*** is managed by the Faculty of Forestry, Belgrade University.

Private forests in Serbia and, therefore, those in the municipality of Majdanpek are managed by the owners who have jurisdiction over the use of their property. According to the Law on forests (1991), owners of forests have those obligations: to manage their forests according to the forest management programs, assign trees before cutting, pay the toll on cutting wood, seal cut wood and give out waybill for transport.

Public enterprises for the management of state forests which conduct **expert technical work and responsible services** within private forests fulfill these obligations. They give the licenses for cutting, assign trees for cutting, give the licenses for transport of wood, and organize activities for forest protection among other jobs.

Analysis of collected data from forest management plans prepared by PE for state forest management in the territory of Majdanpek municipality (See table T-3.41) show forest status due to ownership structure and responsible enterprises for forest management.

T-3.41: FOREST STATUS IN THE MAJDANPEK MUNICIPALITY

		PROPERTY RIGHTS OVER FORESTS	AREA OF FORESTS		STANDING VOLUME		VOLUME INCREMENT	
			(*ha*)	(%)	(m^3)	(%)	(m^3)	(%)
1.	FE Severni Kučaj: FS Majdanpek	State	16.822	40,5	3.874.647	45,3	72.265	44,7
		Private	12.396	57,4	944.184	45,7	15.988	47,7
2.	FE Timočke šume: FS Donji Milanovac	State	7.192	17,3	1.202.991	14,1	24.166	14,9
		Private	5.194	24,1	738.650	35,7	9.545	28,5
3.	PE NP Đerdap: MU Donji Milanovac	State	15.580	37,5	3.136.319	36,7	58.556	36,2
		Private	4.006	18,5	384.214	18,6	7.992	23,8
4.	Forestry Faculty: EC Debeli Lug	State	1.960	4,7	339.890	4,0	6.703	4,1
		Private	0	0	0	0	0	0
∑	**Total**	**State**	**41.554**	**100,0**	**8.553.847**	**100,0**	**161.690**	**100,0**
		Private	**21.596**	**100,0**	**2.067.048**	**100,0**	**33.525**	**100,0**

SOURCE: Internal documents of PEs and Forestry Faculty (2008)

The total planned yield is 1.304.797 m^3 over ten years in forests in Majdanpek municipality, respectively 130.000 m^3 per year. Still in 2008. there were tree cutting realization of 77.000 m^3 which indicates that the planned annual yield is implemented with only 60%.

T- 3.41: PLANNED 10-YEAR YIELD IN FORESTS IN THE TERRITORY OF MAJDANPEK MUNICIPALITY

		MAIN YIELD (m^3)	PREVIOUS YIELD (m^3)	TOTAL YIELD (m^3)
FS Majdanpek	State forests	266.576	247.005	**513.581**
	Private forests	90.000	10.000	**100.000**
FS Donji Milanovac	State forests	92.615	108.547	**200.162**
	Private forests	42.000	8.000	**50.000**
NP Đerdap	State forests	111.082	280.498	**391.580**
	Private forests	0	45.000	**45.000**
Educ.center Forestry Faculty	State forests	0	4.474	**4.474**
TOTAL	State forests	470.273	644.998	1.115.271
	Private forests	132.000	63.000	195.000
	Total	**602.273**	**703.524**	**1.304.797**

SOURCE: FOREST MANAGEMENT PLANS

In the municipality of Majdanpek identified are following wood products: technical wood (around15.000 m^3), fire wood (around 40.000 m^3), charcoal (20.000 m^3) and significant potential

is represented by forest residuals (around13.000 m³) and waste from primary processing that might be used for biomass production.

Because of the need to supply material, a review is provided of the broader area, i.e. the area of municipalities (forest management units) in the surroundings of the municipality of Majdanpek. It is evident that there is a considerable amount of forest waste which occurs in the use of forest (43,700 m³), but in the process of primary processing of wood (14,300 m³), which could be used for the production of wood biomass.

The following non-wood products are identified: medicinal herbs, mushrooms, forest fruits, however information on the potentials and use are not satisfactory and more research is needed.

FIRE WOOD FROM PRIVATE FORESTS READY FOR SALE

Summary

Presence and distribution of forests and wooded land in the municipality Majdanpek (forest cover 67.8%) points to the importance of forest resources for the local population and economy for the region. Since the raw material base and potential this branch is definitely represents a potential contribution to local economic development. Natural resource which is base for the future development is the local richness and variety of municipal forest and forest products.

From the aspect of forest structure and forest condition, production potential of these forests is very good.
The most of the forests are beach forests of high quality with average growing stock of ***168 m^3/ha*** *(Serbian average is 161 m^3) and average volume increment of* ***3,1 m^3/ha*** *(Serbian average is 4,0 m^3/ha).*

According to the ownership structure, most of the forests are ***state-owned****, which occupy 65.8% of the total area of forests - 41,554 ha, while the area of* ***private forests*** *is about 21,600 ha and they contribute in the total area with 34.2%.*

In the territory of Majdanpek municipality planned annual yield is ***130.000 m^3*** *(110.500 m^3 in state forests and 19.500 m^3 in private forests) while in 2008. registered implemented logging of about 77,000 m3 (60% implementation).*

The main wood products are ***technical wood*** *(up to 25%),* ***fire wood*** *(75%) that is beside to meet the needs of the local population also sales in the other areas of the republic. Fire wood so as wood of lower quality from local forests is used for* ***charcoal production*** *which corresponds to production potentials and possibilities of the municipal area.*

Identified potentials of non-wood forest products such as medicinal plants, mushrooms and forest fruits are not used sufficiently.

4. SMEEs in the forestry sector and the wood processing industry in the municipality of Majdanpek

In all developed market economies, the SME sector is the **backbone of economic development.** Experiences in managing the development of SMEs, their number, their positive impact on the growth of gross national product and national income, the relatively high participation of employees in the SME sector among the total number of employees, indicate that a strategic goal at the national, republican, regional and local levels should be management of the development of this sector. The importance of small and medium enterprises in forestry is also recognized in the basic strategic developmental documents of the sector. The *Forest Development Strategy of the Republic of Serbia* (2006) points out the necessity of development of small and medium forest enterprises. The main objective of the establishment and development of small and medium enterprises in forestry is **to increase the contribution** of the forestry sector to the economic and social development of the Republic of Serbia (2006 / b).

4.1. The concept and importance of SMEs

Small- and medium-sized enterprises are those companies that are significantly different from large companies principally in terms of their organization, the scope of their business, the number of their employees and the value of their property.

According to the current *Law on Accounting and Auditing*, companies are classified as small, medium and large depending on the (2006 / C):

- average number of employees;
- total income;
- value of property on the day of preparation of financial statements in the last business year.

According to these criteria, small enterprises are those that meet **at least two of the three** following criteria (2006 / C):

- the average number of employees does not exceed 50;
- the annual income is less than 2.5 million EUR in CSD equivalent;
- the average value of property is less than one million EUR in CSD equivalent

In order to classify a company as a medium-sized enterprise, that company must meet **at least two of the three** following criteria (2006 / C):

- the average number of employees is between 50 and 250;
- the annual income is between 2,5 and 10 million EUR in CSD equivalent;
- the average property value is of 1 to 5 million EUR in CSD equivalent.

Given that the economic development of Serbia is based on the recognition of market economy, which is founded on private property, the liberalization of internal economic flows through the creation of an environment more favorable for direct foreign investment, as well as on the development of the SME sector, one of the main objectives of economic policy is the improvement of institutional conditions and the environment of the economic system in order to provide efficient **support to the SME sector.**

Related to the direct measures for the promotion of SME activities in the forestry and forest industry based on products, a *Strategy of small and medium-sized enterprises and entrepreneurship* was adopted for the period 2003-2008. This strategy assumes the use of the potential of SMEs and entrepreneurship to contribute to the general development of Serbia by increasing the number of jobs, increasing economic growth and speeding up regional development.

The main strategic guidelines are: support of small- and medium-sized enterprises in the primary sector, support of institutions with regard to the interests of companies in resolving legal restrictions, financial support, education and training, export promotion, sector analysis, technical support and national promotion, and the implementation and evaluation of strategy (2003).

4.2. The development of SMEEs in the forestry and wood processing industry in Serbia

According to *The Forest Development Strategy of the Republic of Serbia*, SMEs in forestry have to ensure an increase in the living standard of citizens of Serbia, especially in rural areas, increase employment and ensure equitable regional development. In Serbia today there are about 3000 small and medium-sized companies that base their jobs on the forest as a resource. 98% of all enterprises that base their jobs on the forest as a resource belong to the category of small enterprises.

Until 2000, development of the sector of small and medium enterprises in forestry in Serbia was quite slow. The *Law on Forests* (1991) envisaged a move of the forest utilization industry to other enterprises; these tasks were entrusted to SE Srbijašume.

This, however, was not done and until 2001 SE Srbijašume undertook the business of forest utilization. In 2001, the process of restructuring SE Srbijašume began, based on a program of economic, organizational and technological changes. This process included a reduction in the number of employees, who were invited to leave the enterprise voluntarily with the opportunity through social programs to participate in mechanization and eventually become business partners of SE in the business of forest utilization.

This led to the formation of a number of small enterprises, and, over time, with the reduction of direct participation of state enterprise in the forest utilization business, to an increase in the number of small companies. Now, about 400 SMEs annually sign a contract with JP Srbijašume for the provision of work on cutting and dragging the wood assortments.

Similarly, as in the case of forestry enterprises, the majority of state **wood-industrial enterprises** established in the period of planned economy were unable to adapt to market business conditions, and most of them have been liquidated or are in bankruptcy proceedings, while a small number of them has been successfully restructured and privatized.

The decline in activities of large wood-industrial combines has indirectly led to the formation of a very large number of small wood processing-industry enterprises. The majority of these companies are wood processing industrial companies (about 2,635), and most of them (about 1,580) deal with sawmill processing.

4.3. Characteristics of SMEs in the sector of forestry and wood processing industry in the municipality of Majdanpek

In the area of the municipality of Majdanpek there are 8 companies currently active and engaged in cutting and dragging wood assortments (as well as carrying wood) and only one company which is actively engaged in the primary processing of wood. i.e., the production of lumber. There is also a number of companies engaged in the production and trade of charcoal (in total, there are around 100 charcoal pits).

It must be emphasized that the specificity of business in the forestry sector is such that companies that provide services often change their place of business, depending on market and other conditions, and that companies active in the territory of one municipality are often not registered in that municipality. For this reason, the identification of companies is based on sources, provided by the users of their services: organizations that manage the forests in the municipality of Majdanpek i.e. State Enterprise Srbijašume - Forest Sub-estate Majdanpek and Forest sub-estate Donji Milanovac, and Public Enterprise National Park Djerdap.

For the purpose of defining the basic characteristics of small and medium enterprises in the forestry and wood processing industry as well as their problems in business and development needs, interviews with owners of the identified active and available companies were conducted. Structured interviews with open questions were used, and the responses were then processed by **methods of qualitative analysis**.

Basic **activities** of SMEs in the forestry and wood processing industry in the area of the Municipality of Majdanpek (see Table T-4.1) are: the cutting, removal, dragging and transport of wood assortments, the construction of forest roads and skid trails, charcoal production and the production of lumber.

TABLE T-4.1: ACTIVITIES OF SME IN FORESTRY AND WOOD PROCESSING

ENTERPRISE	ACTIVITIES				
	WOOD CUTTING	DRAGGING OF WOOD ASSORTMENTS	BUILDING OF FOREST ROADS	PRODUCTION OF LUMBER	CHARCOAL PRODUCTION
Beomark ind. DOO	X	X	/	X	/
Fagos DOO	X	X	/	/	X
SZR Ložač	X	X	/	/	X
SZR Ana –Mosna	X	X	/	/	X
DOO Boragić	/	X	X	/	/
DOO Maglov	X	X	/	/	/
DOO Ljubišnja	X	X	/	/	/
SUR Galup	/	X	/	/	/
SUR Bibić Gojko	/	X	/	/	/

It was found that the majority of enterprises combined the above-mentioned activities, so some of them, in addition to cutting and dragging wood also produce charcoal, and one enterprise with cutting and dragging wood assortments also produces of lumber. There are enterprises that perform only dragging, i.e. dragging wood with horses, and one enterprise, in addition to dragging also constructs forest roads.

An overview of the **production factors** in the analyzed enterprises is given in Table **T-4.2.**

TABLE T-4.2: PRODUCTION FACTORS OF SME IN FORESTRY AND WOOD PROCESSING

ENTERPRISE	CHAIN SAWS	FOREST TRACTORS	TRUCKS WITH CRANE	WORKING HORSES	MILLS	CHARCOAL
Beomark ind. DOO	15	2	2	/	1	/
Fagos DOO	5	1	1	/	/	6
SZR Ložač	4	1	1	/	/	4
SZR Ana –Mosna	2	1	1	/	/	2
DOO Boragić	/	2	2	/	/	/
DOO Maglov	3	2	/	/	/	/
DOO Ljubišnja	3	/	3	/	/	/
SUR Galup	/	/	/	12	/	/
SUR Bibić Gojko	/	/	/	15	/	/

It was also found that the majority of enterprises, depending on the primary activities that are carried out, are equipped with a chainsaw, forest tractors, trucks with cranes, a pack, and horses. Those which deal with the processing of wood have a complete sawmill's drive. The same applies to charcoal producers.

TABLE T-4.3: STRUCTURE OF EMPLOYERS IN SME IN FORESTRY AND WOOD PROCESSING

ENTERPRISE	NUMBER OF EMPLOYERS	AGE STRUCTURE	GENDER STRUCTURE	QUALIFICATION STRUCTURE
Beomark industrija DOO	49	20-30 god: 10 30-40 god: 33 40-50 god: 6	38 m **11 ž**	**VSS: 1** SSS: 8 KV: 40
Fagos DOO	4	30-40 god: 10	3m **1ž**	NKV:4
SZR Ložač	5	30-40 god: 5	5 m	NKV:5
SZR Ana –Mosna	7	30-40 god: 7	7 m	NKV: 7
DOO Boragić	4	30-40 god: 4	4 m	KV: 4
DOO Maglov	5	30-40 god: 5	5 m	NKV: 5
DOO Ljubišnja	6	30-40 god: 6	6 m	SSS:1, KV: 3, NKV: 2
SZR Galup	5	20-30 god: 3 30-40 god: 2	5 m	NKV: 5
SZR Bibić Gojko	7	20-30 god: 3 30-40 god: 4	7 m	NKV: 7

Users of the **services** of these enterprises are users of state forests, which were mentioned above: FE Severni Kučaj, FE Timočke šume and PE NP Djerdap (see Table **T-4.4**). However, it is characteristic that only one company performs services for all users of the state forests, while all the others are related to only one user (or FSE FE Severni Kučaj or FSE Donji Milanovac). Also, only one company constructs forest roads and skid trails[23]. It is important to emphasize that neither of these companies provides cutting services in the private forests.

[23] This can be explained by the fact that the Work Unit Machinery, which constructed the roads in the Timok forest area, is part of FE Timočke forest.

TABLE T-4.4: USERS OF PRODUCTS AND ANNUAL AMOUNT OF SERVICE SME IN FORESTRY AND WOOD PROCESSING

ENTERPRISE	FE SEVERNI KUČAJ	FE TIMOČKE ŠUME	NP ĐERDAP	ANNUAL CUTTING (m^3)	ANNUAL DRAGGING /CARRYING (m^3)	MADE FOREST ROADS AND SKID TRAILS (km)
Beomark ind. DOO	X	X	X	7.000	7.000	/
Fagos DOO	/	X	/	3.000	3.000	/
SZR Ložač	/	X	/	2.000	2.000	/
SZR Ana –Mosna	/	X	/	2.000	1.000	/
DOO Boragić	X	/	/	/	?	18
DOO Maglov	X	/	/	5.000	3.000 –10.000	/
DOO Ljubišnja	X	/	/	1.500	4.000	/
SUR Galup	X	/	/	/	4.000 – 10.000	/
SUR Bibić Gojko	X	/	/	/	5.000-10.000	/

The volume of performed services of the analyzed enterprises is in accordance with the available production factors. The volume of cutting is from 1500 m^3 to 7000 m^3 per company per year, the scope of services of dragging by forest tractors is 1000 m^3 to 7000 m^3 per year, while the scope of dragging of wood assortments by horses depends on the configuration of the fields which are the subject of cutting, and varies from 4000 m^3 to even 10,000 m^3 per year. The volume of performed services in the construction of roads is around 18 km per year.

The annual **production** volume of enterprises engaged in wood processing, as well as the markets where they place their products, is given in Table **T-4.5**. A company that is engaged in wood processing, per year produces 6000 m^3 of logs and around 3000 m^3 of lumber. It is important to emphasize that the majority of products of this company are for export.

TABLE T-4.5: PRODUCTION AND SALES OF THE PRODUCTS OF SME IN FORESTRY AND WOOD PROCESSING

ENTERPRISE	PROCESSED AMOUNT OF LOGS (m^3)	PRODUCTION OF LUMBER (m^3)	PROCESSED AMOUNT OF CHARCOAL WOOD (m^3)	PRODUCED AMOUNT OF CHARCOAL (t)	DOMES. MARKET	EXPORT
Beomark ind. D.O.O.	6.000	3.000	/	/	X	X
Fagos DOO	/	/	2.000	250	/	X
SZR Ložač	/	/	2.000	230	X	/
SZR Ana –Mosna	/	/	600	70	X	/

Analyzed enterprises that deal with the production of charcoal annually process from 600 m^3 to 2000 m^3 of wood per company, and produce from 70 to 250 tons of charcoal.

The entire production of one of these companies is intended for export, while the other two place charcoal on the domestic market, or with final users or exporters.

The most serious **problems** of the analyzed enterprises were identified. They are related mostly to the state of production factors (see Table **T-4.6**) and the realization of and payment for the placed products and provided services (Table **T-4.7**).

TABLE T-4.6: PROBLEMS OF SME IN FORESTRY AND WOOD PROCESSING: PRODUCING FACTORS AND LABOR FORCE

ENTERPRISE	PROBLEMS				
	OLD EQUIPMENT AND MACHINES	EXPENSIVE COMMERCIAL CREDITS	LACK OF GOVERNMENTAL AID	BAD INFRASTRUCTURE	LACK OF A GOOD LABOR FORCE
Beomark ind. DOO	/	X	X	/	/
Fagos DOO	X	X	/	/	X
SZR Ložač	X	X	/	/	X
SZR Ana –Mosna	X	X	/	/	/
DOO Boragić	/	X	/	/	/
DOO Maglov	X	X	/	/	/
DOO Ljubišnja	X	X	/	X	/
SUR Galup	/	/	/	/	X
SUR Bibić Gojko	/	/	/	/	X

Linked to the **state of production factors,** old equipment and machinery is the biggest problem of most of the analyzed companies. This usually refers to the necessary machinery (tractors forest, trucks) for the work in the woods

The main reason for these problems is very bad commercial credit. Therefore, for some companies the problem can be the lack of start up money, financial aid from the government that would be used for the development of the small companies in this field.

For just one company the problem is the unsatisfactory state of the infrastructure, which implies a lack and bad condition of forest roads.

Some companies producing charcoal and fuel wood talk about a lack of a labor force as a major problem; this can be linked to the nature of the work that is very demanding and requires great physical strength.

As far as the **realization** of payment of performed services is concerned, some companies have a problem with on the one hand low prices, and on the other hand high costs, which, with the stagnation in the price of services, are constantly increasing.

Furthermore, an even greater problem for the majority of enterprises that perform services of cutting and wood transport is a practice of SE Srbijašume that in compensation for performed services contractors are provided with wood products, which as a rule is fuel-wood or forest waste. This undermines the implementation of the service, as well as the payment of claims which the contractors have to the third parties. This phenomenon, which causes reduced liquidity, persuaded some of the enterprises to base their business on the production of charcoal, for which they provide raw materials from their compensation in wood for performed service.

In addition, for the enterprises engaged in exports, above all in the export of lumber and charcoal, a big problem concerns payment, which is usually delayed. An additional problem is the fluctuation of exchange rates.

TABLE T-4.7: PROBLEMS OF SMES IN FORESTRY AND WOOD PROCESSING: REALIZATION

ENTERPRISE	PROBLEMS				
	LOW PRICE OF PRODUCTS AND SERVICE / HIGH EXPENSES	PAYMENT THROUGH COMPENSATION	PAYMENT DEBT FROM EXPORT	LOSSES DUE TO THE CHANGING MONEY RATE	UNREGISTERED COMPANIES
Beomark ind. DOO		/	X	X	/
Fagos DOO	/	X	X	X	/
SZR Ložač	/	X	/	/	X
SZR Ana –Mosna	X	X	/	/	X
DOO Boragić	/	X	/	/	/
DOO Maglov	/	X	/	/	/
DOO Ljubišnja	X	X	/	/	/
SUR Galup	/	X	/	/	/
SUR Bibić Gojko	/	X	/	/	/

Although by its nature it does not belong here, charges and the associated problems are also classified as unfair competition. Unregistered producers, mainly of charcoal, occasionally sell a certain quantity of this product, as a rule for lower prices. This causes a reduction in the prices of charcoal on the domestic market, and this in turn particularly affects those enterprises that wholesale charcoal to exporters or catering companies.

4.4. Analysis of opportunities and constraints for the development of SMEs in the Municipality of Majdanpek

Table **T-4.8.** shows the SWOT analysis of the SME sector in forestry and wood processing in the Municipality of Majdanpek. The main goal of the SWOT analysis is, on the one hand, the identification of and insight into strengths and weaknesses of the sector and, on the other hand, the threats to and opportunities of the sector.

The biggest **strengths** of enterprises in the forestry and wood processing industry in the Municipality of Majdanpek are the extraordinary benefits based on the rich forest resources (both wood and non wood). Already introduced, the resource potential of the municipality provides very favorable conditions for the development of existing enterprises, as well as for the establishment of new ones. As well, there is good cooperation with the managers and employees of the enterprises that manage forests under state ownership (FAU Majdanpek, FAU Donj Milanovac, NP Djerdap), and a mutual trust and understanding has already been established.

Companies provide specialized services (cutting, dragging, carrying, transport, etc...) in the specified circumstances characteristic of forest economy. They also in a short time increase their enrolment in the whole process of creating valuable wood products.

Therefore some of them, in addition to basic cutting and transport services, get involved in the primal wood industry (producing of lumber, charcoal), and some in the creation of the forest infrastructure (making of forest roads and skid trail).

The mentioned companies are characteristic because of their technological and market flexibility and their capacity to adapt quickly to changes as evident in their ability to do a wide range of jobs, to switch between jobs, and to expand to new jobs.

TABLE T-4.8: SWOT ANALYSIS OF SME IN FORESTRY AND WOOD PROCESSING

STRENGTH	WEAKNESS
Rich forest resources Cooperation with users of state-owned forests in the areas Provide specialized jobs Important role in the chain of making values for the wood products Big market and technological flexibility Fast reactions to the market changes Wide range of business Efficient Independent Produce new working possibilities Contribute to development of local committees Contribute to rural development	Insufficient possibility for self-financed companies Low investment activities (for the basic equipment) Lack of finance for development Lack of information Lack of educated management, up to date technology, marketing, export Lack of educated workers Lack of new equipment Unused capacity High cost of labor Insufficient production Unproductivity
POSSIBILITY	**THREAT**
Big numbers of potential users of services in private forests Production of biomass Interest of municipality government in problems in sector and willingness to help Interest of domestic and foreign investors in investing in SME sector Possibility of making private-public arrangements and partnership in SME sector Accessibility of information, training and consulting services Horizontal and vertical linking in SME sector – organization of cluster and associations of entrepreneurship Exchange of experience with SME and representative of cluster from other parts of the country and abroad Representing interest in SME through activity of cluster in the market and in the institutions Planning and realization of joint activities in the production, servicing and acquisition of the basic equipment.	Frequent changes in business rules (taxes, export regime ….) Lack of start-up policy Law regulation that is not helpful for employment of workers and new business High tax rate, with lack of tax aid, help and even abrogation of some taxes and some tax contributions. Old sectors and legal obligations Inefficient way of legal protection Low level of long-lasting business-technological cooperation of PE and SME Low number of advisory organizations for solving strategic and operative problems that concern SME Disloyal concurrent and “black” economy Inadequate financial aid and bad credit rate from the foreign banks Lack of business funds for financing of SME in sector of forestry and wood processing industry Expensive and inaccessible investment capital

As well, all the enterprises are very efficient as shown in the range of services and products that they offer, and all of them make independent decisions and are ready to accept challenges.

It is very important to emphasize that even though these companies are not very big; they provide new jobs and contribute to the development of local committees. Most of these companies are linked to rural committees both through the workers ,and, because they contribute especially to the development of rural parts of the country, through the places where they provide services as well.

Conversely, the biggest general **weakness** of SME in forestry and wood processing in the Municipality of Majdanpek is the insufficient possibility for self-financing. Similarly, there are limited investment activities, first of all to meet basic needs, and to overcome the lack of development finances. This is the reason for the shortage of up-to-date equipment and basic working goods.

Additional weaknesses, which are also a reason for having previously mentioned finance, are the high cost of the work, insufficient production and nonproductivity. This is evident in the monopoly (SE Srbijašume) that is evident in the dictation of the price and also the payment for services by compensation. It can also be seen in the weakness of its own organization.

Another big weakness is the lack of knowledge about management and up-to-date production and marketing, as well as the shortage of an educated and adequately-trained labor force, which often goes hand in hand with a lack of information.

Every weakness mentioned above is reflected in the statement that because of the inadequate capacity of SME in forestry and wood processing industries, the potential that provides a resource base cannot be realized.

The most important **possibility** for the development of SME in forestry and wood processing is the enormous resource base that is provided by privately owned forests. For the activation of this potential owners must be encouraged to cooperate actively and adequately. To provide sufficient wood it is necessary to increase activities for the organization of the privately owned forests.

New products that have big demands on the world market represent another big possibility for the development of SME. The main product of this kind is biomass.

An important possibility for the development of SME rests with local committees and their willingness to help with problems their enterprise experiences and their readiness to offer adequate support and help to the enterprise.

The interest of domestic and foreign investors in investing in this sector is an important possibility for developing SME in forestry and especially in wood processing. This is especially important for the wood processing industry because with its growth the forestry companies will grow too. The importance of the engagement of local municipality management in searching for investments in forestry and wood processing industry must be emphasized.

Another big possibility for the development of SME lies in making private-public arrangements and partnerships, particularly in terms of an intensive cooperation between SE and SME that is dealing with servicing and wood processing, concerned about the best interests of them both and strategic planning for all of them. In this way, treeing, consulting and openness of information can be used for the development of SME.

Also a big opportunity to develop SME is the horizontal and vertical linking of companies inside the forestry and wood processing sector in the territory of the municipality. This can be done through forming clusters and associations of company owners.

The possibilities for the development of the companies through the work of clusters and associations of companies are huge: from exchanging knowledge with other representatives of associations through representing common interests and common activities on the market, to the planning and realization of activities to acquire equipment, products and for providing services.

The biggest **threat** to the development of SME in forestry and the wood processing industry in the Municipality of Majdanpek as well as in the rest of Serbia is the constant changes in the way of doing business, changes in the regulations, taxes and in the export rules. Also for companies that are exporting, a major problem can be the constant fluctuation in the rate of exchange for domestic currency.

Another very big problem is the lack of supporting policy--even with the already-adopted strategy for improvement. This is reflected in legislation which does not sufficiently encourage the development of small business. In addition, there are high tax burdens under the tax relief and exemptions from certain taxes and the abolition of certain types of taxes and contributions.

A special problem pertinent to the forestry sector results from the Forestry law of 1991 where there is no mention of small- and middle-sized enterprise because at that time only one company with a monopoly on everything having to do with forestry existed. This kind of legal regulation emphasizes the big, crucial and long-lasting differences in the business-technological cooperation between a state-owned company and SME in forestry and the wood processing industry. Even though the state-owned company has no capacity for the work, it nonetheless still monopolizes the use of resources.

Also a threat is the lack of adequate advisory institutions to participate in solving strategic and operational problems that SMEs face. The institutions established by the model created in the socialist period were directed to provide services to great state enterprises, and so they have been unable to adapt to changed economic conditions in a short period of time. In addition, the capacities of specialized consulting houses in this area do not satisfy the needs of the sector.

Another significant threat and a special issue for exporters is the insufficiently effective mechanism for the legal protection of the rights of SMEs in business transactions; a method for fast, efficient and impartial resolution of disputes is essential. A similar problem is the inefficient sanctioning of unfair competition, ie. non-registered competitors.

In the end, the greatest threat to the development of SMEs in forestry and wood processing is inadequate financial support. Unfavorable credit terms by commercial banks and the lack of special funds from the banking sector for small- and medium-sized enterprises means the investment capital for SMEs in the forestry and wood processing with all the specifics of their business is very expensive.

Summary

The SME sector is the backbone of economic development. Experiences in managing the development of SMEs, their number, their positive impact on the growth of the gross national product and national income, the relatively high participation of employees in the SME sector of the total number of employees indicate that a strategic goal at the national, republican, regional and local level should be the management of the development of this sector. The main goal to speed up the establishment and development of small and medium enterprises in the forestry sector is to increase in turn the contribution of the forestry sector to the economic and social development of the Republic of Serbia, whereby the SMEs in forestry must ensure an increase in the living standards of citizens of Serbia, especially in rural areas, increase employment and ensure equitable regional development.

In the area of the Municipality of Majdanpek there are 8 companies currently active and engaged in cutting and dragging wood assortments (as well as carrying wood) and only one company actively engaged in the primary processing of wood - the production of lumber. With them there is a number of companies engaged in the production and trade of charcoal (in total, there are around 100 charcoal pits).

*The most serious **problems** of the analyzed enterprises and entrepreneurs were identified. They are related mostly to the state of production: obsolete mechanization (equipment and machinery), unfavorable commercial loans, the lack of incentive funds, poor infrastructure and lack of quality labor force, but also the realization - charge of placed products and committed services.*

*The biggest **strengths** of enterprises in the forestry and wood processing industry in the Municipality of Majdanpek are the rich forest resources, the established cooperation with the users of state forests on the local level, the significant participation in the creation of the value of wood products, the quick reaction to market changes, and the contribution to local and rural development.*

*The largest general **weaknesses** of SMEs in the forestry and wood processing industry in the Municipality of Majdanpek are the lack of opportunity for self-financing of business, the currently limited investment activities, the lack of information, the lack of a professional labor force, the high costs of work, and a dormant capacity.*

*The most significant **opportunity** for development of SMEs in the forestry and wood processing industry is the huge resource base that is provided by private forests. However, for the realization of this potential, it is necessary to enable the owners of forests and to establish adequate co-operation with a sufficient number of them. In order to mobilize private forest owners it is necessary to intensify the activities of their organization. Other possibilities are interest in the problems of the municipal government sector and the unwillingness to provide support, as well as the possible horizontal and vertical connections in clusters and associations of entrepreneurs.*

*The biggest **threats** to the development of SMEs in the forestry and wood processing industry in the Municipality of Majdanpek as well as throughout Serbia are, first of all, the frequent changes in business conditions concerning changes in regulations, taxes, and contributions, as well as the changes in the foreign trade mode. Also great threats to exporters are the unstable exchange rate for domestic currency and the lack of a compelling development policy, unfair competition from the "gray" economy, and expensive and inaccessible investment capital.*

5. Recommendations for improvement and development in the forestry and wood industry and increase of their impact on the local economy of Majdanpek municipality

5.1. Identified potential of the sector

In this chapter, the identified potential of the forestry sector and wood industry of Majdanpek municipality through the raw material resources (wood and non wood products), production potential, market potential and labor force will be presented.

5.1.1. Raw material potentials

The potential of the forests in the municipality of Majdanpek is one possibility for the **development** of small business. The raw material base can be seen through a wide range of forest products. These products are usually defined as wood and non-wood products. Potential wood products can be considered from the point of view of the categorization of wood mass, which in the further process of production presents raw materials of primary wood processing or is intended for direct use. With the technological aspects of structure, the raw material presents technical wood and fire wood that further in the production process can be used in the chemical industry.
In addition to wood products that in most countries are considered the main product, forests have other benefits, of which the most important is the use of non-wood products as a significant forest potential. The quantity and quality of non-wood products that can be found in the forest are varied and as such are a potential source of income. These products include mushrooms, game, honey, forest fruits and others. In addition to these products there are medicinal herbs (dried and raw materials for the production of essential oils).

5.1.1.1. Wood products

In the area of the Majdanpek municipality, forests are under both state and private ownership. State forests are entrusted to forest user - PE "Srbijašume" and PE NP "Đerdap".

Total standing volume of forests in Majdanpek municipality is around **10.620.000 *m^3*** and average is **168 *m^3 /ha*** (Serbian average standing volume is 161 *m^3 /ha*). Total annual volume increment of those forests is 195.000 *m^3* and average annually volume increment is **3,1 *m^3 /ha*** (Serbian average is 4,0 *m^3 /ha*). According to the ownership structure most of the forests are **state owned** with 65,8% of total area and total area of **private forests** is 21.600ha or 34,2%.

The gross amount of wood which is, according to the plan documents, envisaged for harvest in this area is around ***130,000*** *m^3* annually. The net volume of this amount of wood is around ***110,000*** *m^3* . During the 2008 total yield realized in Majdanpek municipality is 77.000 m³ that is 60% of planned yield.

The largest amount of wood mass is located in the hilly mountain area, which means that the conditions for mechanized technological process are limited compared to the conditions that characterize lowland areas. Of the total amount of wood, the percentage of technical round wood in state forests is up to 50%, while in private forests, because of lower forest quality and a greater percentage of coppice forests, this percentage is significantly lower.

On the basis of this wood mass, and wood mass that gravitates to this forest management district, we can estimate the processing capacities of the primary wood. However, first it is necessary to analyze existing capacities and capacities that are located in the nearby area, and which are provided in part by raw materials from forests in the area of Majdanpek municipality. In addition to the technological structure, the wood assortments structure is very important; on this basis a sort of wood processing capacity can be planned. The assortment structure is one of the important factors of the financial analysis.

From the total wood net volume that is harvested in the area of the Majdanpek municipality, only ***15,000m^3*** is round wood that needs to be transported to the manufacturer for whom these assortments represent raw material input in the production process. The remaining amount, around 45,000m^3, is fire wood that also needs to be transported to the processing capacities or directly to consumers. It is, however, necessary to point out that only 60% of the planned yearly harvest is realized.

5.1.1.2. Non-wood products

Forestry as an economic sector has a dominant role in the use of wood products, while the use of non-wood products is **partly ignored**. This fact is not good, especially in current economic conditions when circumstances require the use of all available resources which are provided by the forestry sector. Currently, contemporary pharmaceutical, cosmetic and food industries emphasize more and more the use of indigenous medicinal plants, fruits, mushrooms and other forest products.

This area has exceptional biodiversity, especially in terms of plants and mushrooms. Sound knowledge of non-wood products that can be found in these forests creates an interest in their use, in accordance with the principles of sustainable development. The repurchase price of non-wood products in terms of strong work organization, rational acquisition, drying, and distribution can provide additional income in the forestry sector.

The collecting, drying, finishing and distribution of medicinal herbs, forest fruits, mushrooms and other things requires professional and organized work, and in that sense it should be made a separate program (see Annex 4) which would include:

- identifying commercially important species of mushrooms, herbs and other non-wood products of the Majdanpek municipality;
- identifying locations for the repurchase of products and their storage;
- identifying locations for the installation of dryers and refrigerators.

Development of the use of non-wood products would create employment opportunities for the local population and workers in forestry who are not capable of heavy physical work. After the creation of the program it is necessary to educate workers in places of repurchase, and through the media raise awareness and interest of the local population, especially of young people, pensioners and unemployed persons, in the possibility of their employment in this work and adequate payment for it.

The potential for use of non-wood products from forests in Serbia is still relatively low for several reasons. The key problem is insufficient knowledge about the possibilities of use, the method of

collecting and of processing technology and marketing, as well insufficient knowledge about the commercial importance of non-wood products and potential users of these products.

One of the most used products from the forest is mushrooms. The amount and types of fungi that may be the subject of harvesting are large, but in terms of quantity, annually it is the boletus that is the most harvested. On the basis of data taken from the repurchase station, as well as the data obtained from the processing companies, it is clear that boletus is the mushrooms that sell the most.

The cultivation of the oyster mushroom on the stamp has significant potential. It is identified as a non-wood raw material resource and its cultivation on the stamp prevents the stamp vegetative reproduction ability thus reducing maintenance costs of the implant area, and as result receiving income from fungi.

According to the estimation of experts,, in the beech forests of eastern Serbia with organized fungi collection, the possible yield reaches around 150 kg mushrooms per hectare (depending on the climate conditions during the year).

Taking into account that the area under forest in the Majdanpek municipality is 63.150 ha, it is clear that collecting mushrooms provides a potential source of income and a solution to the problem of unemployment.

The rich and wide variety of flora in Serbia has a large number of species of plants with medicinal properties. The species most often bought are: St John's wort, thyme, valerian, blueberry, sweetbrier, milfoil, hawthorn, lime, lemon balm, Vranilova grass, and elder. In smaller quantities there are other plants for repurchase: plantain, brush, nettle, wild garlic, etc. These plants in larger or smaller quantities contain different compounds or active substances used as medicinal resources or as raw materials for making drugs. Some of the medicinal plants are overexploited which causes their endangerment.

Medicinal plants must be well-known and understood; in addition it is important to know when to harvest the plant, or some of its parts.

The species of medicinal herbs that are of economic interest in the area of the Municipality of Majdanpek are:

- ***Thymus serpyllum*** L. – thyme
- ***Achillea milefolium*** L. – milfoil
- ***Crataegus monogyna*** Jacq. – black haw
- ***Sambucus nigra*** L.- Black elder
- ***Origanum vulgare*** L. - Vranilova grass
- ***Urtica dioica L.*** – nettle
- ***Tilia platyphyllos*** Scob. – Early lime, wild lime
- ***Hypericum perforatum*** L. – St John's wort
- ***Melissa officinalis*** L.- lemon balm
- ***Taraxacum officinale Web***.- taraxacum
- ***Plantago*** sp.- plantain

From the commercial viewpoint, fruits, medicinal plants and fungi are the most common products in these forests. The most used forest fruits are **sweetbrier**, ***blueberry,*** juniper, raspberry, blackberry, hazelnut, wild apple, walnut and others. The fruits are used for jams, sweets, compotes, tea, etc. The harvesting, collecting, repurchasing and processing of forest fruits are open to the state and private companies.

The Majdanpek municipality is expected to produce and trade on non-wood products because those products bring material gain. In the forests of the municipality of Majdanpek a large

number of medicinal and edible plants that are not in enough demand remain unused in the forests. To be able to effectively use this natural wealth, it is necessary to know not only the inventory of medicinal and edible plants, but also a whole range of their properties.

5.1.2. Production potential

5.1.2.1. Wood products production potential

Technology development in the forestry sector creates conditions for the production of larger amounts of timber at low cost, a greater level of harvest, and with less impact on the environment. Sustainable forest management allows for the use of this resource that is socially accepted and environmentally and economically cost-effective.

Jobs in forestry were until now--and even in some places still are--done manually, and are counted as very **hard physical operations**. With the development of technology, machines partly replaced this physical work which from a humane point of view, became more acceptable. In addition to the motor chain, which in most the countries is still the principal tool for the cutting and manufacture of assortments, more and more machines that are equipped with different hardware and software components are in use and make for an entirely different approach to the utilization of the forest.

Cutting and manufacturing of wood assortments is the first phase in reaching the final product. Although in this phase different methods for the manufacturing of wood assortments are used, they consist of similar operations: cutting and overturning the trunks, pruning of branches captivation, intersection of trunks on measurable lengths i.e. making different assortments from trunks, defining the diameter and volume of assortments, and finally loading and transporting to sawmills and users. Some of these operations do not require this sequence, and some can be done earlier or later. With the technological developments of the 20th century, these operations became automatic.

In the earlier days of forestry, the back-saw was used for cutting and manufacturing wood assortments, and when technology was improved, motor chains were used until the appearance of the first machines for cutting the trees i.e. the first harvester in 1960, then the feller buncher and today the processor. This development of mechanization brought many changes: easier cutting and manufacture of wood assortments, easier transport of assortments, a decrease in the number of needed workers, increased safety, reduced time for doing operations and a reduction in costs.

The use of specific methods of work on operations in forestry requires further analysis:

- Actual status of equipment– means for work
- Planning size of cuttings and production of wood assortments
- Planning of technology in process of production

The planned **size of production** in cutting and the manufacture of wood assortments in the area of the municipality of Majdanpek is around 110 000 m^3. To finish the operations on cutting and the manufacture of assortments **60** motor chains and around **90** workers must be hired annually. Currently in the territory of the Municipality eight companies dealing with cutting and the manufacture of forest assortments are registered. The total number of motor chains which these companies have is 32. This data shows that the number of chain saws, which currently perform cuttings in the municipality of Majdanpek, is insufficient for carrying out planned operations, and only half of these operations can be done with this number of motor chains.

Companies registered in the municipality of Majdanpek deal with different operations in forestry and this is one reason for less work in cutting and manufacturing. Workers do different jobs, depending on the size of the specific type of operation. The fact is that usually companies that are **not registered** in the area of the municipality where operations take place hire workers under specific conditions from the territory of the municipality.

The introduction of a **license for work** creates a specific problem. In this way better conditions will arise for the employment of a specific number of young educated staff, which is unlike the current situation where in seven registered companies only one worker has high professional qualifications. Since private companies are dealing with different types of operations, it is hard to give data, or say what amount is suitable for one company, but besides the need for broader analysis it can be assumed that the required number of companies with this profile for the area of the municipality of Majdanpek is 9.

The number of employees working on cutting and manufacturing is around **90**. The same companies also conduct operations on the captivation of trees.

For the captivation of trunks adapted tractors would be mostly used. For captivation 10 adapted agriculture tractors and five hinged tractors should be engaged and 30 workers should be hired.

Transport of wood by animal haulage is 15%; with an animal **10,000 m^3** of round wood can be captivated. The required production with a yearly norm of one couple of animals can be realized with 10 couples in tandem and 18 workers, necessary for this size of operation.

The amount of fire wood production is yearly around 45,000 m^3. The required yearly size of allegnated fire wood is **30.000 m^3**, which can be realized with 40 lading horses. To take wood using animals, 20 workers must be hired. Besides this, part of the fire wood will be transported by tractors with cages and part of it in the form of round wood. For this quantity 5 adapted agriculture tractors and 7 workers must be engaged.

The process of the production of forest assortments done in continuity represents timely loading and transportation of these assortments to indirect users. In the municipality of Majdanpek this phase of forest utilization can be realized mainly with resources from the private sector. It is generally the buyer who provides the transport of wood assortments from supported timber yards.

During the purchase of machinery for the transport of wood assortments, the choice should be made for adequate means of work. Transport of assortments is done by trucks with or without side car or, for shorter distances, by tractor team.

The total amount of equipment for transport depends on the dynamics of the work. Based on the available wood volume, 10 trucks are needed for transport of round wood and five trucks with side car for transport of fire wood.

There are 15 workers on the transportation of assortments and the same workers are included in the loading of round wood with a hydraulic crane

Loading of wood assortments is done by equipment, which, from an economic viewpoint, is rational. Loading of round wood is done by hydraulic crane, while loading of chopped trees is manual. The driver of the truck will load round wood while 4 workers will load fire wood

Openness of the forest with a communication network represents the basis for effective operations in forestry. Thanks to resources invested in building the network, there is a long term interest in the improvement of all segments in forestry and because of that, analysis of forest openness in the chosen area has been done.

Underlying the planning of the network of forest roads in the forest complex in order to develop the forest network is the principle “from larger to smaller”, with the purpose that every part of this area be connected with centers for processing and selling wood in the municipality of Majdanpek and surrounding municipalities.

Forest roads inside the network are toward purpose, importance and character divided to main, byway and though roads. The main forest roads connect the forest complex with the transport route that has public access and centers for processing and selling wood. They are constructed using hard road cloak. Byway forest roads open up part of the forest complex or bigger valley, while through forest roads open small parts of the forest complex or small valley areas.

The construction of forest communication, a primary and secondary forest network in the area of this municipality, can be given in part to building companies who have adequate equipment.

These companies should have different building machines: bulldozer, roller, compressor, trucks etc. The number of workers needed for the normal process of conducting the operations is around 12.

In addition to the equipment mentioned, depending on how operations are organized other equipment such as buses, vans, container etc could be needed. A specific number of management workers, around 15, is also required.

Table T-5.2 represents an estimation of the equipment needed for operations in forestry in the territory of the municipality Majdanpek.

TABLE 5.2: PRESENT AND OPTIMAL NUMBERS OF EQUIPMENT IN OPERATIONS IN SME IN FORESTRY

MACHINE	OPTIMAL NUMBER	PRESENT NUMBER
Chainsaw	60	32
Adapted agricultural tractors	10	4
Forest tractors	5	5
Pack horse	15	17
Tracks with trailers	15	10
Hydraulic cranes	15	10

In this table the need for investments and financial input in current enterprises can be seen, especially if we take into account that current equipment is outdated and potential is small.

An example of good practical foreign direct investments in forestry and employment is represented by the company ROSNER for cutting and captivation, situated in Jagodina. The company has 12 full time employees, two with university graduates, one of whom is an engineer in forestry, while the other 10 workers have high professional qualifications. The age of employees is between 28 and 66.,The plan is to employ more people depending on the situation and amount of work, while the policy of the company is to employ local population. Training for workers in handling motor chains and machinery is planned; it will be delivered by an Austrian firm. They have modern machines and equipment for work in forests (specialized tractors for operations in forests) and till now investments in basic equipment by the owner in Austria are around 170,000€. The purchase of new equipment is also planned.

5.1.2.2. Production potential of non-wood products

Today non-wood forest products are taking a more and more important role in forest policy in a number of countries, so the revenues from its use are rapidly getting closer to revenues made by the classical production of forest wood assortments. Cases from Czech Republic, Slovakia, Lithuania and Finland show how effective use of these products can be. In each of these cases, it is obvious that non-wood forest products are an important source of employment and revenues and can make an important contribution to the development of recreational tourism.

Non-wood forest products make an important contribution to the economy of these countries. However, one important characteristic of the collection of non-wood products is a huge yearly variation in output, which directly accounts for their limited commercial use.

With some investment and good organization, huge amounts of these products can be collected. Around 20% of medicine in the modern pharmaceuticals industry comes from forest medicinal herbs. Most of the plants that are used in traditional medicine have their origin in forest areas. In some cases, excessive use has led to the extinction of specific species.

An example of well-organized collecting, buying out, and processing of other (non-wood) forest products is represented by a facility for buying out and processing of other forest products (mushrooms, forest fruit and medicinal herbs) from Boljevac (working unit of PE “Srbijašume”). This facility has 15 full-time employees and for different operations hires 30-100 buyers, depending upon the season. Furthermore, they hire the physically and mentally challenged. The production capacity of mushrooms is 300-400 t/per year and for forest fruitage, 100 t/per year; in 2008 they processed 100 t of forest fruitage and 150 t of mushrooms.

In Serbia, non-wood products do not have significant commercial importance and the production of medicinal herbs in plantations is relatively low. But a higher proportion of medicinal herbs and berries should be considered: a huge amount of non-wood forest products can be considered an alternative to their agricultural production and could produce much greater amounts without the use of chemical agents.

Possible forms of development in entrepreneurship, within the framework of the production and processing of medicinal herbs, are small family plantations of medicinal and aromatic herbs, collection and processing of indigenously medicinal and aromatic herbs in mount-mountain areas etc. More work should be done on closing the process of production from production to final product, i.e. starting from production on small private family plantations, through small laboratories for testing and small companies for processing, to the development of useable preparation and balsams and their marketing in small herb drug stores or on the foreign market.

Investment needed to start the process of production depends on production capacity and technological level. Production capacities should be in harmony with the potential of material from the area where these processing capacities are built. Equipment for processing medicinal herbs and mushrooms in small facilities does not need huge investment and consists of a dryer, scales, packing machine, warehouse, dashboard or build craft. The efficiency of the production process increases with the acquisition of a mobile dryer and vacuum packing machine. Besides this, equipment, the purchase of vehicles for the delivery of products, and a vehicle for the transportation of workers who collect these products are needed.

Regulations to control the use and transport of wild flora and fauna determine which wild species of flora, fauna and mushrooms are collected from natural habitants. Their utilization and transportation are put under control and the cost of the toll for their use is decided. Permission for the collection of protected species for commercial purposes is given to private bodies and entrepreneurs who are in the collection area, and also granted by open competition done by a commission under the umbrella of a responsible Ministry. Permission is given by the ministry

responsible for environmental protection and spatial planning and the consideration of the Institute for Nature Protection. The Institute suggests the amounts that could be collected for commercial purposes for the current year.

Open competition for permission for the current year continues at latest till March 1st of that year. The application details the species and amounts that could be collected for use and transport, and asks for:

1) data about the applicant;

2) data about the protected species, requiring the Latin name of species which will be collected and marketed;

3) data concerning the amount by species which will be collected in raw or fresh condition, for commercial purposes;

4) the method of collection of the protected species, localities for collection (indicating the municipality and nearest places where collections are located), number, and places of purchase;

5) data concerning facilities, crafts and devices for storing, processing and trafficking, and degree of processed protected species.

6) data concerning the registration of activity (abstract from a specific register on inscription of activity for collection of forest and other products, buying out, trafficking and processing)

A special toll of 10% of the established annual price of the protected species is levied on the buy out of protected species for commercial purposes, .

Entrepreneurs getting a permit to collect protected species for commercial purposes are required by the Ministry and Institute for Nature Protection to complete a form (see Appendix 4) by January 31 of the year in question about the collected species (their protection, and the identification of the species taken and transported), for each collected protected species and for each buying out station as well, concerning its utilization and commercial purpose.

Private individuals who are entrepreneurs in a nursery for protected species must deliver to the Ministry data about the nurseries (location, area, species which are bred, and annual amount of cultivation) with an attached statement of the Institute for nature protection.

Regarding this procedure connected with the production, processing and trafficking of non-wood products, when all the preconditions have been fulfilled the responsible Ministry assures an export license will be granted. This is in many ways financially beneficial, given that these are very desirable products in raw or processed state, and fetch a high price in the European Union countries.

Most of these products have a high price on the European Union market and are desired in both raw and processed form. However, on the local market these products can be found in many forms at relatively low prices. In Serbia, the export of medicinal herbs has a long tradition, and around 80% of these products are placed on the European market (member states of CEFTA agreement and EU) and 20% in America and Canada. Available resources, potential market, interested pickers, economic surroundings and profit are the major factors on which future uses of non-wood products depend.

There is a huge group of non-wood products including small parts of trees, branches of conifers used for decoration, branches of deciduous used for the production of besom etc that to date have not been recorded and which contribute to the real values of these forest products.

In the area of the municipality Majdanpek, marketing of non-wood products is not developed despite the possible potential of these products.

Education of the population about this type of operation is vitally important, followed by the investment of specific funds for the development of buy out stations. Without investment of specific funds it is not possible to commercialize these products. The market for these products is mainly European but some can possibly be placed on the domestic market as well. Evaluation of the potential of these products in the area of the municipality of Majdanpek has not been done in this study, but there are prescribed quotas on the part of the Institute for Nature Protection.

5.1.3 Market potential

In light of modern market trends and changes, forestry as a sector of the economy must be managed by basic principles of market economy. This means that modern forestry as an economic activity must follow the mechanisms of demand and supply and ways of determining market prices, following the costs of production and research elements upon which they depend, because in modern management, irrespective of the importance of the economic activity, only those companies that function with profit as their economic principle can work.

Researching the market should start with an investigation into the behavior of buyers to understand their readiness to purchase a specific product. In the forest economy, as a business sector which uses relatively few resources which regenerate slowly, it is precisely the power of supply and demand and the market price of the product that on a macro-economic basis will direct and manage future production.

There is no purpose or economic justification for the use of natural resources for production of wood and other types of products if there is no demand for such products and if they cannot be sold for profit. Recognizing this and optimizing the system for cutting depends on carefully studied economic factors regarding operations on cutting and manufacturing throughout the process of the production of wood.

From the point of view of the market as well, it is necessary and justifiable to establish and nurture production potential in the territory of the municipality of Majdanpek because companies which are now working on these operations cannot, with their current equipment for work, make a higher profit. Investment in modern technological equipment creates conditions for lowering costs or increasing profit, and then widening operations. Public enterprises which were given forests to manage did not ensure the continuity of work, yet gave these jobs in forestry to the only partly-prepared private forest sector.

These companies usually have outdated and old machinery. Capacities as such exist, but their output is relatively small, and presently with these resources they will be unable to satisfy the needs of the forest sector in Serbia. Thus, room for development of these companies exists; it only needs specific measures, mainly the provision of an acceptable credit policy which will influence their development.

Marketing technical round wood is developed inside and beyond the borders of our country. The biggest buyers of this product are the primary wood processing industry, for sawmills and the chemical industry. Fire wood is used in part for household fuel and in part for other sources of processing. The demand for quality assortments varies depending on the condition of the market regarding products of the final wood processing.

In Serbia, because it is based on local demands, the market for most non-wood forest products is still undeveloped. The population, especially at the local level is generally not involved in the collection of non-wood forest products. The development of a market for these products is very important in order to involve the population in these activities. The number of products that

today have economic importance on domestic and foreign markets is quite large, but the material potential determines which type of products are commercially lucrative.

The price of and profit from this production depend on the degree of production and marketing. It is not necessary to have a quality product but marketing must make it interesting for and attractive to potential buyers. However, these products are becoming more desirable, since many of these products represents healthy food, which today is emphasized more.

5.1.4 Potential of work force

The work force hired for jobs in forestry is mainly local population within the territory of the municipality of Majdanpek. Results of interviews conducted show the age structure of people hired in the private sector is quite diverse; most of them, however, are middle-aged, which is perspective in terms of work abilities. The educational structure is quite inappropriate because the most current employees have lower education, and that is the factor that does not create the conditions for future companies' development.

In the territory of the municipality of Majdanpek, because of the economic situation in Serbia much of the population is available for employment and thus it is possible that operations in forestry employ a certain number of younger educated staff. These are mainly engineers, where, if licenses will be introduced then companies will be obligated to hire forestry experts in this field. Beside that, space for employing will find other educational professions.

This municipality needs the creation of a buy out network which will include collectors and buy out stations and thereby acquire space for storing, cooling etc. so as to secure the collection of forest products and their distribution to facilities for processing or directly to the market. These buy out stations, depending on the scantly of the terrain will be a few and 2 or 3 employees will work there.

The capacities of the processing facility must be based on pre-determined potential. However, based on current experience, one facility of middle capacity should suffice. This facility will operate on the economic principle of payroll. The number of facilities can be even greater if plantations and breeding of medicinal and other herbs are seriously undertaken. The number of workers in these facilities is small--depending on the organization of the work, between 5 and10. However, for these investments a study of the validity of investment is necessary. Besides wood production, the possibility of production of medicinal herbs on plantations, which is by all current experience a payroll investment, should be researched. In the territory of the municipality of Majdanpek there is room for this type of cultivation which will influence the development of small processing capacities and create employment for a portion of the population. The precise number of new jobs is currently impossible to predict, but it can be assumed that the number would not be small.

In the territory of the municipality of Majdanpek, there is one small company for wood processing that hires 49 workers. Its processing capacity per year is around 6,000 $m^{3.}$ This amount is only 5% of the total wood volume which can be cut according to management plans for the forests of the municipality of Majdanpek. The fact is that a huge amount of round wood, which is the material for the primary processing of wood, is placed in facilities in the surroundings of the municipality of Majdanpek. However, initiating production in sawmills which already exist in this area and the possible construction of some new ones should be considered in light of shorter transportation distances. Although in most of parts in Serbia there are over-capacities of these companies, this is not the case in the municipality of Majdanpek. In fact, if part of the material were processed in the municipality, greater employment would be possible. According to calculation the number of positions would be up to 50.

The total amount of residuals left in the primary processing of wood which could be used for the production of chips for energy is around 5,000 m^3. In addition, part of the material for this requirement can be acquired from forest residuals, from meliorations, selection etc. (20,000m^3 of wood residual remain after the production of technical and fire wood in the territory of the municipality of Majdanpek). The real amount of total wood residuals which could be used here for this purpose is around **10,000m^3**. On the bases of this material, facilities for the production of pellets with a press of 1.5 t. could be installed. One facility for the production of energy from biomass could hire from 6 to 10 workers, with different levels of education. Expansion of processing capacities in the territory of the municipality of Majdanpek would create a better perspective for the development of energy facilities.

Table T-5.1shows the current number and assessment of the optimal number of workers in the forest sector on the basis of local resource capacities.

TABLE T 5.1: CURRENT AND OPTIMAL NUMBER OF WORKERS IN SME IN FORESTRY

OPERATION	OPTIMAL NUMBER OF WORKERS	CURRENT NUMBER OF WORKERS
Cutting and manufacturing	90	around 50
Captivation	30	around 15
Outputting	20	12
Transport	15	Around 10
Loading	4	4
Production of biomass	6-10	0
Construction of forest roads	12	4
Management	15	9

Evaluation of the maximal work force and of the different qualification levels in forestry needed in the municipality of Majdanpek is around 90 workers.

As a precondition to realize these forecasts, first the identification of problems of development of small and medium enterprises in forestry in the primary process of wood is necessary, followed by the definition of directions for improvement of the present situation.

5.2 Recommendations for improvement and development

5.2.1 Identification of development programme

1) The establishment of small companies which will be hired in operations in forestry and the primary processing of wood requires **specific financial investments** which usually necessitate different sources of financing. The technology which is used in operations of forest utilization are on a relatively low level. The equipment for work is outdated and in most of cases has deteriorated. This equipment is a huge polluter of the environment and provides inadequate protection for workers; in addition, costs are higher. Acquiring new equipment for work creates decreased costs for production units, higher profits, a lower level of need for environmental protection and generally better conditions.

2) What makes a problem on the market is the lack of clear legal norms that would regulate the work of private companies, which have neither professional staff nor equipment available for operations in forestry. One reason for this problem is the lack of **licenses** for work on these operations. The level of knowledge and skill on operations in forestry need to be greatly improved. Employers should be obligated to hire qualified workers who are experienced in the use of motor chains and other machines. Not only would this practice result in greater safety for the workers, but also in better use of the wood volume of trunk, and thereby higher profit for companies. Education (through seminars and the awarding of certificates) should give the basic theoretical and practical knowledge of techniques of operation, safety at work, maintenance of equipment and instruments, as well as types and uses of protective equipment.

3) Informing the population about major issues connected to the **use of non-wood products** is necessary. Workers in buy out stations must be taught and educated and then through public information the local population can be introduced to these jobs. The market for non-wood forest products is undeveloped. Active work on the development of a market for these products is necessary in order to create safe market flows and better conditions for the management of these companies and to contribute to local economic development. Collecting, drying, storing, and processing must be based on the most commercially lucrative products, but in amounts that are specified by relevant institutions. So that the natural balance is not endangered, annual quotas that limit the amount collected on specific terrain should be taken into account,.

4) State policy should create **specific preconditions** for the development of entrepreneurs in the forestry sector and wood-processing industry. A systematic approach should be undertaken using legislative, institutional and financial means to:

- exempt from tax obligations firms whose activities are in the forestry sector (a better graded system of taxation of small and medium enterprises in this field);
- ease custom duties on imports of specialized equipment which is not locally produced and is used for work in the field of forestry;
- stimulate financial institutions to provide better conditions for services in the forestry sector;
- create an educational role by the public sector for the support of private forest owners;
- support the establishment of associations of private forest owners on the local and national level as well as the creation of clusters for primary wood processing (horizontal and vertical connections between small and medium enterprises)
- define and establish what is needed, including laws that directly or indirectly influence forestry, in order to successfully enact specific economic measures. Define especially the role of local communities in managing state forests and forest land in the territory of the municipality of Majdanpek.

5) An important current problem concerning the **level of cooperation** between different sector companies, such as, for example, between SME and sector institutions, is unacceptable. Also, because **private forest owners are not organized**, a significant amount of production potential stays unrealized in private forests. Accordingly, it is necessary to initiate or support initiatives for cooperation between private forest owners, for horizontal and vertical cooperation of the SME, and for cooperation of the SME with all other sector organizations, which can be done by forming associations of private owners and clusters of sector companies and institutions.

5.2.2. Directions for future development

1) Promotion and financial support of development of SMEE in forestry and in primary processing of wood

Building an institutional base and overcoming administrative barriers for the purpose of the successful management of small and medium enterprises and the creation of a competitive market economy in Serbia was recently completed primarily by adopting a law on business activities and a law on the registration of business subjects, by the establishment and work of Serbian business registration agencies as well as by a Republic network agency of centers and offices. An agency for the development of SMEE was established to support (help, educate and protect) the development and interests of SME, which should bring a harmonization of the business structure, the dynamics of the business development and an alleviation of economic flows on national, regional and local levels. However, the Regional center for development of SMEE in Zaječar and the recently-established regional center office in Bor have withheld this type of support from the SME in Majdanpek .

Interviewed entrepreneurs from the forest sector are not sufficiently aware of the possibilities and sources of financing. Although two companies competed for funds[24] from the fund for development of RS, interest groups in this sector must be **better informed** about ways and possibilities for financing (credit for most non-developed municipalities, subvention credit for citizens and economy, self-financing credit, start-up credit…).

2) Defining the norms and supervision of SME in forestry

A newly-drafted law on forests calls for the establishment of a Chamber of engineers of forestry in Serbia which will grant licenses as a condition for conducting expert work in forestry. Setting up the norms as to the licensing of companies will in great measure determine the status of this sector. Considering that most companies in forestry, especially those dealing with cutting and captivation of wood assortments, hire a non-qualified working force which is not reported and comes from abroad, regulative measures will contribute to the management of such issues as hiring a local work force. It is necessary to strengthen the **inspection and control of companies** (reporting of temporarily-resident workers, payment of residence tax, social and health insurance of workers…). This problem is recognized throughout Serbia and is due in part to the fact that the PE managing the forest are bound by no pre-established selection criteria for hiring a company .

[24] The foundation for the local economic development of the municipality of Majdanpek represents a specific solution through which the municipality achieved the institutionalization of local economic development and which was revealed as a good practical example. With the support of the Foundation established in 2005, 126 credit demands worth 206 million CSD from the Fund for the development of the Republic of Serbia have been realized. The Foundation intervenes and gives expert and technical support to applications invited from the Public, by giving, within the framework of the program, funds for support of competition and innovations of SMEE, business incubators and clusters for 2009, open competition for beginners without mortgages, start-up credits for entrepreneurs, and private bodies. One local factor and impulse measure for the development of SMEE represents an initiative of the municipal authority in Majdanpek, that is to establish a Sector for business and public activities at the beginning of 2002 not increase local taxes which are 60% higher than in other municipalities in Serbia. The Parliament of the municipality of Majdanpek in 2006 brought a declaration on special conveniences and subsidies for investors in the territory of the municipality of Majdanpek. This initiative for local self-government represents not only a clear attitude and awareness concerning the need for support of the development of SMEE, but also a willingness to support and cooperate with the local community to increase the use of local potential and the advantage of intensive development of SMEE, and thereby enable the basis for the development of the local economy.

3) Support in making business plans

Technical support and a strong database about the local potential of resources are necessary both for starting a business as well as for its improvement and for investment in expanding its capacities. Municipal bodies and the Fund for local economic development of the municipality of Majdanpek reserve their support for the promotion of an idea intended to realize a project of an established company (registration, creating documents, writing a business plan, collecting additional documents).

Making plans regarding resources of other non-wood products is restricted in part by the permission from relevant institutions (Institute for nature protection, Ministry of agriculture, forestry and water management). In this field, the support of local bodies is to some degree necessary, for information on available funds is based on the character of the work force hired for these operations.

4) Promotion of the use of non-wood forest products

It is necessary to stress to the local population the potential sources of revenue and possibilities for employment of the non-wood potential of forests in the municipality. Realization of this potential would allow huge possibilities for employment of endangered groups of the population, especially women. Promotion and marketing to start up these activities could create a better image of the municipality as a region well-known for its healthy food. Supporting and direct subventions for creating a **broader network of buy out stations** would, with adequate promotion, be a stimulus to hire the local rural population as a source of revenue derived from the collection of medicinal herbs, mushrooms, forest fruitage etc. Proximity to agricultural activity is a comparative advantage.

Readiness for investment in processing facilities which will process collected products must be supported in very high measure by the municipality, since investments in this primary process are not high and create additional value.

5) Promotion of organized owners of private forests and the formation of clusters

Although forests under state ownership are the most representative category in the forest fund of the municipality of Majdanpek, a significant volume of wood and non-wood products is in **private forests**. However, owners in the private sector are not organized which is a problem that makes strongly-planned production impossible.

The organization of forest owners represents an **effective mechanism** for inducing and developing cooperation between owners of small forest units, and a similar possibility to the larger forest complexes, because from the point of view of the owners as well as demands by the state, cooperation between owners, in addition to improving the management of forests and production of trees, can, through elimination of the effect of borders between owners, bring about sustainable management.

Potential opportunities for organized owners and their strengths are:

- the possibility of sharing equipment, the costs of acquiring instruments for production, and the cost of technical, expert services;
- joint activities in forest protection;
- the construction and maintenance of roads;
- joint marketing activities;

- lobbying and representation of member interest;
- use of joint knowledge and experience;
- sharing of information;
- financial aid;
- providing subventions and credit;
- providing forest management services to owners who are absent;
- physical consolidation of very small forest properties;
- gathering sufficient forest area to be qualified in the process of forest certification;
- development of local brands of wood products;
- motivation for reforestation

Concrete activities by the municipality intended to **promote and support the organization of forest owners** should mobilize the owners and, with the production of higher amounts of quality wood assortments (in private forests fuel wood is most produced and cuttings are under planned yield) and representation of owners' interests, the initiation for planned production, mutual cooperation and sustainable management .

In this process, local self-government of forest owners must establish **partner relationships**, and mutual activities, so that different goals, from mutual educational programs to activities on construction and maintenance of the forest infrastructure, can be realized, Experiences of neighboring countries (Croatia and Slovenia) and recent experiences of our own country (PFO Podgorac and PFO Selačka) reflect the possibility for different actions by local self-government and associations of forest owners.

Similar to the organization of forest owners, concrete activities to initiate horizontal and vertical cooperation between current sectors of the SME are necessary. This can be obtained through the establishment of **cluster organization** of participants in value added chain where municipal authority can participate also. The huge number of existing private entrepreneurs and small companies for charcoal production within the territory of municipality of Majdanpek needs systematic approach and organized activities through certain type of association and initiative for that can come from the side of local authority.

The municipality and municipality institutions and bodies in this process should provide information, do promotion, be procurators and educators. Of special interest are the **procurement and promotion functions** of the municipality, evident in interest by local entrepreneurs and the attraction of foreign investments.

Additionally, primarily through the creation of an organized network of suppliers of material and companies that provide services, clusters can enhance the development of business practice in forestry and the wood industry, and create an attractive climate for foreign and domestic investors in the development of the wood industry and similar activities.

5.3 Potential contribution to sustainable development of local communities

One of the basic concepts of natural resources and environment economics is the concept of sustainability or **sustainable development**. Sustainable development appears as the essential prerequisite, but the crucial goal is the efficient use of natural resources which deservedly is central to discussion of the long-term prospects of the survival and progress of humanity. Sustainable development strives to create and save a better world with a balance of social, economic and ecological components. A harmonious relationship between ecology and economy is a prerequisite to the preservation of natural wealth for future generations. The concept of sustainable development is based on 3 pillars, economic, social and environmental, and is traditionally applied in the forestry sector primarily through sustainable forest management (sustainability of return and income).

By respecting the ecological principles of conservation and improving the quality of the environment, it is possible to make a positive influence on the development of the economy of this area, which will certainly contribute **to the improvement of the quality of life** of the local population.

Potential benefits of community policy to the development of small and medium enterprises in the forestry and wood industry are reflected in the following:

- development of private entrepreneurship,
- creation of opportunities for the establishment of small and medium enterprises based on raw materials from the forest complex (crafts and semi-industrial production based on wood, food processing, etc..) and the provision of different types of services;
- potential development of rural tourism,
- employment of local population,
- keeping highly educated personnel in the area of the municipality,
- increased incomes and improved standard of living of the rural population,
- local community development, especially in rural areas.

It has already been pointed out that private entrepreneurship is the backbone of economic development, both for the state and all of society, including the local economy and local communities. The municipality's forest resources, especially with their territorial percentage and expressed potentials, can initiate the economic development of the municipality.

As well, the rich forest resources and the attractive natural and cultural heritage of the municipality create exceptional conditions for the development of **eco-tourism and rural tourism.**

The importance of small and micro enterprises for rural areas is significant because of the possibilities of new jobs for the unemployed (**reduction of unemployment**) and the provision of additional funds for the municipality budget. A number of young people, especially people from rural areas, will stay in the rural areas and thereby indirectly have an effect on and improve the living conditions of the local community.

In addition, the introduction of licenses for private companies betters the conditions of employment of educated staff, primarily forestry engineers, and at the same time improves the quality of work carried out, increases safety and maintains the quality of the environment. Furthermore, establishing these companies creates competition in the labor market.

All this, together with the planned activities and support from the municipality through entrepreneurship initiatives, can contribute to an **increase in income** of the local population and **accelerated development** of the local community, especially the rural areas.

Besides these direct benefits, additional benefits would be indirectly realized and reflected in:

- rapid and balanced regional development;
- preservation and sustainable use of natural resources;
- community sustainable development.

Eastern Serbia, in particular the Bor district, previously represented the backbone of economic development of the Republic of Serbia. Too much mono-structural economy based primarily on the exploitation of mineral wealth has, however, disallowed the development of other economic branches. Nevertheless, the great natural and cultural heritage of this area offers a significant opportunity for its re-development, primarily through forestry, agriculture and tourism, which can be carried out using enterprising initiatives. In this context, the development of these initiatives in the area of the Majdnapek municipality will indirectly affect the **development of the entire region.**

In addition to the economic development of the municipality and the development of the local community, it is important to emphasize that the development of entrepreneurial initiatives related to the forestry and wood industry, and supporting activities related to forest resources, can contribute to the preservation of natural resources. This would provide environmental, economic, and social components of **sustainable development.**

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ANNEXES

ANNEX 1: Interview with forestry and wood industry entrepreneurs from MAJDANPEK municipality

INTERVIEW WITH FORESTRY AND WOOD INDUSTRY ENTREPRENEURS FROM MAJDANPEK MUNICIPALITY

I. GENERAL INFORMATION ABOUT RESPONDENT :

I.1. Name: _____

I.2. Address and contact number:_____

I.3. Age: _____

I.4. Occupation: _____

II. GENERAL INFORMATION ABOUT ENTERPRISE:

II.1. Enterprise name:_____

II.2. Year of establishment:_____

II.3. Activities:_____

III. POTENTIAL FACTORS

III.1. Company for wood cutting and wood products transport – mechanical and technical equipment

III.1.1. Chainsaw

III. 1.1.1.Number of chainsaws: _____

III.1.1.2. Types: _____

III.1.1.3. Age: _____

III.1.1.4. Average number of working days in the year: _____

III.1.2. Forest tractors and adapted agricultural tractors for work in forest

III.1.2.1. Number of tractors: _____

III.1.2.2. Types: _____

III.1.2.3. Age: _____

III.1.2.4. Average number of working days in the year: _____

III.1.3. Motor skidder

III.1.3.1. Number: _____

III.1.3.2. Type (or effective power): _____

III.1.3.3. Age: _____

III.1.3.4. Average number of working days in the year: _____

III.1.4.Hydraulic splitters

III.1.4.1. Number: _____

III.1.4.2. Type (or effective power): _____

III.1.4.3. Age: _____

III.1.4.4 Average number of working days in the year: _____

III.1.5. Hydraulic cranes

III.1.5.1. Number: _____

III.1.5.2. Type (or effective power): _____

III.1.5.3. Age: _____

III.1.5.4. Average number of working days in the year: _____

III.1.6. Trucks

III.1.6.1. Number: _____

III.1.6.2. Types:_____

III.1.6.3. Age: _____

III. 1.6.4. Average number of working days in the year: _____

III.1.7. Other machinery for work in forest

III.1.7.1. Category:_____

III.1.7.2. Number: _____

III.1.7.3. Type (or effective power): _____

III.1.7.4. Age: _____

III.1.7.5. Average number of working days in the year:_____

III.1.7.6. Category:_____

III.1.7.7. Number: _____

III.1.7.8. Type (or effective power): _____

III.1.7.9. Age: _____

III.1.7.10. Average number of working days in the year: _____

III.1.7.11.Category:_____

III.1.7.12. Number: _____

III.1.7.13. Types:_____

III.1.7.14. Age: _____

III.1.7.15. Average number of working days in the year: _____

III.2. Wood processing companies – mechanical and technical equipment

III.2.1. Type of process:_____

III.2.2. Average number of working days in the year: _____

III.2.3. Main elements of lodge: _____

III.2.4. Capacity:_____

III.2.5. Annual input of materials:_____

III.2.6. Raw materials source (private, state or own forests %):_____

III.2.7. The main species:_____

III.2.8. Average efficiency: _____

III.2.8. Annual production (by assortment): _____

III.3. Charcoal producers

III.3.1. Number of charcoal kilns:
_____

III.3.2 Capacity: _____

III.3.3. Annual number of cycles: _____

III.3.4. Annual input materials: _____

III.3.5. Raw materials source (private, state or own forests %):_____

III.3.6. The main species:_____

III.4. Companies for non wood products collecting and trading – basic information about repurchase station

III.4.1. Name of repurchase station:_____

III.4.2. Location of repurchase station:_____

III.4.3. What products were purchased?:_____

III.4.4. Repurchase station capacities (by products) :_____

III.4.5. Raw material source (private, state or own forests %):_____

III.4.6 The average annual turnover of products (by products) :_____

III.4.7. Storage method and storage capacity (refrigerators, drying, etc.): _____

III.4.8. Products transport (transport capacity): _____

IV. LABOR FORCE

IV.1. Number of labors: _____

IV.2. Gender structure: _____

IV.3. Age structure: _____

IV.4. Qualification structure: _____

IV.5. Average number of working days in the year: _____

IV.6. HTZ equipment: _____

IV.7. Average performance (expressed depending on the job)

V. MARKETING AND TRADE

V.1. Forest services

V.1.1. Clients: _____

V.1.2. Terms: _____

V.1.3. Average volume of work: _____

V.1.4. Terms and implementation of deadlines:_____

V.1.5. Terms of payment: _____

V.1.6. Problems: _____

V.1.7. Competitors: _____

V.2. Wood and wood products trade

V.2.1. Customers: _____

V.2.2. Trade conditions: _____

V.2.3. Average amount of sold assortment (by assortments): _____

V.2.4. Terms of payment: _____

V.2.5. Problems: _____

V.2.6. Competitors: _____

V.3. Charcoal trade

V.3.1. Customers: _____

V.3.2. Trade conditions: _____

V.3.3. Terms of payment: _____

V.3.4. Problems: _____

V.3.5. Competitors: _____

V.4. Non-wood products trade

V.4.1. Customers: _____

V.4.2. Trade conditions: _____

V.4.3. Average annual amount of sold products (by product) _____

V.4.4. Terms of payment: _____

V.4.5. Problems: _____

V.4.6. Competitors: _____

Thank you for your attention and time

ANNEX 2: THE LIST OF INTERVIEWED PERSONS

NO	ENTREPRENEURS	SME	ACTIVITY	TELEPHONE NO.
1.	Jovan Jovanović	Beomark industry Ltd	Production of lumber/wood cutting and wood product transportation	+381 63/401-423
2.	Siniša Boragić	Ltd Autoprevoznik Boragić	Forest roads construction / wood product harvesting and transport	+381 12/889-036
3.	Zoran Pavlović	SZR Ana - Mosna	charcoal production / wood product harvesting and transport	+381 63/459-753
4.	Jaroslav Stevanović	Fagos Ltd	Harvesting, skidding, wood product transport and charcoal production and sales	+381 30/85-387
5.	Danilović Miodrag	SZR Ložač	Harvesting, skidding, transport and wood product processing	+381 30/85-386
6.	Anđelko Maglov	SZR Maglov	Harvesting, skidding, transport and wood product processing	+381 11/25-25-181
7.	Lučić Miodrag	Ltd Ljubišnja	Harvesting, skidding, transport and wood product processing	+381 65/8377-859
8.	Komljenović Stevan	SUR Galup - Loznica	Carrying out fire wood	+381 64/36-39-634
9.	Bibić Gojko	SUR Bibić Gojko	Carrying out fire wood	+381 63/8339-452

ANNEX 3: PERSONS WHO ARE PROFESSIONALLY CONSULTATED

NO.	NAME AND SURNAME	ENTERPRISE	POSITION	TELEPHONE NO
1.	Jasna Milošević	PE “Srbijašume” – FD “Severni Kučaj” - FO “Majdanpek”	FO Chief	+381 64/81-55-105
2.	Dejan Balabanović	PE “Srbijašume” – FD “Severni Kučaj” - FO “Majdanpek”	Officer for private forests	+381 63/ 81-15-222
3.	Dragan Čančar	PE “Srbijašume” – FD “Timočke šume” – FO “Donji Milanovac”	FO Chief	+381 64/ 81-55-132
4.	Živorad Popović	PE “Srbijašume” – FD “Timočke šume” – FO “Donji Milanovac”	Officer for private forests	+381 63/ 76-16-657
5.	Saša Nestorović	PE NP “Đerdap”	Director	+381 63/ 10-85-312
6.	Marina Milunović	RUSNER-Drvo ltd	Director	+381 61/ 27-44-922
7.	Dobrivoje Davidović	PE „Srbijašume“	Deputy director	+381 64/ 81-555-78
8.	Dejan Baković	Institute for nature protection	Professional associate	+381 63/ 381-862

ANNEX 4: LIST OF POTENTIAL INVESTITORS AND SOURCE OF FINANCING /INVESTMENTS FUNDS IN SME IN SERBIAN FORESTRY

Potential investment companies in SME in Serbian forestry

ROSNER drvo Ltd
Kneginje Milice 87/9
035/240-922
Nikola Stanojević

ESTERHAZY Forst- und Naturmanagement Gesamtleitung Forst- und Naturmanagement
Esterházyplatz 7
7000 Eisenstadt
http://www.esterhazy.at/de/forst-natur/Kontakt.htm
e.prieler@esterhazy.at

REVIT-reststoffen voor industriele teopassingen
Heiko ter Horst
Ribeslaan 85
3053 ML Rotterdam
The Netherlands
revit@hetnet.nl

ITALSVENSKA SpA (Zelena Drina i Dunav JSC)
Via Garibaldi 2
34070 MARIANO DEL FRIULI (GO)
Italy
Phone : +39 0481 637611
Fax : +39 0481 637690
http://www.crabo.it/htm/english/GBDefault.htm
Zelena Drina Ltd.
Milana Obrenovica bb, 31250 Bajina Bašta
031/ 851044

FANTONI SPA (DP SPIK- Sloga Ivanjica)
Venijamina Marinkovića 139, 32 250 Ivanjica
032/662-552
www.spik.co.yu
http://www.fantoni.it/Home.html - FANTONI Group

Potential domestic sources of financing and credit incentives in forestry and wood-processing industry

Micro development fund Ltd.
www.mdf.org.yu/
Svetozara Markovića 17, 11 000 Beograd
Tel/fax: +381 11/3030-667; 3030-669
E-mail: office@mdf.org.yu

Fund for development of Republic of Serbia
www.fondzarazvoj.sr.gov.yu/

Ministry for National investment plan
www.mnip.gov.rs/
Vlajkovićeva 10, 11 000 Beograd
+381 11 361 75 83, 361 76 28

Republic agency for development of small and medium enterprises and enterpreneurship in Serbia
www.sme.sr.gov.yu/
Topličin venac 19
11 000 Beograd
+381 11 33 46 107
E-mail: office@sme.gov.rs

Cross Border Cooperation
http://www.evropa.gov.rs/Evropa/PublicSite/CBC/NP_Default.aspx
Local office Bor
Moše Pijade 19, 19 210 Bor
+381 30 458-295
Vasilija Stanić – local expert
E-mail: vasilija.stanic@mfin.gov.rs

SMECA (Serbian and Montenegro export credit agency) – Fund for insurance and financing services for export-oriented businesses
www.smeca.co.yu
Cara Lazara 3, 11 000 Beograd

Agency for insurance and financing services for export JSC
Bulevar AVNOJ-a 124, 11 070 Novi Beograd
011/ 3118 016

Guarantee fund
www.gf.co.yu
Takovska 46, 11 000 Beograd
011/207-48-10

SIEPA - Serbian investment and export promotion agency
http://www.siepa.gov.rs/site/sr/home/
Vlajkovićeva 3/V, 11 000 Beograd
Office@siepa.gov.yu

Credit offers of business banks

AGROBANKA AD
AIK BANKA
ALPHA BANKA AE
BANCA INTESA AD
EFG EUROBANK AD
ERSTE BANK AD
FINDOMESTIC BANKA
HYPO ALPE-ADRIA-BANK AD
JUMBES BANKA AD
KBC BANKA AD
KOMERCIJALNA BANKA AD
LHB BANKA AD
MARFIN BANK
MERIDIAN BANK AD
OTP BANKA AD
PIRAEUS ATLAS BANK
POŠTANSKA ŠTEDIONICA AD
PRIVREDNA BANKA AD
PROCREDIT BANKA AD
RAIFFISENBANK AD
SOCIETE GENERALE BANK SRBIJA AD

List of leasing companies that take part in realization of Governmental programs for SME development

ALCS - ASOCIJACIJA LIZING KOMPANIJA SRBIJE
EFG LEASING DOO
HVB LEASING DOO
HYPO ALPE-ADRIA-LEASING DOO
INTESA LEASING
KB LEASING DOO
LB LEASING DOO
LIPAKS DOO
PORSCHE LEASING DOO
PROCREDIT LEASING DOO
RAIFFEISEN LEASING DOO
S-LEASING DOO
SOGELEASE SRBIJA
TBI LEASING DOO
VB LEASING DOO
ZASTAVA ISTRABENZ LEASING DOO

Credit lines of international financial institutions

EAR (European agency for reconstruction) - Fund for revolving credits

Unikredit banka Srbija a.d. Beograd (www.hvb.co.yu)
Komercijalna banka a.d. Beograd (www.kombank.com)
Erste banka a.d. Novi Sad (www.novban.co.yu)
OTP banka Srbija a.d. Novi Sad (www.otpbanka.co.yu)
Čačanska banka a.d. Čačak (www.cacanskabanka.co.yu

EIB (European investment bank)
Unikredit banka Srbija a.d. Beograd (www.hvb.co.yu)
Komercijalna banka a.d. Beograd (www.kombank.com)
Erste banka a.d. Novi Sad(www.erstebank.co.yu)
Čačanska banka a.d. Čačak (www.cacanskabanka.co.yu)
Privredna banka a.d. Beograd (www.pbbad.com

Credit line of Government of Republic of Italy
BANCA INTESA a.d. Beograd (www.bancaintesabeograd.com)
UNIKREDIT BANKA SRBIJA a.d. Beograd (www.hvb.co.yu)
KOMERCIJALNA BANKA a.d. Beograd (www.kombank.com)

KfW (German bank for reconstruction, Frankfurt)
UNIKREDIT BANKA SRBIJA a.d. Beograd (www.hvb.co.yu)
OTP BANKA SRBIJA ad Novi Sad (www.otpbanka.co.yu)

EBRD (European bank for reconstruction and development)
UNIKREDIT BANKA SRBIJA a. d. Beograd (www.hvb.co.yu)
ČAČANSKA BANKA A.D. Čačak (www.cacanskabanka.co.yu)

EFSE (European fund for Southeast Europe)
Unikredit banka Srbija a.d.Beograd (www.hvb.co.yu)
Komercijalna banka AD.Beograd(www.kombank.com)
Procredit banka (www.procreditbank.co.yu)
OTP banka Srbija a.d.Novi sad (www.otpbanka.co.yu)
Procredit leasing (www.procreditlesing.co.yu)
NLB-LHB banka a.d.Beograd (www.ppbank.com)
Privredna banka a.d.Beograd(www.pbbad.com)

Credit line NLB LHB bank ad Beograd in cooperatin with KfW and EFSE
NLB LHB banka a.d.Beograd (www.ppbank.com)

Local supporting organizations and institutions

Fondacion for local economic development of Majdanpek municipality
Trg oslobođenja 19
Živka Krstić, 064/85 10 292
030/590 577, 581 371
E-mail: kler_dm@ptt.yu

Regional center for support of rural development Zaječar
Trg oslobođenja 1, 19000 Zaječar
019/426-376, 426 377
E-adresa: rrc@raris.org
www.raris.org/ruralni_razvoj.htm
Coordinator: Vladan Jeremić 064/8510-265, vladan.jeremic@raris.org
Manager: Jelena Nakić 064/8510-281, jelena.nakic@raris.org

RARIS – Regional agency for development of Eastern Serbia
Trg oslobođenja 1, 19 000 Zaječar
www.raris.org
e-mail: office@raris.org

Regional chamber of commerce Zaječar
National employment service Zaječar
www.rpk-zajecar.co.rs

Agency for wood – Wood industry cluster from Serbia
Viline Vode br. 6,
11000 Beograd.
tel/fax: +381 11 321 7494
tel: +381 11 339 2473, 339 2030
email: office@agencijazadrvo.co.yu
www.agencijazadrvo.co.yu

Association of private forest owners Podgorac
Vojislav Milijić, secretary of association
Tel: +381113561774
Mob: +38162553089
e-mail: vojmil@sezampro.yu and vojmil@vps-srbija.org

Internet portal: Voice of private forest owners in Serbia
www.vps-srbija.org

ANNEX 5: VOCABULARY OF PROFESSIONAL FORESTRY TERMS

High Forest – forest from seed (generative origin), higher and better production potentials (predispositions for production of better and more qualitative wood sortiments than low forests)

Coppies (low forests) – forest from sprout-stump (vegetative origin), lower productive predisposition and capacities for production of qualitative wood sortiments than high forests

Low degradated forests – low forest that significantly lost quality and ability of growth due to unfourable biotic and abiotic factors including human activity

Forest accessibility (openness) – ratio between length of roads inside the forest complex and area of forests (1m/ha or 1km/1000ha)
Internal forest accessibility – means length of soft forest roads, main hard and public roads within forests per area of forests (1m/ha or 1km/1000ha)
External forest accessibility – means length of local, regional and magistral roads per area of forests (1m/ha or 1km/1000ha)
Skiding road – secondary soft forest roads which are used for tractor driving and collection of wood sortiments

Technical wood – wood from which technical characteristics are used, i.e. wood dedicated for further mechanical - technical processing, wood that has tecnical use (trunk for veneer, trunk for cutting, technical round timber)

Fire and cellulose wood – wood concentrated in logg storage where thermal and chemical characteristics are used (cellulose wood and fire wood)

Total standing volume – overall, total wood mass (volume) that is in forest in standing, vital condition (m^3)

Average standing volume – total wood mass (volume) that is in forest in standing, vital condition, position presented on area unit (m^3/ha)

Annual volume increment – represents increasing of wood volume in one year period due to tree growing (m^3)

Average volume increment – represents increasing of wood volume in one year period due to tree growing presented on area unit (m^3/ha)

Wood sortiments – products from wood whose characteristics are defined by appropriate standards

Forest management – represents forest silviculture (basic and extended reproduction), harvesting of forests, forest land and other forest potentials, building and maintaining of forest roads and other forest objects which have role in forest management and enhancement of all forest functions

Stand – part of forest which is different from other parts by tree species, age, development stage, origin, silviculture form and management system (method)

Main yield – amount of wood prescribed by forest management plan as main cutting from mature or young stands if there are certain reasons to use them before harvesting age

Previous yield – amount of wood prescribed by forest management plan obtained from selective cutting within young, middle age or ripens stands

Accidentally yield – amount of wood obtained as result of natural disasters (snow, wind, ice, fire), plant disease, attack of harmful (destructive) insects

Total yield – sum of main, previous and accidentally yield

Management unit – territorial entity (unit) of forest, forest and other land that are constituted from forests that have same form of property

Pellets – refined homogenous form of fuel produced from wood residuals arrised in primary wood processing so as residuals from other forms of wood processing and after that their mincing to wood flour and pressing in special compresses

General forest management plan – forest management plan for forests within forest district, as for forests within national park and those plans are prepared by calculation of data from special forest management plans and programs for private forests management

Special forest management plan – planning document which arrange type and scope of activities for management unit based on forest condition and objectives constituted in general forest management plan

Forest silviculture – consist of activities on forest regeneration (natural and artificial) and forest care, afforestation and production of forest reproductive material

Forest harvesting – consist of activities on tree cutting, processing, transport and sale of wood sortiments so as use of non-wood forest products

Forest regeneration – process of raising, establishing of new young forests in place of the existing forests naturally (rejuvenation) or artificially raising

Sanitary tree cutting – cuttings that eliminate damaged, sicken and dry trees in order to disable destructive influence and possible chaining of damages

Forest infrastructure – objects, forest roads, transport skidding roads and other infrastructure which are primarily intended for forest management

Forest residual – parts of loggs that stay in forest after cutting as useless for further production (except parts of loggs and branches above 7cm)

Forest order – situation in forest that provide conditions for their maintain, regeneration and improvement/enhancement and specially: fire protection, plant diseases and locust-tree, land protection from emergence and development of erosion processes due to tree cutting or wood elimination from forests and progeny protection

Forest protection – system of measures and activities that are conducted in order to provide forest survival, preservation and enhancement of forest health condition and vitality