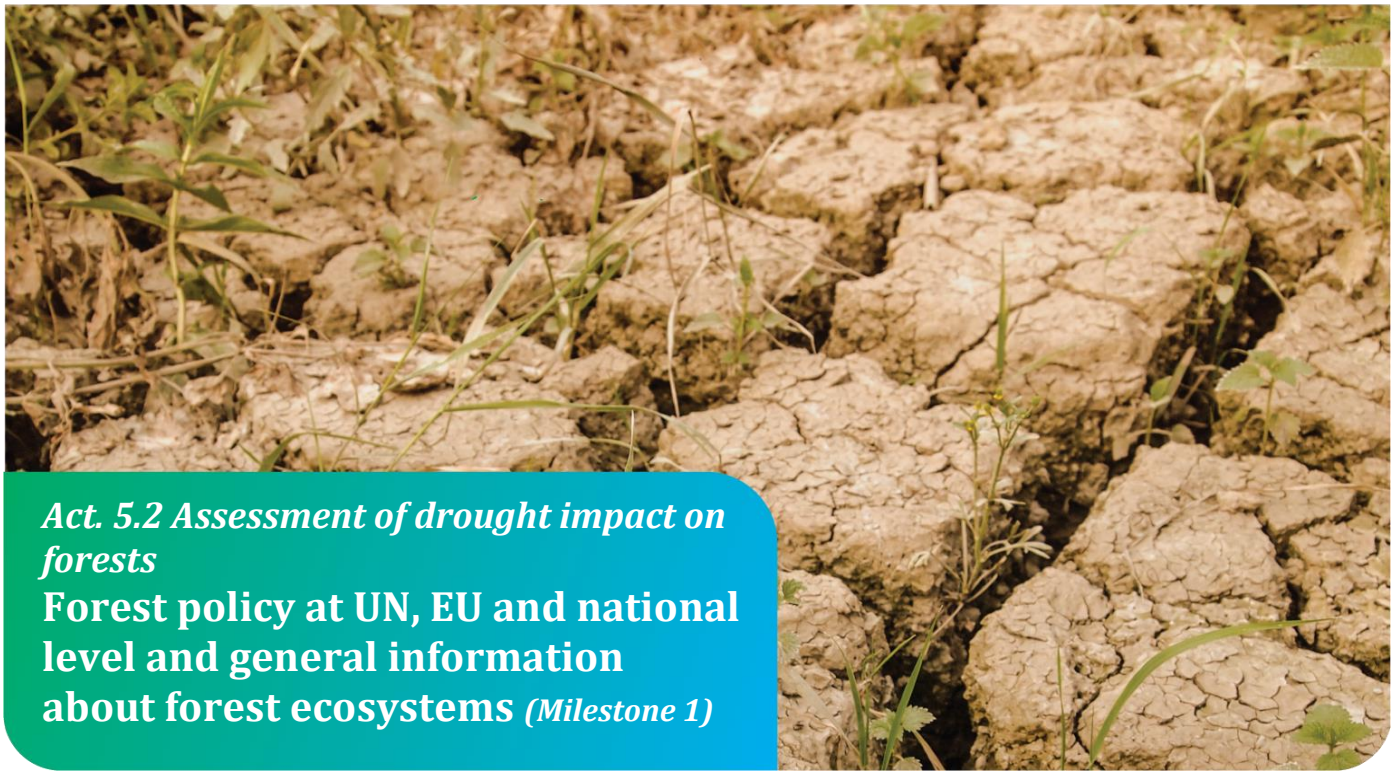
Global Water Partnership
Central and Eastern Europe

Integrated Drought Management

Programme in Central and Eastern Europe



Act. 5.2 Assessment of drought impact on forests

Forest policy at UN, EU and national level and general information about forest ecosystems ***(Milestone 1)***

Name of the milestone:	Joint report on Topic 1 and 2: Forest policy at UN, EU and national level and general information about forest ecosystems – comparative analysis for 4 GWP CEE countries
WP:	**WP5**
Activity:	**Act. 5.2 Assessment of drought impact on forests**
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ACRONYMS

EEA – European Environment Agency
EC – European Commission
EU – European Union
GWP – Global Water Partnership
CEE – Central and Eastern Europe
IDMP – Integrated Drought Management Programme
UN – United Nations

1. INTRODUCTION

The demonstration project Activity 5.2 “Assessment of drought impact on forests” is part of IDMP CEE.
Projected impacts from climate change for Central and Eastern Europe are as follows (EEA. 2012):

- increase in warm temperature extremes,
- decrease in summer precipitation,
- increase in water temperature,
- increasing risk of forest fire,
- decrease in economic value of forests.

These impacts will influence on sustainability of forestry and water sector. Forests are significantly dependent on water regime and, in turn, have a significant impact on the water regime of territories. Drought is a factor of extreme importance for the forest management in the conditions of climate change.
The main output of the forest demonstration project is the establishment of local programmes with adaptation measures for the forests in Bulgaria, Lithuania, Slovenia and Ukraine – pilot area to mitigate negative effects of the drought.
The objective of Milestone 1 is to describe the current sitution of the forestry sectors in these countries which will be the base for further investigations in the frame of IDMP.

2. GENERAL INFORMATION

The 4 GWP CEE countries with total area 800 203 km^2 and 58 million inhabitants, covered by demonstration project, are geographically situated in different parts of GWP CEE region (Figure 2.1, Table 2.1). There is a big difference in socio-economic conditions between Bulgaria, Lithuania, Slovenia and Ukraine (Table 2.1 and Table 2.2). Only Ukraine is not member of EU.

Figure 2.1. Map of Europe.

Table 2.1. General country information.

No.	Indices	Bulgaria	Lithuania	Slovenia	Ukraine
1.	Population (inhabitants)	7 327 224 * (1.01.2012); 5 384 040** (2060 – NSI)	3 007 758*** (2012)	2 055 496**** (2012)	45 633 600***** (2012)
2.	Territory (km^2)	111 002*	65 300***	20 273****	603 628 *****
3.	GDP (Million EUR)	39 667.7* or 0.3% of EU-27 (2012)	32 781.8*** or 0.3% of EU-27 (2012)	35 466.3**** or 0.3% of EU-27 (2012)	176 308 (Million USD)*****
4.	GDP per capita at current prices (EUR)	5430*(2012)	10 968*** (2012)	17 244**** (2012)	6394 USD (2012)
5.	GDP per capita at purchasing power (PPS)	12 033* or 47 (EU-27=100) (2012)	17 808*** or 70 (EU-27=100) (2012)	20 967**** or 82 (EU-27=100) (2012)	7418 (USD, 2012)
6.	Unemployment rate (% of labour force)	12.3* (2012)	13.3*** (2012)	8.9**** (2012)	7.5 (2012)*****
7.	Agriculture, forestry and fishing (% of total GVA)	5.3* or 1.7% in EU-27 (2010)	3.4*** or 1.7% in EU-27 (2010)	2.5**** or 1.7% in EU-27 (2010)	7.9 (2012)*****

*http://ec.europa.eu/agriculture/statistics/factsheets/pdf/bg_en.pdf; **NSI – National Statistical Institute, ***http://ec.europa.eu/agriculture/statistics/factsheets/pdf/lt_en.pdf,****http://ec.europa.eu/agriculture/statistics/factsheets/pdf/sl_en.pdf, *****State Statistics Service of Ukraine http://www.ukrstat.gov.ua/

Table 2.2. Population, employment and GVA according to the new EC methodology.

No.	Indices	Bulgaria		Lithuania		Slovenia	
		Bulgaria* (2009)	EU-27	Lithuania** (2009)	EU-27	Slovenia** * (2009)	EU-27
1.	**Total population (1000 inhabitants), of which:**	7 620	1.5% of EU-27	3 349.9	0.7% of EU-27	2 032.4	0.4% of EU-27
1.1.	in predominantly rural regions (PR)	38.7%	23.6% in EU-27	43.3%	23.6% in EU-27	43.1%	23.6% in EU-27
1.2.	in intermediate regions (IR)	44.9%	35.5% in EU-27	31.3%	35.5% in EU-27	31.2%	35.5% in EU-27
1.3.	in predominantly urban regions (PU)	16.4%	41.0% in EU-27	25.4%	41.0% in EU-27	25.7%	41.0% in EU-27
2.	**Employment (1000 inhabitants), of which:**	3825.3		1 415.1		983.8	
2.1.	in predominantly rural regions (PR)	1 275.1		585.1		386.9	
2.2.	in intermediate regions (IR)	1 642.2		441.4		277	
2.3.	in predominantly urban regions (PU)	908		388.6		319.9	
3.	**GVA (Million EUR), of which:**	29 518.8		23 978.3		30 788	
3.1.	in predominantly rural regions (PR)	7 513		7 221.8		30 788	
3.2.	in intermediate regions (IR)	10 928.7		7 551.2		8 379.2	
3.3.	in predominantly urban regions (PU)	11 077.1		9 205.3		11 319.6	

*European Commission, Directorate General for Agriculture and Rural Development, 2012 Rural Development Report - http://ec.europa.eu/agriculture/statistics/factsheets/pdf/bg_en.pdf
**http://ec.europa.eu/agriculture/statistics/factsheets/pdf/lt_en.pdf
***http://ec.europa.eu/agriculture/statistics/factsheets/pdf/sl_en.pdf

The total forests area of Bulgaria, Lithuania, Slovenia and Ukraine is about 35% of forests area in GWP CEE region (Table 2.3).

Table 2.3. Key figures of the forests in GWP CEE region.

EU27/ country	Forest&OWL		Forest available for wood supply	Fellings in % of net annual increment	% of forests (not including OWL) with a protective function		Forest under public ownership area as % of forest area
	1000 ha	% of land area	% of forest		2000, %	2005, %	
1	2	3	4	5	6	7	8
EU 27*	177016	42	73	60	11	13	39
Bulgaria*	3678	34	70	41	17	16	92
Czech Republic*	2647	34	95	84	15	15	77
Estonia*	2358	56	89	52	12	11	38
Hungary*	1948	22	86	56	12	9	61
Latvia*	3150	51	90	68	4	4	54
Lithuania*	2198	35	83	73	15	16	77
Poland*	9200	30	91	55	38	35	83
Romania*	6649	29	70	46	-	29	94
Slovakia*	1932	40	91	75	16	18	52
Slovenia*	1308	65	88	44	7	9	28
Moldova**	3450	10,2	70	40	2,8	4,2	95
Ukraine***	9746	15.9	58	50	21.2	22.9	100

Source: *EC. 2010a. Accompanying document to the Draft Green Paper on: Forest Protection and Information in the EU: Preparing forests for climate change. COM (2010)66 final, p.14
**Anuar statistic, Chisinau, 2011
*** Reference book on forest fund of Ukraine (on results of state forest inventory on 01.01.2011)

Slovenia is the third most forested country in Europe, after Finland and Sweden. 1 184 369 ha of forests cover more than a half of its territory (58.4 %). The occurrence and the structure of the forests are therefore, to a great extent, shaped by the climate, parent rocks, soils and relief.

Ukrainian forests and forest management have several distinctive features compared to other countries: low percentage of forest cover; historically forests were continuously managed by permanent users; large forest area is located in a zone polluted by radiation, and half of the forests are artificial and need intensive maintenance, which raise the climate change threats on forestry sector.

Forests in Bulgaria provide and support the quantity and quality of 85% of the water-flow in the country or resource of about 3,6 billion m^3 pure drinking water. Bigger part of Bulgarian forests would be affected by drought, because 61% of them are in the zone below 800 m a.s.l.

The forests management in Lithuania is improved very fast after soviet period. The total forest land area at 2012 was 2 173 000 ha, covering 33.3% of the country's territory. Since the 1st January 2003, the forest land area has increased by 128 000 ha corresponding to 2.0% of the total forest cover. During the same period, forest stands expanded by 104 000 ha to 2 055 000 ha. The good practice in Lithuania will help other countries for better management of forestry sector, especially in drought period.

The demonstration project covers the forests terrestrial area under Natura'2000 which is about 7% of total EU 27 forests area in 2009 (Table 2.

Table 2.4. Area of forest habitats designed under Natura'2000 in GWP CEE region

(*database DG ENV- February 2009*)

	N2000 terrestrial area (1000 ha)	**N2000 forest habitats designated under the N2000 total land**	**N2000 forest habitats types in FOWL (%)**
1	**2**	**3**	**4**
EU 27*	72943	20	8
Bulgaria*	3766	32	33
Czech Republic*	1045	17	7
Estonia*	799	20	7
Hungary*	1956	22	23
Latvia*	712	9	2
Lithuania*	909	5	2

	N2000 terrestrial area (1000 ha)	N2000 forest habitats designated under the N2000 total land	N2000 forest habitats types in FOWL (%)
1	2	3	4
Poland*	5163	12	7
Romania*	4885	26	20
Slovakia*	1413	23	17
Slovenia*	720	34	19
Moldova	Not member of EU		
Ukraine	Not member of EU		

Source: *EC. 2010a. Accompanying document to the Draft Green Paper on: Forest Protection and Information in the EU: Preparing forests for climate change. COM (2010)66 final, p.14

3.FOREST POLICY

3.1. Forest policy at UN and EU level

Forests and other wooded land cover 177 million hectares or 42% of the terrestrial area of the 27 Member States of the European Union. Public entities own 41%, while private and other, sometimes unknown, parties own 59%. Forests provide many benefits to society and to the economy and play an important role in the preservation of natural biodiversity and the mitigation of climate change (EC.2009).

Forestry is a significant, and an essential element of several existing and developing UN and EU policies, for example relating to rural development, climate, energy, water and soil etc.

Human beings receive multiple/countless benefits from forests in the form of goods and services such as food, wood, clean water, energy, protection from floods and soil erosion, regulation of climate cycles, recreation and cultural values. These services make significant direct and indirect contributions to national economies and human welfare.

Forests have developed together with the naturally changing climate over the millennia (EC. 2010). As climate shifted slowly, and the natural environment presented few barriers, species and communities could adapt and evolve more easily. Most EU forest management is aimed at developing forests that are well adapted to local growing conditions. However the rapid rate of human-induced climate change is now overcoming the natural ability of ecosystems to adapt. The rate of temperature increase is unprecedented. A fragmented landscape, often simplified forest composition and structure and pressures such as forest dieback, new pests and storms make autonomous forest adaptation much more difficult. Therefore, increased human intervention regarding species choice and management techniques is likely to be required to maintain viable forest cover and continuity of all forest functions. Some regions may experience more favourable conditions for forest growth in the medium term.

Mean temperatures in Europe have now risen by almost 1°C during the past century and are expected to climb further, the most optimistic scenario forecasting an increase of 2°C by 2100 (EC. 2010). A change of this magnitude corresponds to the difference in the temperature optimum of forest types as different as spruce versus beech forest or beech versus oak stands. It will thus alter the suitability of whole regions for certain forest types, forcing a shift in natural species distribution and leading to changes in growth of existing stands. In addition extreme events (storms, forest fires, droughts and heatwaves) are expected to become much more common and/or severe.

Many EU member states make use of the water regulating role of forests in the provision of drinking water. In certain arid areas, forests can increase water deficits through higher evapo-transpiration than alternative vegetation types. This is particularly true for water-demanding fast-growing tree species and varieties planted on inappropriate sites (EC.2010).

The 2000 Water Framework Directive (WFD) sets a single framework for the protection of all EU waters with the aim of reaching “good ecological status” as a rule by 2015. The originality of the WFD lies in the adoption of the river basin district as the basic water management unit based on natural geography and hydrology, across to administrative boundaries. Practically, the WFD could allow member states to support forest protection in order to assure water quality, although there is no specific support for water related forestry (managing forest soils to enhance groundwater quantity and quality) at EU level. The introduction of schemes for payment of ecosystem services (PES) that remunerate forest owners and managers for taking a water-conscious approach is a promising development (EC. 2010a).

Since 1990, nineteen resolutions have been adopted at five Ministerial conferences.

The Ministers gathered at the High-level Segment of the Ninth Session of the United Nations Forum on Forests and for the launch of the International Year of Forests 2011, underscore that forests are an integral part of the global environment and

human well-being, providing multiple goods and services essential for people worldwide and crucial for sustainable development and the achievement of the internationally agreed development goals, including the Millennium Development Goals (Ministerial Declaration, 2011). Also, the Ministers stress the vital role and significant contribution of all types of forests and trees in addressing the complex and interconnected global challenges related to economic and social development, poverty eradication, environmental sustainability, food security and agriculture, energy, water, mitigation of and adaptation to climate change, combating desertification and land degradation, conservation of biodiversity, watershed protection and disaster risk reduction.

A top-level United Nations conference on March 11-15, 2013, in Geneva has, for the first time, laid the foundations for practical and proactive national drought policies to increase resilience to the world's most destructive natural hazard, which is being aggravated by climate change. The Prince of Orange, chairman of the Advisory Board on Water and Sanitation of the Secretary-General of the United Nations, gave a keynote speech on the need for integrated water management. "The nature of drought and its effects on key sectors such as water, agriculture, meteorology, forestry, fisheries and aquaculture, etc. call for close collaboration between these sectors and beyond in order for drought management to achieve its goals," said. The meeting issued a consensus declaration stressing the need for national drought management policies.

Sustainable forest management in Europe is a holistic approach to balancing environmental, economic, and social and cultural functions of forests. The first goal to support the new vision for forests in Europe in the Oslo Ministerial Decision is as follows: European Forests 2020 is that sustainable management of all European forests ensures multiple forest functions and enhances lasting provision of goods and services (Forest Europe. 2012).

3.2.Forest policy in Bulgaria, Lithuania, Slovenia and Ukraine

Currently there is an absence of legislative grounds for acceptance and applying of general forestry policy of the EU, that's why the measures for forests undertaken by the EU find their place in the directions of other general policies:

- general agricultural policy (GAP) – forestry measures;
- as part of the climate policy – forests are basic component in carbon cycle;
- nature protection policy – European ecological network NATURA 2000 – forests are part of protected habitats;
- renewable energy policy – biomass production from forest territories;
- FLEGHT policy – Wood regulations 2010;
- European Water Framework Directive (WFD) – the programme of measures for river basins, also including forestry measures.

The responsibility for development and implementation of national forestry policy is of each EU member state and they should determine which national priorities could be directed to the EU level.

Bulgaria

After the joining of Bulgaria to the EU in 2007, the Ministry of Agriculture and Food and Executive Forest Agency actively participate in the activities of work structures of the EU, EC and FAO/UN, as well as in pan-European processes related to sustainable management of forests – "Forest Europe" of the Ministerial Conference for Protection of Forests in Europe (MCPFE) and negotiations for legislative agreement for forests in Europe, initiated by the EU and the Sixth MCPFE.

Bulgaria is a side in numerous international agreements concerning the sustainable and multifunctional management of forests, more important among them being: legislatively non-committing instrument for all types of forests (NLBITF), accepted on 17.12.2007 by the UN General Assembly and Regulations № 995/2010 of the European Parliament and the Union determining obligations of operators offering timber and timber products on the market.

There is an absence of developed and implemented unified GIS. There is internet-based information system functioning on module principle – *www.system.iag.bg*, but in fact a system for monitoring of forests is necessary as a basis for their efficient management.

The effect of main factors, which influence on the development of the forestry sector in Bulgaria – the acceptance of the country as EU member state and harmonization of normative order with the EU legislation (recently the measures for support of private forest owners are limited), development of the globalization process, continuing economic crisis in the European economic zone and coming into force of the Law of Forests in 2011 demanded giving a new meaning of aims and priorities, which should be in the basis of a new forestry strategic document. To respond to this necessity and according to article 10, paragraphs 3 and 4 of the Law of Forests, in the beginning of June 2012 the Ministry of Agriculture and Food started a process of development of a National Strategy for the development of the Forestry Sector with a vision up to 2020.

The National Strategy for Development of the Forestry Sector in Bulgaria in the period 2013 – 2020 (NSDFSB 2013 - 2020) is the basic document, which determines the strategic framework of state policy for achievement of long-term and sustainable

management of vigorous and productive multifunctional forests and increasing competitive power of the forestry sector as a basis for better living standard especially in mountain and rural regions.
The National strategy for Development of the Forestry Sector 2013-2020 is directed to implementation of the following vision:
„Towards 2020 Bulgaria will have vigorous, productive and multifunctional forests, sustainable, competitive and innovative forestry sector, preserved biodiversity, quantity and quality of water resources in forest territories. The sector will support the economic development of the country; will provide conditions for complete realization of employees will contribute to mitigation of the climate change effect and will guarantee keeping of healthy environment."
On the basis of aims, priorities and measures in NSDFSB 2013 – 2020, a Strategic Plan for Development of the Forestry Sector will be developed, which will determine particular activities for their implementation.
NSDFSB 2013 – 2020 is integrated document for the development of the forestry sector up to 2020, formulating national priorities in conformity with the European framework for planning in the sector. New problems for the sustainable development of the forestry sector in the EU necessitate increasing of the contribution to green economy and *overcoming of unfavourable consequences from climate change*, biodiversity conservation, balancing of increasing biomass utilisation as energy source with the demand for sustainable utilisation of the resource. Together with the priorities outlined in the Europe 2020 Strategy, these challenges are in the basis of the decision taken by the EC in 2010 for the development of a new EU strategy for forests 2014 – 2020. The vision of this strategy is connected with the management of multifunctional and sustainable forests and innovative forestry sector contributing to implementation of Europe 202 Strategy and satisfaction of present and future social and ecological utilities, supporting activities related to forests. The document, developed by a working group to the standing committee on forestry of the EC, is put forward for agreement and ratification by European institutions.
During the development of NSDFSB 2013 – 2020 in Bulgaria, the following European strategic documents were also taken into account:

- Decisions of the Ministerial Conference for Protection of Forests in Europe (FOREST EUROPE), Oslo, 2011;
- Improved pan-European criteria and indicators for sustainable management of forests (2002);
- Green book of the EC for protection of forests and information in the EU;
- Preparation of forests for climate change (2010);
- White book of the EC "Adaptation to climate change: towards European framework for action", EC (2009);
- European strategy for biodiversity conservation, EC (2011), and
- other strategic and programme documents related to long-term and sustainable management of forests in Europe.

NSDFSB 2013 – 2020 is also conformed to the *Third national climate change action plan 2013 – 2020* in which the forests are put in sector "Land use, change in land use and forestry". Bigger part of Bulgarian forests would be affected by drastic climate change, because 61% of them are in the zone below 800 m a.s.l.
The European Union continues its efforts for engagement of all big economies with enough ambitious aims with a view to achieve the common aim for limitation of global warming to 2°C and this is one of the conditions for the ratification by the EU of the future comprehensive legislative committing agreement for the climate after 2012.
Until now Bulgaria has no forestry projects approved according to the Scheme for green investments. There is some experience and potential for their development.
The implementation of the NSDFSB 2013 – 2020 project should be considered as continuous process and, when necessary, the strategic document will be updated with the participation of all stakeholders in the management of Bulgarian forests. The result of this demonstration project will be discussed with decision makers for further implementation in NSDFSB 2013 – 2020.

Lithuania

The basic forest policy statements are defined in the Lithuanian Forest Law in 1994. In 2001 the new Forest law was approved. In new Forest Law basic principles of sustainable forest management and biodiversity conservation were introduced in a broader sense. The Forest Law establishes rights and duties of all forest managers, owners and users of the Republic of Lithuania to utilize, reproduce, grow and protect forests, strike a balance between the interests of forest owners and society, establishes the main principles of forest management.
The Lithuanian Forest Policy and Strategy statement as the separate document was approved in 2002. The state takes the responsibility to form and implement a rational forestry development policy, which would ensure ecologically, economically and socially balanced development of the forestry sector. This is comprehended as:

- Ensuring of the stability of the forest ecosystems, preservation of the biodiversity, increase of the forest productivity, improvement of their quality and healthiness.
- Preservation of the valuable forest genetic fund by using the national forest genetic resources for the establishing and creating of new objects of forest seed basis.

- Increase of the forest cover of Lithuania by planting forests on uncultivated and poor-quality soils as well as other non-used land areas where forest planting would contribute to the formation of the Lithuanian natural carcass.
- Ensuring of the variety of forest ownership forms and the efficiency of forestry state regulation.
- Ensuring of meeting of the general forest-related social needs of the society.
- Creation of a favourable legal, economic and institutional environment for the effective and competitive functioning of the forest economy, wood industry and a variety of forest business enterprises in a free market.
- Encouraging of innovations, competitiveness, development of markets and establishment of working places.
- Ensuring of the maintenance of the scientific potential and its rational application as well as the preparation of high-qualification forestry specialists.

The Lithuanian forestry policy has been formed in compliance to the policies of other branches of the economy of the country, based on the traditions of the country and requirements of the European Union legal norms, international conventions, resolutions, agreements, programmes, and national legal acts.
The major objectives in relation to forestry are:

- Preservation and increase of the forest resources;
- Ensuring of the forest ownership variety;
- Participation of the society in the solution of the major forestry issues;
- Informing of the society about the forests of the country, their condition and management;
- Development of forest research and forest education;
- Strengthening and development of international relations;
- Rational, sustainable and continuous use of the forest resources and increase of the forest productivity;
- Improvement of the economic efficiency of forestry;
- Ensuring of sustainability of forest ecosystems;
- Preservation of the biodiversity and improvement of forest healthiness;
- Satisfying of the general forest-related society needs;
- Development of state and private forestry in the context of the general rural development.

Slovenia

Forestry in Slovenia can be considered as very progressive and ecologically oriented. For many decades, the concepts of sustainability and multi-functionality have been implemented in management practice and forest policy. The Resolution on national forest programme, released in 2007, is the basic document, which determines the strategic framework of state policy for achievement of long-term and sustainable management of productive multifunctional forests in Slovenia.
For the assessment of developmental potential, several goals were formulated in the frame of:
Forests and economic activities:

- increase utilization of production potential of forest sites;
- increase the openness of forests with forest roads;
- adequately maintained forest roads;
- develop Slovenian market of forest wood assortments.

Forest seed production and arboriculture:

- provide adequate quality and quantity of forest reproductive material.

Management of state forests:

- increase the share of state forests;
- improve cadastre and plot structure of state forests;
- preserve farm holdings and rural areas in mountains with restricted management possibilities;
- rational forest production.

Management of private forests:

- improve organization of forest owners;
- intensify education of forest owners and counselling;
- stop further fragmentation of forest holdings;
- provide implementation of necessary cultivation and protective works in forests;
- provide implementation of works in technologically modern and safe way;
- incentives for forests in which ecological or social functions determine the manner of management;
- better participation of owners in the planning of the development of their forests;
- improve marketing of forest wood products, other forest products and functions of forests.

Wood and paper industry:

- increase export of wood products with increased added values in domestic wood industry;
- increase the use of wood and wood products in construction and residential environment;
- wood and wood products should become the leading material by 2015.

Other activities related to wood:

- higher share of use of wood in Slovenia's primary energy balance;
- increase the scope of activities using wood, in particular in rural areas, where those activities considerably contribute to their development.

Hunting:

- ensure sustainable commercial use of all huntable species.

Beekeeping:

- use bee pasturing potential of forests.

Collection of non-wooded forest products:

- use the potential of forests in terms of the acquisition of non-wooded forest products in a manner friendly to forest.

Tourism and recreation in forest areas:

- use of forest for tourism adjusted to functions of forests.

Livestock pasturing in forests:

- regulate livestock pasturing in forests and direct it to adequate areas.

Ukraine

In Ukraine separate Forest Policy has not been formulated. Instead, the Forest Code of Ukraine, which is the main legislative document in Ukrainian forest management, defines the role of Ukrainian forests:

Ukrainian forests are national assets whose designated functions, depending on their locations, have predominantly ecological (water protection, conservation, recreation), aesthetic, educational and other uses, the use and exploitation of which are restricted and subject to State monitoring and protection.

Non-wood products of forests have been given priority over their wood-producing function.

The basic law on forests and forest management is Forest Code of Ukraine in edition of Law of Ukraine on 08.02.2006 № 3404-IV, which joined into force from 03.31.2006. Basic provisions of the Forest Code of Ukraine are follows:

- Unified state governance towards forests;
- Predominantly state forest ownership;
- Recognition the right of forest management only on a base of permanent use of forests;
- Exclusive right of permanent forest users on harvested timber and income from timber harvesting.

According to the requirements of Forest Code of Ukraine Ukrainian Government approved:

- Rules of forest regeneration;
- Order of special use of forest resources;
- The procedure for issuing special permits for use of forest resources;
- Order on division of forests into categories and determination of protective forest land;
- Rules of improving the quality of forests;
- Order of conducting State forest cadastre and state forest recording;
- Rules of final fellings in the Carpathian Mountain forests.

Besides the Forest Code there are some other national laws that have an effect on forest management activities. One of them is the Conception of Forestry Reforming and Developing approved by the Cabinet of Ministers of Ukraine (Document No. 208-p of 18.04.2006).

Conservation and regeneration of forests is regulated by the following Ukrainian laws (among others):

- Environmental Protection (25.06.1991 p. No. 1264-XII);
- Moratorium on Clear Cutting in Fir-beech Forests of the Carpathian Mountains (10.02.2000 p. No. 1436-III);
- National Ukrainian Program of National Ecological Network for 2000–2015 (21.09.2000 p. No. 1989-III);
- Nature-Reserve Fund in Ukraine (16.06.1992 p. No. 2456-XII).

The Ukrainian Land Code (25.10.2001 p. No. 2768-III) regulates land in relation to forest, flora and fauna management. It incorporates all the aspects of land use: territorial basis, natural and production resources, sustainable management and land protection, requirements of ecological safety, non-intervention in the activities of citizens, and legal entities and local communities related to their ownership, exploitation and land use, unless otherwise provided by the law.

Ukraine has adopted several nature conservation programmes and legal documents directed towards biodiversity conservation. Among them are: Law on Econet (2004), Law on Red Data Book (2002), the series of Ministry of Environmental Protection Decrees on limits on the use of animal and plant species, Decree of the Cabinet of the Ministers on the Strategy for the Sustainable Development of the Carpathians (2006), Resolution of the Cabinet of the Ministers on the Cadastre of Plant Species (2006), Decree of the Cabinet of the Ministers on the Concept of the State Programme on Protected Areas until the Year 2020 (2006).

Ukraine ratified a number of selected treaties in the field of biodiversity conservation (European Landscape Convention (2005), African-Eurasian Waterbird Agreement (2002), Framework Convention on the Protection and Sustainable Development of the Carpathians (2004), Cartagena Protocol to CBD (2002), UN Convention on Combating Desertification (2002), The Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic Areas (2003).

The forest sector plays an important role in rural areas with high unemployment by the provision of work and maintenance of rural communities.

Forest management in Ukraine is organized on the basis the State Programme “Forests of Ukraine”, approved by the Cabinet of Ministers in Resolution “State Programme: Forests of Ukraine 2010-2015”, 16.09.09 No. 977.

The Program "Forests of Ukraine" is the main normative document for forest management in Ukraine, which presents the main indicators of forest management within the largest permanent forest users.

The program defines the aims of forest management (State Forest. 2012):

- to provide the industry with qualified managers and workers;
- to improve the rational use of forest resources;
- to increase the percentage of forest cover to optimum levels in all natural zones;
- to improve the productivity and quality of forests;
- to enhance the nature-protective functions of forests, to conserve biological diversity;
- to improve the resistance of forest ecosystems to negative factors and climate change;
- to encourage the introduction of sustainable forest management;
- to intensify the activities in protective afforestation and forest agro-melioration;
- to develop regulative and legal bases in forest management and to harmonise them with the international principles of sustainable forest management;
- to strengthen state control in the protection, conservation, exploitation and regeneration of forests;
- to develop research and education in forestry;
- to improve the social protection of forestry workers;
- to promote international cooperation in the development of forestry industry;
- to implement a recreation and tourism infrastructure;
- to improve the efficiency of forestry management.

The activities are aimed at improving forest conditions and quality, ecological and protective functions, and forest productivity. The expected outcome of these activities is to finalized regulative and legal bases in forest conservation and regeneration, to develop the regulative system for sustainable forest management and forest resource exploitation, with a particular emphasis on the social, ecological and economic requirements.

The expected outputs of the program are an increase in forest covered areas of 0.5 million ha, in forest cover from 15.6% to 16.1%, and in growing stock by 16.7%. Along with the increase in forest harvesting activities, fulfilling the targets would improve the biological diversity in forests, have a positive influence at local, regional and global levels, and reduce land degradation and greenhouse gases in the atmosphere. Therefore it would mitigate global climate change.

4.FORESTRY SECTOR in BULGARIA, LITHUANIA, SLOVENIA and UKRAINE

4.1. Forest governance

Bulgaria

In conformity with the constitution of the Republic of Bulgaria and in pursuance of normative statements the minister of agriculture and food carries out state policy in the field of forestry and game management. Other institutions connected with the implementation of forestry policy are the ministry of finance (MF), the ministry of environment and water (MOEW), ministry of interior (MI), ministry of economics and energetic (MEE) and the ministry of regional development (MRD). The control organ in the field of finance is the MF, in the field of environment – MOEW, in the field of production of thermal energy and electric energy from renewable sources – MEE, in the field of prevention and control of illegal activities in forest territories and forest fires – MI. The management of protected territories is shared by the ministry of agriculture and food (MAF), the Executive Forest Agency (EFA) at MAF and the MOEW.

Executive Forest Agency (EFA) is legal entity finance by the budget – secondary manager with budget credits by the Ministry of Agriculture and Food, head office of EFA is in the capital city of Sofia. *http://www.nug.bg/lang/1/index*

In March 2011 a new Law of Forests was approved, which divides the control and economic functions in the management of forests. It is EFA's responsibility to carry out control functions on the implementation of normative documents in forest territories. For the management of forest territories – state property, which are not on disposal of administrations or juridical person, six state enterprises were established, whose territorial branches remain 164 state forest enterprises and state game management enterprises in 2011. Executive bodies of state forest enterprises under article 163 in the Law of Forests are the minister of agriculture and food and administrative councils of state forest enterprises. To provide financial stability of the state enterprise under article 163 in the Law of Forests and investments to carry out activities according to the law, the enterprise established fund Investments in Forests and fund Reserve.

MOEW carries out control on the management of all protected territories and direct management of national parks and reserves. Until now the MOEW has established directorates of three national parks with total staff 191 persons by the end of 2011. EFA is responsible for the management of nature parks, as well as for protected territories and natural landmarks in forest territories – state property. Eleven directorates were established for the management of nature parks. The total number of employees working there is 90. The activities on management of protected areas and natural landmarks in forest territories are carried out by state forest enterprises and state game management enterprises, in whose territory these areas are included.

The ecosystem services are legislatively arranged by the Law of Forests in 2011. For the first time it was regulated that social ecosystem benefits from forest territories, which advantage carrying out of economic activities, are required. The scientific experience and results from scientific investigations could be good basis in the development and implementation of a concept for ecosystem services and their sustainable and socially acceptable management. Representatives of state and scientific institutions and organizations, forest owners, forest business and trade unions, ecological NGOs and branch associations are included in the National Council of Forests, Game Management Council and Forest Protection Council.

In 2010 the National Council on Biodiversity at MOEW accepted the developed regimes for management of forests in NATURA 2000. Since 2010, active providing of funding began with the help of European programmes for protection and restoration of biological and landscape diversity. With funds from Operative Programme Environment 2007 – 2013, 81 projects were carried out of total amount 240 million BGN, within the frame of which plans for management of national parks and reserves and nature parks were developed and updated, field works were carried out and conservation and restoration of biodiversity on the territory of the whole country was supported.

Lithuania

The whole country is divided into 10 counties and 60 municipalities. The highest forest percentage situated in Alytus (49.1%) and Vilnius (44.0%) counties, while the least forested counties are Marijampolė (21.7%) and Klaipėda (26.4%).

Forty two State forest enterprises and 1 national park, under subordination of the Ministry of Environment, managed 1 037 000 ha of forest land. The number of forest districts during the last year decreased from 355 to 354 reaching an average size of 3 000 ha.

Slovenia

Forests and forestry are the responsibility of the Forest Department of the Ministry of Agriculture and the Environment. The Ministry is responsible for the forest policy (preparing the national legislation), adopting forest management plans, financing the public forest service and paying subsidies. In addition, it is also in charge of international relations.

The Chamber of Forest Owners has been established in 1999 and is intended to represent forest owners and their interests. Membership is obligatory for almost all forest owners. The chamber will also take over some tasks that are presently under the responsibility of the Forest Service and are directly related to forest owners.
Forest policy is based on the 1993 Forest Act and it regulates forest protection, silviculture, exploitation and its use. In turn, the Act considers forests as natural resources in order to ensure their close-to-nature and multipurpose management in accordance with the principles of protection of the environment and natural values, long-term and optimal development, so they can fulfil their functions. The Act also regulates the conditions of forestland and individual forest trees and groups of forest trees outside settlements in order to preserve and enhance their role in the environment.
Besides the Forest Act, in 2007 the Slovenian Parliament also adopted the National Forest Development Programme, which was prepared by the Ministry of Agriculture, Forestry and Food. Taking into account the natural principles of forest ecosystems, public interest, available state budget, as well as the needs and interests of forest owners, the Programme provides the basis for the conservation and development of all forests and their functions. It sets out strategies for the development of individual spheres of forest management and provides professional guidelines for co-operation with fields that interact with forestry in the landscape.
Public forestry service is performed in all forests, regardless of ownership, by the Slovenia Forest Service, while certain tasks of the public forestry service are also performed by the Slovenian Forestry Institute. Management of private forests is often ineffective because forest holdings are fragmented. Association of owners, for which timber removal and other works in larger complexes are organised, can significantly contribute to better efficiency of management of private forests. The Chamber of Agriculture and Forestry should also be involved in the training of forest owners for reaching commercial efficiency of forest management. Large area covered by forests and the necessity of comprehensive direction of their development require highly competent and well-organised public forestry service. Tasks of the public forestry service are determined in the Forest Act.
The Slovenia Forest Service is a public forestry service. It is organized at the state level (central unit), regional level (14 units) and local level (94 local units and 430 forest districts). It employs about 700 forestry experts. According to the 1993 Forest Act, the Forest Service is responsible for forest protection (preparing forest fire protection plans), monitoring of forest conditions, their development, for providing guidelines for forest management, for preparing forest management plans (at 3 levels), for constructing and maintaining forest roads, for advising forest owners and for providing them with knowledge and training (courses).
The Chamber of Forest Owners has been established in 1999 and is intended to represent forest owners and their interests. Membership is obligatory for almost all forest owners. The chamber will also take over some tasks that are presently under the responsibility of the Forest Service and are directly related to forest owners.
Supervision in forests from the aspect of observance of the Act on Forests, the Forest Reproductive Material Act and the Nature Conservation Act, and related regulations, is performed by the forestry inspection service, and also by the inspection responsible for nature conservation in protected areas. In 2006, the Slovenia Forest Service started implementing, in accordance with the Nature Conservation Act, direct supervision in nature, which presents supervision in forest area from the aspect of observance of the regulations on nature protection. Supervisors already carry out nature protection supervision in protected areas.

Ukraine

For forest management forests are given for permanent use to different Ministries and agencies. Among them: State Forest Resources Agency – 7,5 million ha (68%), Ministry of Agrarian Policy and Food – 1,8 million ha (17%), Ministry of Defense – 0,2 million ha (2%), Ministry of Emergency Situations – 0,2 million ha (2%), Ministry of Environment and Natural Resources – 0,1 million ha (1%), Ministry of Infrastructure – 0,1 million ha (1%), other ministries and Agencies – 0,2 million ha (2%), forests on state reserve lands – 0,7 million ha (7%).
The main tasks of the State Agency of forest resources are following:

- to implement state policies for forest and hunting management, forest protection and conservation, sustainable forest management, regeneration of forest resources and game, and to improve the efficiency of forest and hunting management;
- to administer, regulate and control forest and hunting management;
- to develop and implement national, international and regional programmes for forest protection, productivity improvement, sustainable forest management and reforestation, management and the regeneration of game animals, development of hunting and forest management planning.

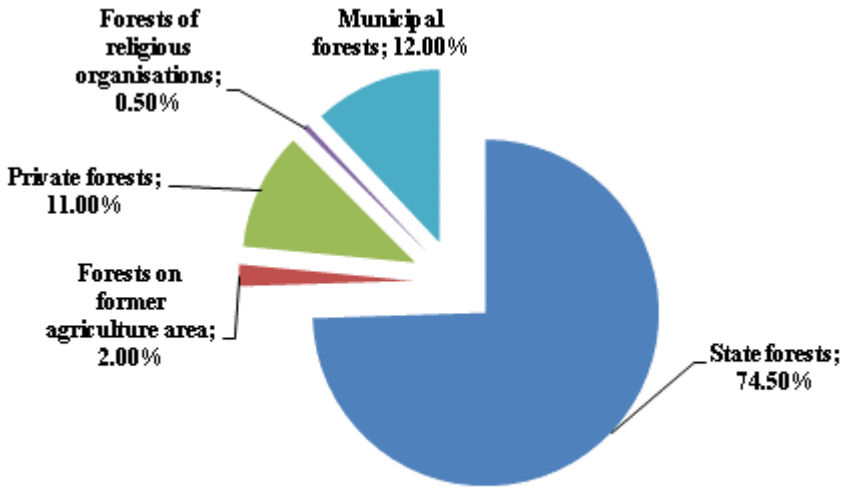
The State Agency of Forest resources carries out a normative function in forest and hunting management for all Ukrainian forests. The implementation and local administration are organised through regional state forest service enterprises. The enterprises are usually located in small settlements and villages. The State Committee of Forestry manages about 380

enterprises and organizations, among them 294 are state forestry enterprises and specialized forest-hunting farms, 2 are national protected parks and 6 are nature reserves.
Forests which are administered by the Ministry of Agrarian Policy include areas which are located in agricultural landscapes and have a critical importance for maintaining soil moisture levels and preventing wind erosion in arable lands. The management of those forests has been decentralized to a regional level. In 16 regions which have relatively more forest resources, agroforest enterprises undertake forest operations. In the remaining 9 oblasts, forests are managed through forestry departments within the main agricultural departments. Compared with forests managed by SAFR, a bigger proportion of agricultural forests are categorized as protected forests, where there are restrictions on commercial cutting.

4.2. Forest's property, employment and GDP

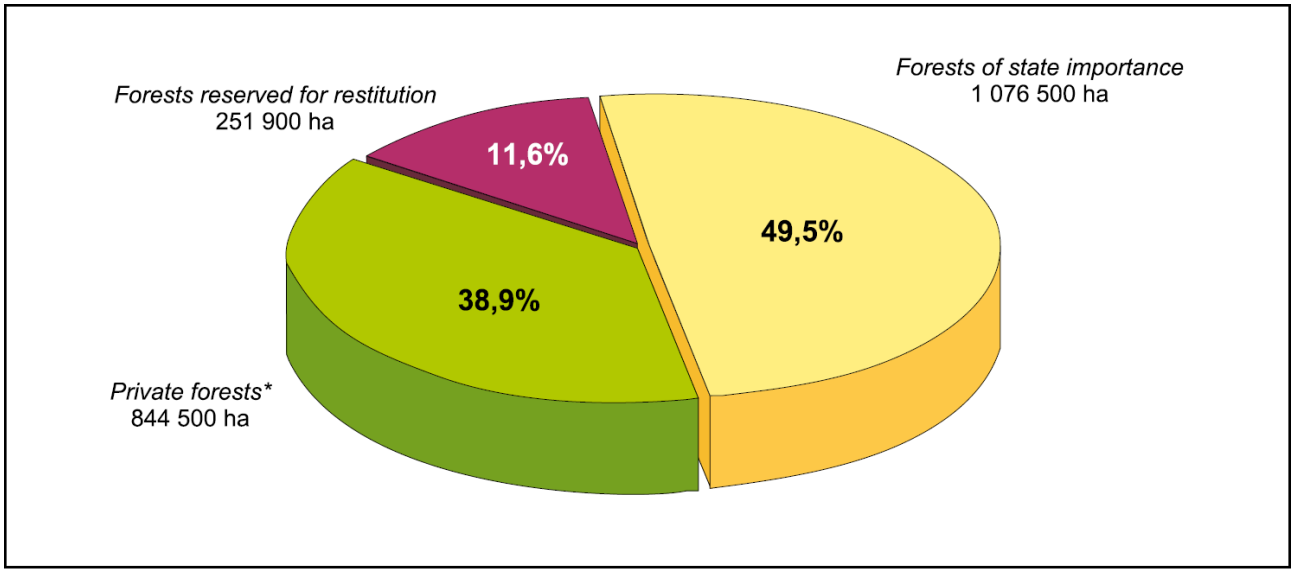
The percentage of state forests is the bigger part in Bulgaria - 74.5%. The municipal forests are 12%, private forests 11%, forests on former agriculture area 2% and forests of religious organizations 0.5% (Figure 4.1).

Figure 4.1. Share of forests in Bulgaria according to type of property towards 31.12.2011.



The state forests in Lithuania is 49.5% of total forests, and the percentage of private forests should be 50.5% in the future (Figure 4.2). The largest area of privately owned forests is in the territory of the Telšiai state forest enterprise, where private forest owners use 43 100 ha of forest land. Within the Utena enterprise private owners possess 42,300 ha and in Varėna 40,200 ha. Private forests in Telšiai, Rietavas, Zarasai, Rokiškis, Druskininkai, Kupiškis and Kretinga cover from 45% to 50% of forest land.

Figure 4.2. Forest land by ownership in Lithuania.



71 % of forests in Slovenia are private property, 29 % of forests are public (owned by the state or communes). It is estimated that at the completion of the denationalisation process, about 80 % of forests will be privately-owned and about 15 % will be state owned. Other forest owners will most likely be municipal authorities, the Roman Catholic Church or co-operatives.

The state property of the forests in Ukraine is 99.75% and private forests are 0.2% only (Table 4.1).

Table 4.1. Share of forests in Ukraine according to the ownership, 1.01.2011.

Ownership	ha	%
State forests	9791164.5	99.75
Including Agricultural (ministry of agriculture)	566150.7	5.45
Municipal forests	4962.7	0.05
Private forests	16421.9	0.2
Total	10378699.8	100

The full time employment (FTE) in forestry, wood and paper industry in Bulgaria is about 60 700 persons in 2010, in Lithuania – 31 800 persons, in Slovenia – 24 000 persons and in Ukraine – 172 200 persons or total in 4 GWP CEE countries – about 288 700 persons (Table 4.2).

Table 4.2. Full time employment (FTE) in forestry, wood and paper production.

No.	Category	Year	Total	Gender	
				Men	Women
			thousands FTE	%	%
1.	**Bulgaria:**				
1.1.	Forestry (ISIC / NACE 02)	2010	22.9	74	26
		2005	20.5	75	25
1.2.	Production of wood and wood materials (ISIC/NACE 20)	2010	27	76	24
		2005	26.3	78	22
1.3.	Production of paper and paper materials (ISIC/NACE 21)	2010	10.8	55	45
		2005	10.6	54	46
2.	**Lithuania:**				
2.1.	Forestry (ISIC / NACE 02)	2010	9.0	-	-
		2005	9.9	-	-
2.2.	Production of wood and wood materials (ISIC/NACE 20)	2010	19.5	-	-
		2005	30.5	-	-
2.3.	Production of paper and paper materials (ISIC/NACE 21)	2010	3.3	-	-
		2005	2.8	-	-
3.	**Slovenia:**				
	Forestry (ISIC / NACE 02)	2010	3	84	16

3.1.		2005	3	-	-
3.2.	Production of wood and wood materials (ISIC/NACE 20)	2010	14	77	23
		2005	15	-	-
3.3.	Production of paper and paper materials (ISIC/NACE 21)	2010	7	63	37
		2005	8	-	-
4.	**Ukraine:**				
4.1.	Forestry (ISIC / NACE 02)	2010	66.2	82	18
		2006	90.5	81	19
4.2.	Production of wood and wood materials (ISIC/NACE 20)	2010	32.4	68	32
		2006	36.8	70	30
4.3.	Production of paper and paper materials (ISIC/NACE 21)	2010	73.6	50	50
		2006	69.6	50.7	49.3

The percentage of the gross domestic product of the forests sector in 2011 is as follows: Bulgaria – 0.3%, Lithuania – 0.6%, and Ukraine – 0.4% (Table 4.3.). In 2001, the share of forestry in GDP of Slovenia is only 0.36 %, while in 2011 the GDP is 0.6 %. Such a low economic contribution can be explained partly by the structure of forest ownership and partly by the GDP accounting methods.

Table 4.3. GDP of forests sector, % of total national GDP.

No.	Sector	2007	2008	2009	2010	2011
1.	Bulgaria:					
1.1.	Agriculture, forestry and fishing	5.6	7.2	4.9	4.9	5.6
1.1.1.	incl. forests	0.2	0.3	0.2	0.3	0.3
2.	Lithuania:					
2.1.	Agriculture, forestry and fishing	3.5	3.3	2.5	3.0	3.2
2.1.1.	incl. forests	0.5	0.4	0.4	0.5	0.6
3.	Slovenia					
3.1.	Agriculture, forestry and fishing	2.2	2.0	2.1	2.2	2.4
3.1.1.	incl. forests	0.5	0.5	0.5	0.5	0.6
4.	Ukraine:					
4.1.	Agriculture, forestry and fishing	7.5	7.9	8.3	8.7	9.6
4.1.1.	incl. forests	0.4	0.4	0.3	0.4	0.4

4.3. Main forest indices

The values of the main forests indices, needed for the establishment of the mitigation measures to climate changes, are given in the following tables and figures.

The biggest forests area is in Ukraine (9.7 million ha) and smaller one in Slovenia (1.2 million ha) (Table 4.4). Nevertheless, the forests percentage of country land area is bigger in Slovenia - 58.4%, and 37.4% in Bulgaria, 33.3% in Lithuania, 15.9 % in Ukraine. Also, Slovenia is with the biggest mean stock per ha – 283 m^3 and Bulgaria is with smaller one – 172 m^3. The percentage of the forests with protected status is as follows: Bulgaria – 38.3%, Lithuania – 15.6%, Slovenia 9.2% and Ukraine 53.9%.

Table 4.4. Comparative analysis of main forests indices.

No	Indices	Bulgaria		Lithuania			Slovenia		Ukraine	
		1960	2010	1961*	2003	2012	1961	2011	1960	2010
1.	Total area of forests, million ha	3.6	4.1	1.6	2.04	2.2	0.96	1.2	7.7	9.7
2.	Forests, % of country land area	32.4	37.4	23.9	31.3	33.3	47.5	58.4	12.9	15.9
3.	Forests with protected status, %	10.3	38.3		-	15.6	4.5 (1980)	9.2	30.5	53.9

4.	Total forest stock, million m^3	243	645		453	501	150.1	334.1	738	2100
5.	Mean stock per ha, m^3	76	172		226	240	126	283	127	251
6.	Mean annual increment, million m^3	6.1	14.3		16**	17.2**	3.4	8.2	15.6	24.6
7.	Fellings, million m^3	8.6	8.1		5.3	5.1	2.9	3.9	13.6	13.2

* Forests data of the soviet period are questionable.
** Gross annual increment, million m^3

The coniferous trees are mainly in Lithuania – 55.9% of total trees, and less in Slovenia – 47.1%, Ukraine – 43.9%, Bulgaria – 28.7% (Table 4.5). Deciduous species in the natural forests prevail in south countries: Bulgaria – 71.3%, Ukraine – 56.1%, and Slovenia 52.9%, and less in Lithuania – 44.1%.

Table 4.5. Forest tree species, % of total forests.

No.	Forest tree species	Bulgaria	Lithuania	Slovenia	Ukraine
1	**Coniferous:**	**28.7**	**55.9**	**47.1**	**43.9**
1.1.	*Pinus sylvestris* L.	14.85	35.1	5.7	34.7
1.2.	*Pinus nigra* Arn.	7.69	-		
1.3.	*Picea abies* (L.) Karst.	4.29	20.8	32.3	7.3
1.4.	*Abies alba* Mill.	0.87	-	7.6	1.6
1.5.	*Pinus peuce* Grisb.	0.37	-	-	-
1.6.	*Pseudotsuga menziesii* (Mirb.) Franco	0.2	-	-	-
1.7.	*Pinus leucodermis* Ant.	0.03		-	-
1.8.	*Larix decidua* Mill.	0.02	-	1.2	0.1
1.9.	*Juniperus spp.*	-	-	-	0.1
1.10.	Others	0.33	1.2	0.3	0.02
2	**Deciduous:**	**71.3**	**44.1**	**52.9**	**56.1**
2.1.	*Quercus* sp.	35.48	2.1	7.0	27.6
2.2.	*Fagus sylvatica* L.	16.46	-	31.7	8.9
2.3.	*Carpinus betulus* L.	4.2	-	-	1.4
2.4.	*Robinia pseudoacacia* L.	4.03	-	-	2.7
2.5.	*Carpinus orientalis* Mill.	3.86	-	-	-
2.6.	*Tilia* sp.	1.5	-	-	0.3
2.7.	*Populus* sp.	0.63	-	-	0.5
2.8.	*Fraxinus oxycarpa* Willd.	0.4	-	-	2.4
2.9.	*Betula pendula* Roth.	0.24	22.4		5.7
2.10.	*Juglans nigra* L.	0.19	-	-	0.1
2.11.	*Populus tremula* L.	0.17	3.8	-	0.6
2.12.	*Acer pseudoplatanus* L.	0.12	-	-	0.6
2.13.	*Ulmus minor* Mill.	0.05	-	-	0.3
2.14.	*Gleditsia triacanthos* L.	-	-	-	0.1
2.15.	*Alnus glutinosa*	-	6.9	-	4.4
2.16.	*Salix* sp.	-	-	-	0.3
2.17.	noble hardwood	-	-	4.5	-
2.18.	hardwood	-	-	8.0	-
2.19	softwood	-	-	1.7	-
2.20.	Others	3.94	8.8		0.24
3	**Total forests**	**100**	**100**	**100**	**100**

In the Slovenian forests, there are a total of 71 different native tree species, 10 of which are coniferous and 61 deciduous.
The total area of softwood deciduous forest land in Lithuania increased by 120 100 ha over the last nine years but the area of hardwood deciduous has decreased by 8 800 ha and coniferous forest by 6 800 ha.

The age structure of the forests in 3 GWP CEE countries is shown in Table 4.6. The biggest area of the forests with age of 41-60 years is in Bulgaria (1 092 000 ha) and Ukraine (1 905 000 ha), but the situation in Lithuania is different – 315 000 ha with 101-120 years old forests. The same data are not available in Slovenia because they calculate the growing stock by different forests age structure (Table 4.7). The biggest growing stock is by 101-120 years old forests.

Table 4.6. Forest area (thousands ha) by age structure of the forests.

No	Indices	I	II	III	IV	V	VI	VII	VIII	Total
	Age, years	1-20	21-40	41-60	61-80	81-100	101-120	121-140	> 140	
1.	Bulgaria	547	902	1092	553	230	195	120	98	3737
2.	Lithuania	213	154	153	171	243	315	265	194	2057
3.	Slovenia	n.a.*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
4.	Ukraine	527	864	1905	1521	889	329	118	140	6293

*n.a. – not available data

Table 4.7. Growing stock (%) by age structure of the forests in Slovenia, 2011.

Indices	I	II	III	IV	V	VI	VII	VIII	Total
Age (years)	1-20	21-40	41-60	61-80	81-100	101-120	121-140	>140	
Growing stock (%)	0	1	7	15	23	26	19	9	100

In 2010 the value of natural regeneration is biggest in Slovenia – 78.3%, but the artificial regeneration with high value is in Lithuania – 62.9% (Table 4.8).

Table 4.8. Forests regeneration in 2010.

No.	Country	Natural regeneration		Artificial regeneration		Total	
		ha	% of total	ha	% of total	ha	%
1.	Bulgaria	3447	66.6	1727.1	33.4	5174.1	100
2.	Lithuania	2427	37.1	4121	62.9	6548	100
3.	Slovenia	1290.8	78.3	358.5	21.7	1649.3	100
4.	Ukraine	14008	20	56076	80	70084	100

The damages of the forests by defoliation in 2009 is almost the same in Slovenia (26.1%), Lithuania (21.3%) and Bulgaria (21.1%) (Table 4.9). Defoliation decreased rapidly in Ukraine after 2004.

Table 4.9. Damages of forest trees by defoliation, %.

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Bulgaria	38	39.2	49.6	60.2	44.2	46.3	33.8	37.1	33.7	39.7	35	37.4	29.7	31.9	21.1
Lithuania	24.3	19.1	21.2	20.7	19.9	20.8	19.7	20.5	21.1	21.6	20.3	20.5	20.0	20.5	21.3
Slovenia	20.8	19.3	25.6	27.6	29.1	24.8	28.9	30.3	27.6	29.1	30.6	29.5	25.4	25.7	26.1
Ukraine	29.6	46.0	31.4	51.5	56.2	60.7	39.6	27.7	27.0	29.9	8.7	6.6	7.1	8.2	6.8

Forests fires in drought periods is a big problem in Bulgaria. 150 231 ha forests burnt out in the period of 2000-2012 (Table 4.10).

Table 4.10. Burnt out areas with forest stands, 2000-2012.

Year	Bulgaria		Lithuania		Slovenia		Ukraine	
	Number of fires	Burnt out area, ha	Number of fires	Burnt out area, ha	Number of fires	Burnt out area, ha	Number of fires	Burnt out area, ha
2000	1710	37431	610	327	-	-	3696	1618
2001	825	18463	272	111	-	-	3116	3710
2002	402	6513	1489	721	-	-	6383	4983
2003	452	5000	845	382	224	1593	4527	2833
2004	291	1139	418	218	51	77	1876	595
2005	251	1446	301	51	73	142	4223	2325
2006	392	3537	1545	1199	112	1023	3842	4287
2007	1479	42999	251	38	133	99	6100	13787
2008	582	5289	301	112	74	47	4042	5529
2009	314	2276	507	315	122	115	7036	6315
2010	222	6526	110	21	32	52	3240	3668
2011	635	6882	142	293	114	159	2526	1049
2012	876	12730	-	-	168	606	-	-

Damages by insects, diseases, game animals, abiotic and other factors were recorded on 55 000 ha of state forests area in Lithuania in 2011 (Table 4.11).

Table 4.11. Proportion of all tree species by damage type in Lithuania, 2003-2011.

Year	The share of damaged trees (% of all observed trees)						
	Game	Insects	Fungi, diseases	Abiotic agents	Human activities	Cause not identified	All damaged trees
2003	2.4	0.1	0.3	0.7	0.9	6.0	10.5
2004	2.3	0.1	0.3	0.7	0.9	6.3	10.7
2005	2.2	0.1	0.3	0.8	1.0	6.5	10.9
2006	2.1	0.1	0.3	0.9	1.1	6.7	11.1
2007	2.2	0.1	0.3	0.9	1.2	6.5	11.2
2008	2.5	0.1	0.6	1.2	1.4	6.8	12.5
2009	2.8	0.1	0.9	1.3	1.6	6.8	13.5
2010	2.9	0.1	1.2	1.5	1.7	6.8	14.2
2011	3.2	0.1	1.7	1.8	1.8	7.1	15.7
2003-2010 Average	2.5	0.1	0.7	1.1	1.3	6.6	12.3

Different types of pest control are applicable. Sanitary felling is preferable in Lithuania and Ukraine but in Bulgaria air chemical control is more applicable (Table 4.12).

Table 4.12. Pest control, ha.

No.	Kind of pest control	2000	2005	2010	2012
1.	**Bulgaria:**	**121672**	**65278**	**25804**	**36328**
1.1.	Air biological control	41298	14824	9461	10396
1.2.	Air chemical control	35992	14515	2950	17892
1.3.	Land chemical control	1255	3027	1188	729
1.4.	Mechanical control	4677	912	976	720
1.5.	Sanitary felling	38450	32000	11229	6591
2.	**Lithuania:**	**27504**	**43531**	**50747**	**57761**
2.1.	Air biological control	20601	37854	28487	23880
2.2.	Air chemical control	6903	5677	3745	4233
2.3.	Land chemical control	-	-	-	-
2.4.	Mechanical control	-	-	-	-
2.5.	Sanitary felling	-	-	18 515	29 648
3.	**Slovenia**	n.a.	n.a.	n.a.	n.a.
4.	**Ukraine:**	**292280**	**333490**	**289440**	**301400**
4.1.	Total biological control	122000	129000	114500	111000
4.2.	Air chemical control	15000	45000	13500	29200
4.3.	Land chemical control				
4.4.	Mechanical control	-	-	-	-
4.5.	Sanitary felling:	155280	159490	161440	161200

Hunting plays an important role in social and cultural life. Wild game management provides ecological, social and economic functions of wild game and their habitats, and includes planning, preservation, sustainable management and monitoring of the condition of wild game (Table 4.13).

Table 4.13. Game animals, number.

No.	Species	1995	2000	2005	2010
1.	**Bulgaria:**				
1.1.	*Cervus elaphus* L.	26214	18262	16021	19590
1.2.	*Cervus dama* L.	5860	4306	4708	5843
1.3.	*Capreolus capreolus* L.	86802	71572	66552	79264

No.	Species	1995	2000	2005	2010
1.4.	*Sus scrofa* L.	37583	44994	52854	71204
1.5.	*Rupicapra rupicapra* L.	2087	1779	2106	1524
1.6.	*Ovis musimon* Pall.	2625	2279	2667	4430
1.7.	*Tertrao urogallus* L.	2227	2737	2793	2824
1.8.	*Ursus arctos* L.	852	834	1030	898
1.9.	*Bos bonasus* L.	79	69	51	19
1.10.	*Bos mutus* Przewalski	35	21	17	18
1.11.	*Capra ibex* L.	32	14	2	0
2.	**Lithuania:**				
2.1.	*Cervus elaphus L.*	13800	12864	14400	23495
2.2.	*Alces alces L.*	-	4828	4222	7470
2.3.	*Sus scrofa L.*	-	22810	32419	57805
2.4.	*Capreolus capreolus L.*	-	68680	86362	116127
2.5.	*Bison bonasus L.*	-	42	52	60
2.6.	*Cervus dama L.*	-	468	582	1390
2.7.	*Castor fiber L.*	-	17152	23778	48046
2.8.	*Meles meles L.*	-	2210	3427	6162
2.9.	*Lynx lynx L.*	-	103	69	252
2.10.	*Vulpes vulpes L.*	-	425	300	300
3.	**Slovenia**	n.a.	n.a.	n.a.	n.a.
4.	**Ukraine:**				
4.1	*Hoofed animals (heads)*	237279	177788	195005	238975
4.1.1	*Alces alces L.*	9068	4771	4510	5524
4.1.2	*Cervus spp.*	21342	15986	17606	19996
4.1.3	*Sus scrofa L.*	47070	36181	43119	61715
4.1.4	*Capreolus capreolus L.*	157035	118974	126267	147728
4.1.5	*Bison bonasus*	659	426	303	268
4.1.6	*Cervus dama*	1331	1021	2692	3232
4.1.7	*Ovis musimon Pall.*	723	370	419	420
4.1.8	*Equus hemionus*	51	59	89	92
4.2	*Fur-bearing animals (thous. units)*	2498	24168	23488	2250
4.2.1	*Sciurus vulgaris*	56	60	62	67
4.2.2	*Lepus europaeus*	2063	1874	1790	1646
4.2.3	*Martes martes*	39	53	60	63
4.2.4	*Vulpes vulpes*	87	116	88	80
4.2.5	*Ondatra zibethicus*	850	1460	1720	1870
2.6	*Mustela lutreola*	3	3	4	6
4.2.7	*Castor fiber*	10	15	23	43
4.2.8	*Canis lupus*	2	3	3	3
4.2.9	*Ursus arctos L.*	1	1	1	1
4.2.10	*Oryctolagus cuniculus*	1	1	1	1
4.2.11	*Marmota bobak*	110	77	70	67
4.2.12	*Nyctereutes procyonoides*	8	10	11	11
4.2.13	*Meles meles*	16	25	25	27
4.2.14	*Lutra lutra*	6	9	12	13
4.2.15	*Mustela putorius*	13	20	22	26
4.2.16	*Felis silvestris*	1	1	1	1
4.2.17	*Lynx lynx*	1	1	1	1
4.2.18	*Mustela erminea*	-	4	7	9
4.3	*Game birds (thousand units)*	11795	9418	9281	10673
4.3.1	*Lagopus lagopus*	1026	1014	890	992
4.3.2	*Tetrao urogallus*	4	4	4	4
4.3.3	*Lyrurus tetrix*	17	13	13	11
4.3.4	*Anser spp*	730	162	104	118
4.3.5	*Anas platyrhynchos*	4251	3125	2893	2866
4.3.6	*Phasianus colchicus*	406	271	282	336
4.3.7	*Coturnix coturnix*	602	799	928	1399
4.3.8	*Tetrastes bonasia*	13	16	22	24

No.	Species	1995	2000	2005	2010
4.3.9	*Cygnus spp.*	15	55	22	19
4.3.10	*Fulica atra*	1676	1527	1667	1893

Slovenia is one of the rare countries in Europe which preserve stable populations of large carnivores. There are 420 hunting clubs in Slovenia, with the total of 20 000 hunters, which represent 1% of the total Slovenia's population. The 10 years result of hunting in Slovenia is shown in Table 4.14.

Table 4.14. Review of kills and established losses of wild game, 1995–2004.

Wild game	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001*	2002*	2003*	2004*
Roe deer	37,734	39,355	35,543	37,492	38,993	38,685	38,66	41,874	43,249	43,404
Red deer	3,919	4,024	3,742	4,331	4,355	4,158	4,468	5,203	5,034	4,784
Fallow deer	78	95	289	112	114	87	135	180	143	135
Mouflon	573	557	632	608	689	633	580	773	734	715
Chamois	2,203	2,28	1,949	2,084	2,106	2,18	2,323	2,453	2,634	2,604
Wild boar	2,864	3,032	2,755	4,289	4,47	5,088	5,865	7,223	6,28	6,44
Brown hare	6,339	4,617	3,923	3,738	3,444	2,971	3,006	2,863	3,353	3,463
Pheasan	32,621	33,864	36,284	39,416	41,476	40,841	36,202	33,327	35,541	36,909
Grey partridge	1,606	1,873	1,82	2,092	2,032	2,532	2,375	2,174	2,446	2,266
Mallard	9,076	6,562	7,866	6,42	6,504	5,884	6,452	6,134	5,888	6,073

*Calendar year

Territories covered with forests play the most important role for carbon absorption and accumulation. In the last 21 years the absorption of greenhouse gases in the sector compensates between 11.35% and 19.9% of total greenhouse gases emissions in Bulgaria. According to the prognoses for the dynamics of forest resources in the period 2015 – 2030, in 2020 Bulgarian forests will be a basin of 264 million t CO_2, and in 2030 – of 288 million t CO_2. Forests in the EU, including Bulgaria, extract totally 0,5 billion t CO_2 equivalent per year, while greenhouse gases emissions from industry in the EU-27 are equal to 5 billion t CO_2 equivalent per year (Green book on protection of forests and information about forests in the EU: preparation of forests for climate change, EC, 2010). 178 million t is the carbon stock in living forest biomass in Slovenia in 2010 (Table 4.15).

Table 4.15. Trends in carbon stock in living forest biomass in Slovenia, 1990-2010.

Carbon stock in living forest biomass (million t)					Annual change (million t/y)			Annual change per hectare (t/ha/y)		
1990	2000	2005	2010	2010	1990-2000	2000-2005	2005-2010	1990-2000	2000-2005	2005-2010
116	141	159	178	142	2	4	4	1.6	2.8	2.8

4.4. Forests education and research

Bulgaria

Education of specialists for the needs of the forestry sector is carried out in the University of Forestry and 24 secondary vocational schools. There are also centres for short-term training for improvement of qualification of people working in the forestry sector. Research activities in the field of forestry, forest industry and natural resources conservation are carried out by the University of Forestry, the Forest Research Institute at the Bulgarian Academy of Sciences, and by the experimental stations for fast-growing tree species in Svishtov and for oak forests in Burgas, and the National Research Station in Game Management, Biology and Game Diseases. The scientific potential covers basic research fields and problems of the forestry sector.

Lithuania

Lithuania has a well-developed education system for preparing foresters. Aleksandras Stulginskis University is a state institution of higher education and research. The faculty of Forestry and Ecology provides undergraduate and graduate studies in forestry studies direction and ecology study branch of biology study direction. Faculty has over 610 undergraduate students (annual admission - 110), 120 master students (annual admission - 25) and 20 doctoral students.

The second high school are Kaunas Forestry and Environmental Engineering College of higher non-university education which preparing engineers of forestry, hydraulic engineering, cadastral surveys, awarding to them

vocational Bachelor's degree. Landscape Design and Land Management study programs are offered at the College as well.

Forest research is carried out by LAMMC Institute of Forestry and Aleksandras Stulginskis University. The basic research directions of the Institute of Forestry are as follows: (1) Physical, chemical, biological soil properties and plant nutrition; (2) Forest plant breeding, genetics and biotechnology; breeding for new varieties and research on forest plant genetic resources in Lithuania; (3) Forest plants biology and modeling of silviculture systems for wood quality and stand productivity; (4) Microbiology and plant pathology, toxicology of forest products and materials; (5) Optimization and modeling of forest plant processing and product storage; (6) Sustainability of forest ecosystems and climate change; (7) Forestry systems; the social and economic problems of forestry, forest policy.

The Aleksandras Stulginskis University, faculty of Forestry and Ecology applied research and experimental (social, cultural) development trends: Environment (soil, air, water, vegetation) quality; Biodiversity of the natural and anthropogenic ecosystems, their structure, stability and variation under climate change and human activity; Wildlife populations; Sustainable forests formation under changing environment conditions; Stands productivity and growth modeling; Logging technologies and wood quality; Modern methods of remote sensing, spatial analysis and modeling.

Slovenia

Forestry personnel of the professional and medium level are educated in the Forestry and Wood Processing Secondary School in Postojna, while the Biotechnical Faculty (University of Ljubljana), Department of Forestry and Renewable Forest Resources offers higher education professional study of forestry and university study of forestry and renewable forest resources. A higher education programme (forestry and hunting engineer), is taking place in Postojna, at the Higher Vocational College.

The majority of research activities in the area of forestry take place at the Slovenian Forestry Institute and the Department of Forestry and Renewable Forest Resources at the Biotechnical Faculty. They are co-funded by the Ministry of Education, Science and Sport and the Ministry of Agriculture and the Environment. Individual research projects and project tasks are also funded by the Farmland and Forest Fund of the Republic of Slovenia, and forest management and other companies. The Slovenia Forest Service also participates in research field.

Education of forest owners is one of the most important forms of active participation of forest owners in the provision of efficient forest management, both in economic sense and in the sense of strengthening of all non-material functions of forests. Institutions which independently or through mutual cooperation act in the area of education of forest owners are: Slovenia Forest Service, Forestry and Wood Processing Secondary School in Postojna, Chamber of Agriculture and Forestry, Slovenian Forestry Institute, Slovenian Adult Education Centre, Biotechnical Faculty, Union of Forestry Associations of Slovenia, Association of Forest Owners with their local branches and associations related to forestry.

The most frequent topics of education are: cultivation and protection of forests, technology of work and forest roads, wood processing, acquisition and use of wood for energy, financial support in forestry, direction of development of wild animal populations, planning of development of forests and forest area, functions of forests and cultivation of forest landscape, legal regulations on forests and forestry and the area of the EU forestry policy.

Ukraine

Forestry education is provided in Ukraine by 8 colleges and 4 universities. Around 1600 graduates are qualified as junior specialists every year. Bachelors and masters are taught in Universities: National University of Life and Environment Sciences (Kyiv), National Forest Engineering University of Ukraine (Lviv), Kharkiv National Agrarian University named after V.V.Docuchaev, Zhitomir National Agroecological University and other. Every year Universities are preparing over 250 bachelors and masters, including 160 in forestry.

Training and advanced training of forestry executives and professionals is performed by Ukrainian Center for training, retraining and skills development in forestry (Boyarka, Kyiv region) which has a Carpathian branch - Carpathian Regional Training Centre (Ivano-Frankivsk). Annually about 1,5 million people are trained in this Center.

The National Forestry Engineering University of Ukraine, National University of Bioresources and Nature Management of Ukraine, Carpathian National University, Ukrainian Research Institute of Forestry and Forest Melioration, and Ukrainian Research Institute of Mountain Forestry run postgraduate training programs in forest-related specialties.

Forest research is carried out by Ukrainian Research Institute of Forestry and Forest Agromelioration named after G.M.Vysotskiy (URIFFM) and Ukrainian Research Institute of Mountain Forestry named after P.S.Pasternak (URIMF). Research network of URIFFM and URIMF covers all natural zones and unique forest research places, some of which were created over 150 years ago. The research performed by URIFFM and URIMF covers fundamental and practical aspects. Research institutions are EFI and UIFRO members.

5. PROBLEMS and SWOT

Bulgaria

Basic problems related to increasing of economical vitality and competitive power of the forestry sector are:

- low labour efficiency;
- difficult access to financing;
- absence of opportunities to use financial tools from structure EU funds for investment in renovation of equipment in timber processing, machines, production facilities and forest production transportation;
- insufficient participation (support) on the side of banks in investment projects;
- low share of certified forest territories and forest contractors (the area of forest territories certified according to FSC – state property towards 31 December 2011 is about 7% of the total area of forest territories and timber processing certified companies for timber origin, or so-called Chain of custody (COC) – trace of production, is totally 29). All this limits the access of products and ware of the forestry sector to the international markets;
- there is an absence of assessment of capacity of forest ecosystems for biomass production as renewable sources with a view the achievement of the aimed 16%-share of the renewable energy in the gross final consumption in the country after 2020.

Challenges according to the condition and productive capabilities of the manpower are as follows:

- employment of new manpower for keeping of the necessary capacity in utilisation, regeneration and conservation of forest resources and territories, both according to number and of higher competence;
- ageing of manpower, especially in rural and mountain regions;
- low social status of forestry workers, low salaries and unattractive labour conditions in forestry sector, especially in timber production.

As general problems, concerning maintenance and development of institutional capacity, the following could be determined: unsatisfactory condition of the system for professional qualification and insufficient special education (incl. problems related to interests of non-state forest ownership; forest information and communication; climate change and adaptation; carbon stock), shortage of knowledge, skills and administrative capacity for development and implementation of projects, with the exception of Executive Forest Agency and state enterprises. The capacity of national operative programmes, co-financed by the European Social Fund, is not optimally used; there is an absence of capacity for development of projects with external financing.

The contribution of science to the development of the forestry sector is insufficient due to the low expenses for research, practical and innovative activities with practical effect. These activities in the forestry sector are financed predominantly by the state. The connection between science and forestry sector, innovations and transfer of technologies in the forestry sector are poorly developed. Key points are the expansion of direct collaboration between scientific organisations and enterprises and the increasing of the share of private financing in scientific activities.

Lithuania

Lithuania operates a uniform fire prevention and forest health protection system, which currently provides fire and sanitary forest protection. The system is designed and adapted to large-scale forest managers - forest enterprises. With increasing small-scale private forest estates the system may not be sufficiently effective to ensure protection of all forms of ownership of forest.

With increasing private forest area, decreasing forest enterprises managed forests. Some forest enterprises could become too small for economical sufficient work, as well as to ensure all forest restoration, protection and maintenance. In Lithuania dominate small private forest holdings, also small private forest holdings, weak cooperation of forest owners, lack knowledge about forestry stopped the development of private forestry.

Slovenia

Environmental impact of forests and their economic incidence is reduced by all factors which pose a threat or disturb their functioning and stability or cause direct damage.

Although Slovenian forests in the period until 1990 were on average well open with roads (19.8 m/ha), there are still numerous areas, primarily in private forests, which require the construction of forest roads. Construction of forest roads in closed forests is among the most important forest management measures.

Particularly on rocky terrain without forest towing paths it is not possible to transport wood to roads; wire transport is considerably more expensive. The problem of shortage of forest towing paths in private forests is similar in its scope to the problem of shortage of forest roads.

Many forest owners, primarily those with small forest holdings which dominate in Slovenia, do not pay enough attention to forest management, and the majority is not trained for work in forest, therefore such owners are not ready to carry out forest

growing works despite co-funding of by the state and the EU. With the abolition of the renewal of forests by planting where this is necessary and of cultivation works, forests deteriorate in the long run from the economic aspect.
Forest holdings in Slovenia are very fragmented, whereas co-owners were not taken into account; joint ownership is frequently a hindering factor in forest management; forest holdings are usually divided into separated parcels, which additionally hamper forest management and their development.
Various works in forests could be carried out more rationally if they would be implemented simultaneously in larger areas - connecting fragmented holdings. Single forest owners are very ineffective with their small quantities of wood on the wood market, and they find especially hard to sell wood of lower quality.
Due to small scope of works in forests as a consequence of small size of forest holdings, forest owners are insufficiently skilled for the work in forests, which also reflects in low efficiency and high frequency of accidents at forest work.
The other problems are as follows:

- low level of innovation in the marketing of other functions of forests, related to non-wood forest products and services provided by forests;
- insufficiently directed research work in the area of innovation and entrepreneurship related to economic incidence of forests;
- insufficient level of interaction among industries, which are based on wood in the sense of industry organisation, production chains and logistics channels;
- insufficient social awareness of the importance of wood and consequently insufficiently exploited wood potential;
- low level of value added to wood in Slovenia,
- lack of competitive edge of the primary wood production and reduction of its capacities.

Ukraine

The major part of Ukraine is densely populated and located in industrial territories. The environmental state is far from normal: atmospheric pollution, soil and water contamination is very high. Intense agriculture and unsatisfactory land management are a specific feature of rural territories. The level of land transformation is the highest in Europe. Large problems have been generated by the Chernobyl nuclear power plant accident that resulted in large areas of land to be heavily contaminated by radioactive nuclides. Such a situation defines the crucial role of forests and other stabilizing components of landscapes in current and future ecological, social and economic development. On-going and expected climate change can substantially accelerate the insufficient state of environment and land causing further worsening of life conditions of the population.

SWOT analysis of the forestry sector

Bulgaria

Strong sides of the forestry sector	Poor sides of the forestry sector
➢ Favourable natural conditions, determining relatively high share of forests on the country's territory, exclusive plant and animal diversity and considerable water resources in forest territories; ➢ Traditions in the establishment and management of forests, wood production and forest industry in the presence of stocks of row materials, local and international markets; ➢ Availability of normative and sub-legislative order in harmony with the EU legislation; ➢ Sustainable increasing of forests area, wood and carbon stock in forest biomass; ➢ Increasing of the average annual increment of wood and achieving of utilisation up to 50% of the increment amount; ➢ Good health status of forest ecosystems; ➢ Legislatively regulated ecosystem services; ➢ Inventoried forest territories; ➢ Increasing share of natural and semi-natural forests; ➢ Constantly preserved variety of forest genetic	➢ Insufficient use of the tending fellings resources; ➢ Keeping the number of infringements in forest territories constant; ➢ Low efficiency of the application of penal laws mentioned in forestry legislation; ➢ Insufficient density and unsatisfactory condition of forest road network; ➢ Insufficiently developed information system of forests; ➢ Absence of forest cadastre; ➢ Insufficient integration of activities on biodiversity conservation with forestry planning and management of forests; ➢ Absence of assessment of the capacity of forest ecosystems for wood biomass production for thermal and electric energy; ➢ Low degree of utilisation of forest territories for tourism; ➢ Out-of-date technology and equipment in wood production; ➢ Low efficiency of labour;

resources; ➢ 10,5% of forest territories of the country are included in protected territories according to the Law of Protected Territories; ➢ Forest territories included in the European ecological network NATURA 2000 are 57% of the total forest area; ➢ Increasing share of naturally regenerated forests in result of wider application of regeneration cuttings with natural seed regeneration; ➢ Qualified staff with forestry education in forest administration and well-trained staff in the structures of management of non-state forests and in forest industry; ➢ Good health status of the game in Bulgaria. Conditions for restoration of the populations of main game species; ➢ Bulgaria is included in the European forest fires information system (EFFIS).	➢ Difficult access to financing; ➢ Insufficient participation of science in the decision of challenges in forestry sector; ➢ Low degree of qualification of considerable part of workers in wood production and forest industry; ➢ Insufficient number and poorly trained experts in the field of biodiversity conservation; ➢ Non-effective mechanisms for taking into account the public opinion in the field of forestry sector development and participation of civil society in the process of their decision.
Opportunities for development of the forestry sector	**Challenges in the development of the forestry sector**
➢ Efficient spending of European funds in the sector; ➢ Improvement of management of forests and achievement of higher levels of wood production through increasing the share of tending fellings; ➢ Multifunctional and sustainable use of the potential of natural resources, landscape and biological diversity; ➢ Determination of the capacity of forest ecosystems for wood biomass production as renewable energy source; ➢ Increasing of the share of non-wood forest products and benefits; ➢ Optimal use of the potential for tourism development in forest territories; ➢ Development of ecosystem services; ➢ Use of fund "Investment in forests" for building up infrastructure in forest territories; ➢ Improving of qualification and knowledge of employees in the sector; ➢ Establishment of optimal information system; ➢ Carrying out of national forest inventory; ➢ Improving of the dialogue and interaction between state administration and stakeholder groups in problems related to activities in forestry sector.	➢ Challenges in the sector related to the negative influence of the economic crisis, ***climate change***, unfavourable demographic trends; ➢ Intensifying of the contradiction between increasing of the area of protected and special forest territories and increasing demand for wood and non-wood products and services; ➢ Risk of natural disasters and forest fires; ➢ Expansion of illegal cutting and poaching; ➢ Poor professional adaptation and qualification, non-conformed to the specific character of the branch and demands of labour market; ➢ Excessive utilisation of wood in determined forest territories as a result of poor and insufficient forest infrastructure; ➢ Damage of forests of high conservation value during construction of new forest roads; ➢ The process of fragmentation of private forests continues – 94% of forest properties are with area up to 2,0 ha, and the average area of a single forest estate is under 1,0 ha.

Lithuania

Strong sides of the forestry sector	**Poor sides of the forestry sector**
➢ Sufficient forest resources for public use and forestry activities development; ➢ Large forest areas for forest ecosystems, soil, air and water protection, recreation and other environmental and social functions; ➢ Dominate productive stands, forest logging ensures sourcing of local forest raw materials for industry and people. Also for export of wood products and forest raw materials; ➢ All Lithuanian forests and their resources are inventoried, actualized periodically, and used in forestry practice; ➢ Forestry activities do not need to subsidize from national budget; ➢ Specialists from forestry sector have high enough	➢ Small forest seedling nurseries doesn't guarantee low cost and quality of forest seedlings, also limiting ability to use modern machinery and advanced technology. Many forest seedling nurseries grown insufficient assortment of deciduous trees and shrubs species; ➢ Land (forest) reform goes slowly, therefore national forest resources are insufficiently used; ➢ Small private forest holdings, weak cooperation of forest owners, lack knowledge about forestry stopped the development of private forestry; ➢ Large part of round and low-treated wood are exported; ➢ Underdeveloped country's timber industry.

qualification; ➢ Forest enterprises use rational logging technology and modern logging equipment; ➢ Sufficient road network for forestry development.	
Opportunities for development of the forestry sector	**Challenges in the development of the forestry sector**
➢ With increasing afforestation in poor soils and abandoned lands, Lithuanian forest coverage would increase a few percent and approximate to other Baltic States forest coverage; ➢ Lithuanian forest condition could be improved in the future due to decreasing air pollution and prevention of forest pests, diseases and other damaging factors; ➢ Increasing volume of contract work in forestry, create favorable conditions to expand private contracting companies; ➢ Favorable geographical location for export of wood products in foreign countries.	➢ With increasing small-scale private forest estates, existing fire and forest health protection system can be insufficient effective; ➢ With decreasing of the state forest areas, a part of the forest enterprises can become economically inefficient.

Slovenia

Strong sides of the forestry sector	**Poor sides of the forestry sector**
➢ Long tradition of sustainable forest management; ➢ High potential of forest funds; ➢ Sufficient quantity of quality wood used as a raw material for a strong woodworking industry; ➢ Public Forestry Service is ensured for all forests in Slovenia; ➢ Due to a large proportion of forests, wood presents a significant CO_2 sink; ➢ Biomass presents an important renewable source of energy; ➢ Positive changes in awareness of low-carbon materials and energy sources importance; ➢ High level of knowledge and experts in forestry sector.	➢ Poor function of wood market; ➢ High fragmentation of forest holdings; ➢ Income from forests presents irrelevant source of revenue to many forest owners; ➢ Forestry Service is not fully utilized regarding economic consultancy; ➢ Disconnectedness of links in forest-wood chain; ➢ Low competitiveness of wood manufacturing industry; ➢ Lack of capital.
Opportunities for development of the forestry sector	**Challenges in the development of the forestry sector**
➢ Connecting links in the forest-wood chain; ➢ Orientation of policies and resources in the direction of the response to social challenges (energy efficiency, health etc.); ➢ (Green) tourism development; ➢ Inter-sector cooperation; ➢ Wood is the main natural resource for Slovenian industry; ➢ Opportunity for EU funds in projects related to forest-wood chain; ➢ Certification of Slovenian wood in private forests.	➢ Increase utilization of production potential of forest sites; ➢ Develop Slovenian market of forest wood assortments; ➢ The possibility of achieving a high value-added wood along the forest-wood chain; ➢ Increase the share of state forests; ➢ Improve organization of forest owners; ➢ Intensify education of forest owners and counselling; ➢ Stop further fragmentation of forest holdings; ➢ Better participation of owners in the planning of the development of their forests; ➢ Increase export of wood products with increased added values in domestic wood industry; ➢ Increase the use of wood and wood products in construction and residential environment; ➢ Increase the scope of activities using wood, in particular in rural areas, where those activities considerably contribute to their development; ➢ The provision of favourable condition of forest habitat types and species in the area of Natura' 2000; ➢ The definition of hydrologic function, when better hydrologic expert bases are available, and in the protective function – on the basis of even more detailed study of terrain conditions over different infrastructural and other

	facilities; ➢ Preservation of clean potable water and creation of water regimes in water sources.

Ukraine

Strong sides of the forestry sector	Poor sides of the forestry sector
➢ Long historical traditions of forestry, forest education and research in Ukraine; ➢ Approved regulatory framework on forest relations in the conditions of independent state (Forest Code, the Forestry development programs); ➢ Forests of Ukraine are diverse by species composition related with the diversity of natural conditions and forest site conditions; ➢ Forest sector has qualified specialists; Big experience in forest melioration, silviculture, and forest seed and forest breeding, forest protection, and forest taxation.	➢ Lack of experience on forest management in a market economy, there are no long-term relations on international timber markets, low demand for timber on domestic market; ➢ No legally approved national forest policy and strategy for long-term reform of the sector; ➢ Forest area is low and slowly growing, there is a shortage of forest resources; ➢ Natural conditions are not favourable for plantation forest growing for the biomass purpose; ➢ Organizational structure and institutional support is not enough to meet the requirements of market economy and the information society. Imperfection of forestry management in forests that belong to different forest users; ➢ Imperfection of financial mechanisms of forestry development; ➢ Lack of technical support, high degree of wear of equipment for timber and wood processing; ➢ Lack of integration into the international economic system; ➢ Low level of investment in the forest sector.
Opportunities for development of the forestry sector	**Threats in the development of the forestry sector**
➢ Adopt a law on national forest policy, which would be based on the principles, criteria and indicators for sustainable forest management; ➢ Develop and adopt a strategy of forestry sector, consistent with the European forest strategy; ➢ Expend the afforestation of agricultural land by creating a system of environmental encourage of landowners; ➢ Improve the population well-being and health, expanding opportunities for recreation and tourism; ➢ Strengthen water protection and water regulation role of forest stands, especially in connection with flood events; ➢ Strengthen the role of local communities in decision-making for forest planning and forest use; ➢ Use modern information technologies for forest inventory and public education on the multi-purpose role of forests; ➢ Develop and adopt a national cadastre of emissions and removals of greenhouse gases.	➢ Economic crisis, climate change, etc.; ➢ Worsening of conflict between different forms of forest management (forest utilization, environment protection, recreation, etc.); ➢ Uncontrolled expansion of recreation and tourism in forests, which may lead to degradation of the forest environment; ➢ Organizational and institutional restructuring may not achieve the aims of market reform; ➢ Failure in afforestation programs due to under-funding of state programs, lack of motivation among landowners; ➢ Reducing the area of forest land due to uncontrolled construction, expansion of transport networks, etc.; ➢ The legislation does not sufficiently harmonized with different requirements in the context of sustainable forest management.

6. CONCLUSIONS

The main conclusions about the forestry sectors in Bulgaria, Lithuania, Slovenia and Ukraine are as follows as:

- there is a tradition of planned management of the forests;
- multi-purpose use of the forests is related with production of material assets, ecological, social and recreation functions;
- most significant threats, challenges and opportunities for development of the forestry sector depend on drought which influence on forests living conditions.

REFERENCES

EEA. 2012. Climate change, impacts and vulnerability in Europe 2012. An indicator-based report, EEA Report No 12/2012, European Environment Agency

EC. 2009. Forestry Statistics. p.172 http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-78-09-993/EN/KS-78-09-993-EN.PDF

EC. 2010. GREEN PAPER on Forest Protection and Information in the EU: Preparing forests for climate change Brussels, 1.3.2010, COM(2010)66 final, p. 22

EC. 2010a. Accompanying document to the Draft Green Paper on: Forest Protection and Information in the EU: Preparing forests for climate change. COM (2010)66 final, p.14

Forest Europe. 2012. FOREST EUROPE Work Programme. Pan-European Follow-Up of the FOREST EUROPE Ministerial Conference, Oslo June 2012, Adopted at the FOREST EUROPE Expert Level Meeting, 14–15 February 2012, Madrid, Spain, p.14

Ministerial Declaration. 2011. Ministerial Declaration of the High Level Segment of Ninth Session of the United Nations Forum on Forests on the occasion of the launch of the International Year of Forests (3 February 2011), p.2

Standing Forestry Committee. 2012. Report to the Standing Forestry Committee by the Standing Forestry Committee ad hoc Working Group VII contributing to the development of a new EU Forest Strategy, p.5 http://ec.europa.eu/agriculture/fore/publi/sfc_wg7_2012_summ-and recommend_en.pdf

UN General Assembly. 2007. Non-legally binding instrument on all types of forests. A/C.2/62/L.5, 22 October 2007, p.10

GLOSSARY

Forest (*definition of FAO and UNECE*) - Land with tree crown cover (or equivalent stocking level) of more than 10 percent and area of more than 0.5 ha. The trees should be able to reach a minimum height of 5 m at maturity in situ.

n.a. – not available data

a.s.l. – above see level

Other wooded land (OWL) (*definition of FAO and UNECE*) - Land either with a tree crown cover (or equivalent stocking level) of 5-10 percent of trees able to reach a height of 5 m at maturity in situ; or a crown cover (or equivalent stocking level) of more than 10 percent of trees not able to reach a height of 5 m at maturity in situ and shrub or bush cover.