FORESTS AND NATURAL RESOURCES CONSERVATION

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Abstract

This paper discusses the current trends in forestry sector development (including in Bulgaria). The relevance of the topic stems from the importance of forests for preserving the other natural resources in order not to allow the natural balance of the planet to be disturbed. From this point of view, emphasis is placed on the dynamic changes in economy, and in particular in the agricultural sector, which require the implementation of a responsible (incl. national) forest policy, in terms of: climate change, conservation of biological and landscape diversity in forest areas, natural disasters (forest fires), etc. That is why the importance of forests as a renewable resource for the conservation of natural resources is manifested in the fulfillment of their social, environmental and economic functions. The focus is on forest certification and the use of certification as a modern tool for sustainable forest management. The aim is to promote effective forest management for forest ecosystems preservation, incl. biodiversity, carbon dioxide capture and storage, soil protection and other factors. In this respect priority is given to high conservation value forests, maintaining the so-called islands of old age, preservation of minimum quantities of dead wood in forest areas, etc.

Key words: *forest, policy, eco-system, natural resources, conservation*

1. INTRODUCTION

At European level, the strategic framework for forestry policy is governed by the so-called EU Forest Strategy.

At national level, the long-term sustainable management policy is set out in the National Strategy for Forestry Development in the Republic of Bulgaria for the period 2013-2020. It sets out three strategic objectives – Table 1:

Table 1. Strategic objectives for sustainable national forest management

№	Strategic objective
1.	Ensuring sustainable forestry sector development by achieving an optimal balance between the environmental function of forests and their ability to provide material benefits and services over the long term
2.	Strengthening the role of forests in securing economic growth in the country and steady (balanced) territorial socio-economic development
3.	Increasing the forestry sector contribution to the green economy

Four priorities and twenty measures for forestry sector development by 2020 are defined based on the above-stated strategic objectives – Table 2:

Table 2. Priorities and measures for the national forest sector development by 2020

Priority	**Measure**
1	**2**
1. Maintaining viable, productive and multifunctional forest ecosystems to mitigate the negative impacts of climate change	1.1 Increasing the forest size, the timber stock and carbon stock in forest areas
	1.2 Improving the forest management
	1.3 Increasing the effectiveness of forest fires prevention and combating the illegal activities in forests
	1.4 Increasing the sustainability and adaptability of forest ecosystems to climate change
2. Conserving, restoring and maintaining the biological and landscape diversity in forest areas	2.1 Improving the system for planning and implementing activities related to the conservation of the biological and landscape diversity in forest areas
	2.2 Developing the protected areas network, including through expanding the operation of the financial mechanisms for improving the management of forests in Natura 2000 protected areas
	2.3 Maintaining and developing the forest genetic resources conservation system
	2.4 Improving and increasing the game and fish populations for preserving the biodiversity and sustainable development of forest ecosystems
3. Improving the viability and competitiveness of the forestry sector	3.1 Providing sustainable planning of forest areas activities
	3.2 Effective management and sustainable development of state enterprises under art. 163 of the Forest Act
	3.3 Promoting forest owners associations and optimizing public-private partnership in the forestry sector
	3.4 Efficient absorption of the resources from European and international funds and programmes
	3.5 Promoting employment and entrepreneurship in forests and improving the quality of the professional qualification of forestry sector workforce
	3.6 Developing research activities and linking them with the needs of the forestry business
	3.7 Active participation in the preparation and implementation of the EU policies, related to the forestry sector and the international processes of sustainable forest development
	3.8 Providing information, publicity and transparency and applying the principle of partnership in forest sector sustainable management
4. Using the forestry sector potential for green economy development	4.1 Sustainable production and consumption of biomass as a renewable energy source
	4.2 Promoting the process of forest area certification
	4.3 Effective and sustainable use of the tourism potential of forests and developing recreational activities in them

These priorities find expression in the implementation of the requirements set by the specific measures as follows:

Measure 1.1 focuses on increasing the afforested areas, maintaining and increasing the timber and carbon stocks, with sustainable annual yield of timber and timber products.

Measure 1.2 creates conditions for: creating and maintaining multifunctional forest ecosystems, increasing forest productivity, improving their resistance to diseases, pests, natural disasters and other factors.

Measure 1.3 aims at increasing the efficiency of forest fires prevention and optimizing the system for control and preservation of forests and game.

Measure 1.4 aims at increasing the sustainability and adaptability of forest ecosystems to climate change.

Measure 2.1 focuses on improving the system for planning and implementing activities related to the conservation, restoration and maintenance of the biological and landscape diversity – part of the natural potential for sustainable development of forest areas.

Measure 2.2 maintains the development of the Natura 2020 protected areas network and creates conditions for improving their management.

Measure 2.3 aims at increasing the performance of specialized governmental units in the approval, registration and cancellation of the sources of the forest seed-production base, the gathering and harvest of forest reproductive materials, their qualification, trade and import.

Measure 2.4 focuses on increasing game and fish populations to preserve the biodiversity and sustainable development of forest ecosystems.

Measure 3.1 focuses on improving forest planning through developing national strategic documents, regional development plans for forest areas and others that will provide a comprehensive, integrated and sustainable development of the forest areas.

Measure 3.2 aims at improving the economic activities (investment, marketing, social) carried out by state enterprises under art. 163 of the Forest Act, in compliance with the principles for multifunctional management of forests.

Measure 3.3 creates conditions for sustainable development of forests in non-governmental forest areas through: encouraging the association of forest owners to effectively carry out forestry activities of mutual interest and evaluating and optimizing public-private partnership in the forestry sector.

Measure 3.4 is expected to make effective and efficient use of European and international funds and programmes and to enhance the trust of European and international partners.

Measure 3.5 aims to increase employment in the forestry industry, logging and other forestry and hunting activities and develop forestry entrepreneurship.

Measure 3.6 supports the development of scientific-applied research in priority trends for the forestry sector and increasing their efficiency and effectiveness.

Measure 3.7 is aimed at strengthening the participation of the Republic of Bulgaria in the European Union activities related to the forestry sector and in the international processes for sustainable forest management.

Measure 3.8 focuses on:

- establishing a mechanism to implement the partnership and information provision principle aimed at involving non-governmental organizations and the public in the decision-making and implementation process.

- organizing consultations to take into account the views of all stakeholders and to reflect current policies.

Measure 4.1 creates conditions for meeting the national commitment to reach a 16% share of the energy from renewable sources in the gross final consumption after 2020.

Measure 4.2 encourages the certification of forest areas by creating appropriate conditions for their development. Forest certification is a direct tool to guarantee the sustainable management of forest resources.

Measure 4.3 creates conditions for the sustainable use of forest areas as a tourism resource for the development of mountain, ecological, hunting and fishing tourism and other specialized forms of tourism, as well as the planning and development of recreational activities in them.

Measure 4.4 aims to evaluate the ecosystem services provided by forestry areas and to help identify and implement innovative financial mechanisms and incentives to promote the conservation and sustainable use of water resources and biodiversity through the Payments for Ecosystem Systems scheme (PES).

The vision, strategic objectives, priorities and measures presented in the National Strategy for Forestry Sector Development in the Republic of Bulgaria for the period 2013-2020 are the basis for the development of the Strategic Plan for Forestry Sector Development 2014-2023. It sets out the strategic objectives and the related priorities and operational objectives and activities by objectives realization – Table 3:

Table 3. Strategic objectives and priorities of the national forest sector for the period 2014-2023

Strategic objective	Priority
1. Ensuring sustainable forestry sector development by achieving an optimal balance between the environmental function of forests and their ability to provide material benefits and services over the long term	Maintaining viable, productive and multifunctional forest ecosystems to mitigate the negative impacts of climate change
	Conserving, restoring and maintaining the biological and landscape diversity in forest areas
2. Strengthening the role of forests in securing economic growth in the country and steady (balanced) territorial socio-economic development	Conserving, restoring and maintaining the biological and landscape diversity in forest areas
	Improving the viability and competitiveness of the forestry sector
	Using the forestry sector potential for green economy development
3. Increasing the forestry sector contribution to the green economy	Maintaining viable, productive and multifunctional forest ecosystems to mitigate the negative impacts of climate change
	Conserving, restoring and maintaining the biological and landscape diversity in forest areas
	Improving the viability and competitiveness of the forestry sector
	Using the forestry sector potential for green economy development

The presented laws, programmes, strategies and other documents, developed and adopted at national level, adequately reflect the significance of the forestry sector for the country's economy. The permanent updating of the legal and regulatory framework is a prerequisite for regulating the public relations in the forestry sector.

2. MATERIALS AND METHODS

In order to implement a sustainable forest policy at European level for the period 2014-2020, financial instruments are envisaged, the spending parameters of which are set out in the European Union Regulations (№ 1303/2013, №1300/2013, №1305/2013, № 1301/2013, № 1304/2013, № 1299/2013, № 1293/2013, etc.).

At national level the forest policy in the Rural Development Programme 2014-2020 envisages the following measures:

- Measure 8. Investment in the development of forest areas and improvement of forests' viability (with a budget of about EUR 65 million);

- Measure 15. Environmental services and climate services in forestry and forest conservation (with a budget of about EUR 15 million).

The total forest area includes afforested areas, land areas for afforestation and non-timber producing land. Information on the forest area for the period 2011-2014 is presented in Table 4:

Table 4. Forest area (thousand ha) for the period 2011-2014

Area (thousand ha)	**Year**			
	2011	**2012**	**2013**	**2014**
Areas by types of forests	**4148**	**4164**	**4180**	**4202**
Coniferous	1271	1267	1263	1261
Deciduous	2877	2897	2917	2941
High-stemmed	908	912	919	926
Low-stemmed	1969	1985	1998	2015
Incl. afforested area	**3775**	**3796**	**3811**	**3836**
Coniferous	1141	1138	1134	1133
Deciduous	2634	2658	2677	2703
High-stemmed	850	856	861	868
Low-stemmed	1784	1802	1816	1835

The forestry activities carried out are aimed at preserving and increasing the basic functions of forests through their cultivation, natural regeneration, conservation of genetic resources, maintenance and restoration of biological diversity, etc. Priority is given to the maximum utilization of the natural regeneration potential of forests in the management of forests. Information on forestry activities is presented in Table 5:

Table 5. Forestry activities in forest areas for the period 2011-2014 (ha)

Events	Year			
	2011	**2012**	**2013**	**2014**
Preparing the soil for afforestation	1603	1164	1337	1137
Afforestation	1498	1119	1252	1204
New afforestation	735	436	586	679
In mature non-renewable planting	745	642	595	478
Filling in sparsely forested areas	18	41	71	47
Creating intensive crops	666	619	622	431
Filling in crops	634	558	550	322
Cultivating crops	9218	7304	6571	7323

Maintaining the ecological functions of forests is a prerequisite for the economic sustainability of the forestry sector, and their preservation and (re)production have a social aspect.

The sustainable management of forest resources requires maintaining the health and viability of forest ecosystems through protecting them from diseases, pests and other factors of biotic and abiotic nature.

Forest genetics and selection provides quality reproductive material and helps to preserve biodiversity and the autochthonic and improved genetic resources. Table 6 presents information about forest seed production:

Table 6. Forest seed production for the period 2011-2014 (kg)

Indicators	Year			
	2011	**2012**	**2013**	**2014**
Picking pine cones	5869	12367	4557	3796
Gathering and harvesting seeds	23705	27094	23880	23783
Coniferous	429	2931	479	80
Deciduous types	23276	24163	23401	23703
Of them: oak acorn	18484	22301	22385	21653

The 2016 requirement that only certified operators should work in forests focuses on forest certification as a modern tool for sustainable forest management.

The nature of the forest certification system is expressed in encouraging the economic efficient forest management in accordance with the social needs of the local population and the need for environment preservation.

Forest certification emerged in the late 1980s and early 1990s as a mechanism for encouraging sustainable forest management in response to market demands. Certification itself is an assessment by a third independent party that forest management is carried out according to the requirements of a standard. In this way it is possible to:

- certify forest management – the forest certification mechanism is expressed in obtaining a certified

standard. The standard guarantees the balanced implementation of ecological, social and economic functions of forests. It contains criteria and indicators certifying the minimum conditions for the sustainable management of forest areas;

- track the production chain – a process of monitoring the channels through which the harvested forest resources are distributed from the place of origin in the forest to their receipt by the end user.

The use of eco-labels proves the origin of certified wood – a guarantor of responsible forest management.

The role of forest certification stems from the need to:

- protect the areas – water sources and river currents, which require:
    - limiting the intensive felling in the water catchment areas;
    - prohibition of felling on both sides of the riverbeds in order to avoid damaging the river ecosystem;
    - not tracing wood along the riverbeds to prevent the destruction of habitats of forest animals and river organisms on the one hand, and on the other – the destruction of river banks, a prerequisite for creating a landslide risk.
    - construction of facilities to prevent water in forest areas from becoming muddy when crossing the water source is necessary.
- protect vulnerable and endangered species and ecosystems, which requires:
    - identification and preservation of at least 5% of old-age forests to form the so-called islands of old age – forests 100, 200, 300 years old and over, creating natural conditions for the emergence of new species and maintenance of genetic diversity globally.
    - preservation of at least 10% of the stock of deadwood in forest areas;
    - ban to cut trees with hollows by local inhabitants and under which there are endangered plant species, etc.

Table 7 presents forest management in Bulgaria according to the requirements of the Forest Management Council.

Table 7. Certified forest areas in the period 2012-2015

Indicators	**Year**			
	2012	**2013**	**2014**	**2015**
Total area of certified forests (ha)	231 899	424 860	689 118	807 834
FSC Certificate – forest management and tracing the production (organizations and companies)	40	24	103	109
PEFC Certificate – tracing the production (organizations)	1	3	3	No data

Certified forest areas are expected to cover about 58% of the total area of certified state forests by the end of 2016.

3. RESULTS AND DISCUSSION

The importance of forests for preserving the natural resources lies in the implementation of their social, ecological and economic functions – Table 8:

Table 8. Forests and their role in fulfilling their functions

Functions of forests	Importance of forests
Environmental	protect the soil
	regulate fresh water supplies
	absorb carbon dioxide
	preserve biodiversity
	regulate local and regional climate
Social	create employment and help reduce poverty
	maintain the traditional cultural identity of local communities
Economic	provide material timber resources
	provide material non-timber resources
	provide non-material resources

The above-stated is a reason for focusing the attention on the following aspects:

Forests absorb water, which is conserved and passed gradually to the surface soil layers. This helps to limit the floods, and the stored amounts of rainwater are especially needed during periods of drought.

The protection of catchment areas near populated areas and their possibilities for use is appropriate in economic, ecological and social aspects.

By implementing the environmental functions of forests, the negative climatic challenges of the conservation of natural resources are limited. If incorrectly managed, they are also a source of carbon dioxide. That is why it is vital to maintain the forests, a natural absorber for capture and storage of carbon.

To reduce carbon dioxide emissions, various measures are used that help conserve and use sustainably the biodiversity – Table 9.

Table 9. Measures for reducing carbon dioxide emissions

Climate impact	Adaptation, based on ecosystem approaches
Increasing the drought	Using appropriate agricultural and forestry practices to increase the capacity for water retention and mitigate the consequences of drought
Excessive heat	Increasing green areas in cities to improve the microclimate and air quality
River floods	Maintaining and restoring marshes and river beds – natural buffers against floods
Increased risk of fires	Growing a variety of forests more resistant to pest attacks and with a lower risk of fire

Forests aid the circulation of air and the circulation of water on land. Contributing to the regulation of the local and regional climate limits soil drought, solves problems with water supply, etc.

Forest certification encourages the concept of high conservation value forests. It is used as a tool for sustainable forest management in decision-making on forest resources conservation. Forests of high conservation value are forests with one or more of the following characteristics – Table 10:

Table 10. High conservation value forests

High conservation values (HCV)	Characteristics of high conservation value forests
HCV 1	Forest areas with globally, regionally or nationally significant biodiversity.
HCV 2	Forest territories that include globally, regionally or nationally significant forests on a landscape level where viable populations of most or all of the really occurring species exist in their natural distribution and concentration levels.
HCV 3	Forest areas that are in or include rare, endangered or threatened ecosystems.
HCV 4	Forest areas that fulfil important natural functions in critical situations (for example, water retainers, etc.).
HCV 5	Forest areas, fundamental for satisfying the basic needs of the local population
HCV 6	Forest areas risky for the traditional cultural identity of local communities (areas of cultural, ecological, economic or religious significance).

For the preservation of forest ecosystems the so-called Landscape model (landscape structure) is developed. It gives an idea of the spatial distribution of the forest vegetation cover. For this purpose, an indicator is used to determine varietal landscapes (geographic mosaics). It evaluates the different degrees of connectivity between them in the process of their unification and differentiation over time. The differentiation of landscape levels is expected to meet the requirements at a group unit level in the forestry group. Gathering, summarizing and analyzing information on landscape structure is necessary in terms of their impact on the environmental processes involved in plant pollination, pest propagation, etc. The landscape structure is characterized by three major landscape modifications: insufficient total area of forest habitats, isolated areas of forest habitats and areas where forest habitats are bordered by altered ecosystems.

Due to the lack of a normative basis regulating landscape conservation and management and an adopted methodology for defining the landscape structure as of present at national level the state and trends in the development of landscape models, the impact of the landscape changes dynamics on ecological processes that are significant for forest ecosystems are not assessed and there is no publicly available data.

Dead and dying trees play an important role in the functioning and productivity of forest ecosystems through their impact on biodiversity, carbon storage, the substance and energy cycle, hydrological processes, soil protection and tree species resurgence. The maintenance of certain quantities of deadwood is a factor for the sustainable management of forest ecosystems, including the preservation of islands of old age, which are of high conservation importance.

4. CONCLUSIONS

Climate change in our times is one of the greatest challenges for human civilization in recent decades. National policies to respond to climate change should include a variety of actions, taking due account of local circumstances in the context of global processes.

At European level, efforts are being made to develop effective climate models to mitigate the effects of its change, in the light of the commitments made in the negotiations for reaching a global agreement.

At national level, the following aspects of the forestry policy are outlined:

1. The forestry sector has enormous potential not only as a resource and a natural fact, but also as having a high added value.

2. Forests are a priority factor in reducing greenhouse gas emissions, and over-implementation of quotas is a source of financial revenue.
3. More extensive use of material (timber and non-timber forest) and non-material forest resources is needed.
4. The implemented forest policy is a prerequisite for the economic development of the agricultural sector, but when carrying out consistent, responsible and sustainable management of the forest areas.

The importance of forests for the conservation of natural resources requires optimal use of their potential in harmony with the fulfillment of their economic, social and environmental functions.

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