



**Slovak Environmental Agency**  
**Banská Bystrica**

**Forestry and its Impact on the Environment  
in the Slovak Republic 2009**

**Indicator Report**



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## Foreword

Report Forestry and its Impact on the Environment in the Slovak Republic as of 2009 is one of task outcomes listed in main task program of the Slovak Environmental Agency and Ministry of Environment of the Slovak Republic that is titled as Assess Effects of Selected Sectors in Economic Activities on Environment and Implementation of Environmental Aspects into Sectoral Policies. This has been already the third report. The first report was completed in 2005 and the second in 2007.

Within the task in 2005, sets of indicators and indicative sectors 'reports were completed for agriculture, forestry, transportation, energy, industry, and tourism. The reports, in full, assess a correlation between economical sector and environment through environmental indicators and are focused on key questions and issues. Document was submitted for comments within relevant resort, other resorts, and at routine daily meeting of Ministry of the Environment. Further work procedure was approved and adopted at the daily routine meeting. The Slovak Environmental Agency was instructed to proceed in the assessment through updating of indicators database in a year interval and summary sectoral reports in two-year intervals. At the same time, an obligation to publicize the indicators and reports on the webpage was laid: [www.enviroportal.sk/sektor/](http://www.enviroportal.sk/sektor/).

## Summary

### What is the present state and direction of forest management in the SR?

Following 1989 a considerable shift in understanding of and behaviour toward forests and their resources can be discerned, from looking at them from the almost purely production aspect (timber felling) towards the recognition of the need to ensure the balance of all (i.e. non-production) functions of forests, and also toward the application of permanently sustainable management of forests.

### Trends in forest management

- Forestry's share in the total GDP for the SR since 1990 has been constantly falling, despite a fluctuation in 2004-2006, which was due to the sale of wood processed following the autumn gale of 2004, even so this share moves in a range permanently below 1%.  
(Indicator [Share of forestry on GDP production](#))
- At present the state owns 40.9% of forest land, while 54.8% is in utilisation by the state. The property rights of 5.6% of forest land remain to be settled, meaning that the settlement of the ownership and utilisation of forests under restitution laws have not yet been completed.  
(Indicator [Structure of ownership and utilisation relationships in forestry](#))
- The area of forest stands is stable in Slovakia, and is growing from the long-term aspect. Presently it represents 41% of the total area of the country.  
(Indicator [Trend in area of forest land](#))
- From the results of the Corine Land Cover project it can be seen that the most significant changes in land cover in Slovakia over the period 1990-2000 occurred in forest land. According to the CLC project, in total 25.9 km<sup>2</sup> of mostly coniferous forests have been lost since 1990.  
(Indicator [Changes in forest covering](#))
- Timber felling in the forests of the SR is of increasing tendency in a long term; it has increased from the volume of more than 5.2 mil.m<sup>3</sup> in 1990 up to 9.2 mil.m<sup>3</sup> in 2009. However, the development of timber felling has been influenced by the volume of incidental felling in the long run which varies between 35 - 65%.  
(Indicator [Timber felling](#))
- From the local ecological point of view, Slovak forests display overall a favourable species structure. Broadleaved trees comprise 59.5%, comprising mostly beech and oak, and coniferous trees form 40.5%, mostly spruce.  
(Indicator [Tree species composition of forests](#))
- The age composition development indicates a progressive shift towards the growths of higher degrees, while the actual age composition of Slovak forests differs partially from the normal (theoretical) structure.  
(Indicator [Age composition of forests](#))
- Standing volume in Slovak forests have been growing over the past decades. In 2009 they stood at 456 mill.m<sup>3</sup> and had grown by 31% against 1990, while stocks of broadleaved timber have exceeded those of coniferous timber since 1994.  
(Indicator [Standing timber volume](#))
- The immission damage of forests has declined over the past years (with sulphur depositions being somewhat higher than nitrogen depositions), but the level of acid deposition on forests and forest land is still high. In result of the synergic effect of a complex of injurious agents and ongoing climate change, extensive spruce decline is continuing.  
(Indicator [Forests damage caused by immissions](#))
- The damage to forests is largely caused by abiotic agents, of which the greatest share is due to the wind disasters (86% in 2009).  
(Indicator [Abiotic injurious agents](#))
- From among the biotic injurious agents the most significant group is formed by bark beetles (they attacked over 4 mill.m<sup>3</sup> of wood matter). The damage due to game has been increasing continuously, whereas the total estimated damage in 2009 was twice as much as in the

previous period and it has reached the highest value for the past 20 years.

(Indicator [Biotic injurious agents](#))

- As regards the forest condition and their protection, signs of damage are exhibited by 32% of trees, which is worse than the European average. Nevertheless, it can be considered as stable from long-term perspective. The most damaged wood included oak tree, fir tree and spruce, while the least damaged included hornbeam.

(Indicator [Forests condition by degree of defoliation](#))

- Receipts and revenues of forest management in 2009 have dropped by 23% although the volume of sold wood has increased by approx. 3%. This was mainly caused by a 22% decrease of commercial value of wood.
- A significant decrease in the support of forestry via state budget funding has been recorded as well; whereas public funding has reached 33.1% in current prices from the level in 1990 and only 5.4% in fixed prices in 1990.

### What is an impact of forest management on environment in the SR?

- Forest ecosystems play a key role and have irreplaceable position in creating and protecting the environment in the country and in maintaining the ecological stability of the territory.
- With regard to the specific position of forest management and links between the forests and the surrounding country, its impact on the environment is in most cases positive.
- More than 28% of the forest area is located in the highest degree of naturalness and almost 20% of forest ecosystems may be evaluated as ecologically stable, or 48% as predominant ecologically stable.
- In the period following 1990 there was an increase in requirements for the full application of the welfare functions of forests, from which time the size of production forests has been declining, whereas the share of protective forests (17.1%) and special purpose forests has risen.

(Indicator [Forests categorisation](#))

- Forest stands have a considerable share in captures of atmospheric CO<sub>2</sub>, annually representing in Slovakia a reduction in net carbon dioxide emissions of 2 – 7%.

(Indicator [Capture of CO<sub>2</sub> emissions by forest ecosystems](#))

- Utilisation of forests may be evaluated as permanently sustainable; since timber felling is below its annual increment. In 2009 this proportion stood at 77.9% mainly due to the realisation of incidental felling caused by disasters.

(Indicator [Utilisation of forest resources](#))

- Consumption of fuel biomass, as well as its production has been growing over the long term, however, its use for energy purposes in the SR as well as in forest management itself still lags considerably behind its potentials in terms of the utilisation of these resources.

(Indicator [Dendromass production and consumption in forestry](#))

- The amount of carbon bound in the forests in the SR has considerably increased during the recent decades which has been mainly the result of the extension of forested area and increase of wood matter reserves in hectares.

(Indicator [Carbon stock in forest biomass and soil](#))

- At present particular emphasis is being placed on increasing the share of natural regeneration, which has practically doubled since 1990. Currently it represents 41.8% which is, however, still less than and only gradually approaching the level of countries with highly developed forest management. A negative tendency in the increase of clearings further continues.

(Indicator [Natural regeneration share of total annual forest regeneration](#))

- The priorities in forest management at present and its key tasks include the biological diversity of forest ecosystems. Monitoring of endangered forest species is of great importance for implementing permanently sustainable management in forest, but a special database concerning these species is still lacking in Slovakia.

(Indicator [Forest biodiversity and its endangerment](#))

- Forest coverage of protected nature areas forms around 72% and thus forest constitutes in Slovakia one of the most important ecosystems. The total proportion of forests with limited nature protection represents 55%, whereas it is necessary to review the excessive scope of the network of preserved areas and preservation levels in forests including the zonation, apart from other reasons due to the limitation to the ordinary forest management and related damage.

(Indicator [Forests and protected areas](#))

- The forest land within the NATURA 2000 network represents 53% of their area in the proposed SPA and 86.7% in the proposed SCI, whereas the current forest management in many locations does not require any changes (their protection is fully within the competence of a member state).

(Indicator [Overlapping of forests and NATURA 2000 areas](#))

- One of the ways to evaluate the forest management on the basis of ecological, economic, and social principles as per internationally accepted criteria includes the process of forest certification. There are 2 schemes used in the SR for these purposes: PEFC (certified 1,266.4 ths. ha of forest – 63.1% of total area of forests in the SR) and FSC (area of 174,086 ha).

(Indicator [Forest certification](#))

### **Is the eco-efficiency of forest management improving in the SR?**

In relation to the selected indicators, eco-efficiency at present has a mostly positive trend. The application of permanently sustainable management of forests is creating the preconditions for improving the eco-efficiency of forest management in Slovakia.

- The eco-efficiency of forest management with regard to the consumption of dendromass has been growing, since the consumption of fuel biomass has been rising under alongside a fluctuating output from forest management in GDP. A partially negative tendency is observed in case of eco-efficiency of forest management with regard to the consumption of dendromass with a recorded slight decrease from 2005.

(Indicator [Environmental efficiency of forest management with regard to dendromass production and consumption](#))

- The eco-efficiency of forest management in connection with overall fuel consumption in forest management may be evaluated as slightly positive, since the fuel consumption in forest management is gradually decreasing (meaning milder environmental impacts); however, up-to-date data for more accurate evaluation is missing.

(Indicator [Environmental efficiency of forest management with regard to fuel consumption](#))

## 1. INTRODUCTION

Indicator Report **Forestry and its Impact on the Environment in the Slovak Republic as of 2009** is a third report and it is focusing on evaluation of environmental impact of the forest management as one of economic sectors in Slovakia, and environmental aspects, which are in the process of being implemented in the forestry policy.

**Integration of environmental policy into sectoral policies** commenced at the European Council Summit in Cardiff. It represents an all-European process, in which environmental policy purposes and goals are reflected in the sectoral policies and which aims to provide a permanently sustainable development.

**Future of forestry worldwide and in the EU** is seen, apart from others, via supporting the integration of sustainable environment development and protection principles in all the policies concerning forests.

**An efficient evaluation tool** of environmental aspect integration into forestry policy is represented by **indicator sets** – measurable indicators which are subsequently evaluated by means of **sector reports**.

Impact evaluation of forestry management on the environment is based on the respect for the process of creation and evaluation of indicators and processing of sector evaluation reports at the level of the European Union under the auspices of the European Environment Agency (EEA), Organisation for Economic Cooperation and Development (OECD) and Statistical Office of the European Communities (EUROSTAT).

**The purpose** of a sector report for the area of forest management in the Slovak Republic is to obtain:

- a basic document to be able to know the impact of forest management on the environment,
- a document for the evaluation of the efficiency of environmental measures implementation into the forestry policy,
- a basic document for the implementation of the Cardiff Process and Lisbon Strategy in the Slovak Republic conditions,
- an efficient tool for the evaluation of strategic aims/long-term priorities of the National Sustainable Development Strategy.

The report is primarily focused on the evaluation of the mutual relationship between forest management and environment. Marginally it concerns some of the economic and social factors which have a significant indirect influence on the environment. It represents the expression of environment specialists' attitudes but, on the other hand, it also accepts the agriculture specialist attitudes.

The report is first of all designed for the politicians as a suitable tool for decision-making processes, for environment and agriculture specialists and, last but not least, for students and general public interested in environmental issues.

## 2. METHODOLOGY

The indicator report is based on a methodology implemented by the European Environment Agency (EEA), established in Copenhagen. It is a process; in which implementation of the environmental aspects into economic activities sectors and sector's impact on the environment is assessed through the indicators analyses. The evaluation process is focused on two stages:

1. Stage: Preparation and processing of a list of aggregated and individual indicators by D-P-S-I-R model;
2. Stage: Writing the indicator sector report.

**Chain of causal indicator links according to the DPSIR model** is a methodological tool for integrated assessment of the environment. Within individual chain links, the aggregated and individual indicators are defined as following:

- **Driving forces (D)** – they are starting mechanisms of processes in a society and they initiate
- **Pressure (P)** with an negative impact on the environment or a positive impact, which is an immediate cause of changes in the
- **State of the environment (S)**. Deterioration of the environment's state - its elements usually cause a negative
- **Impact (I)** to human health, biodiversity, functions of ecosystems, and it logically leads to formulating of measures and tools concentrated on elimination or remedy of environmental damages in the last chain link- and it is
- **Response (R)**.

The analyzed individual forestry-environmental indicators of the Slovak Republic in the D-P-S-I-R structure are in detail available at the web page [www.enviroportal.sk/indikatory/](http://www.enviroportal.sk/indikatory/). It includes description of the indicator, trend assessment, and identified political objectives in relation to indicator, international comparison, and reference to topics.

The set of environmental indicators, arranged by D-P-S-I-R model, serves as a theoretical base for preparation of **indicator report**. The main priority of the report is to understand **causal-consequential correlations** between an activity of human being and state of the environment by means of D-P-S-I-R causal chain link and in such way to offer an innovative view of the state and trend in the environment through the integrated assessment.

The D-P-S-I-R model for the forest management is a simplified formulation of reality. There are more existing correlations and factors (e.g. social and economic), which have significant effects on the environment and they are not included within the model.

The indicator sector report is focused to answer **three key political questions**:

1. What is current status and trend of forest management in the Slovak Republic?
2. What impact does forest management have on environment in the Slovak Republic?
3. Does eco-efficiency of the forest management in the Slovak Republic increase?

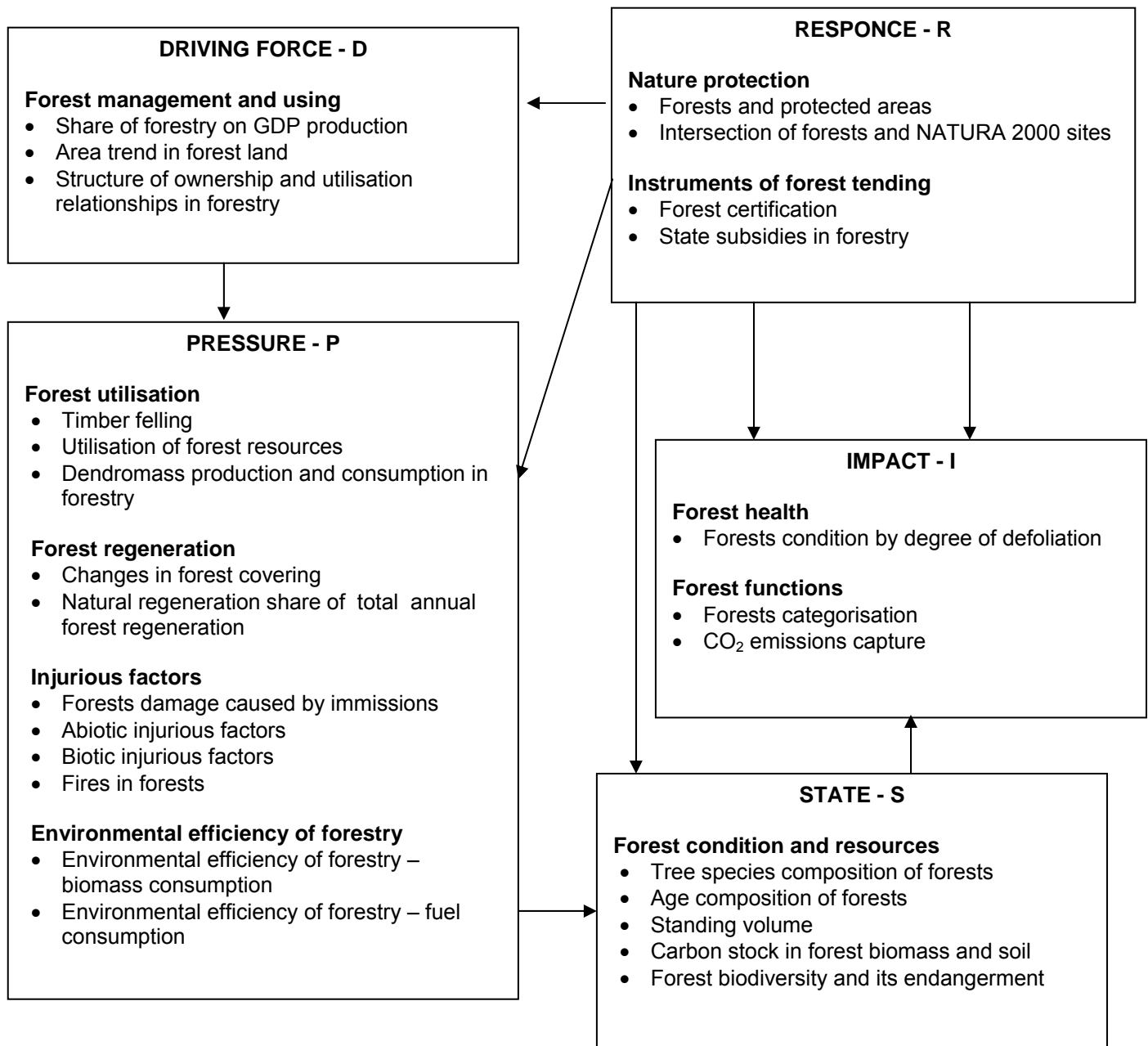
The report also takes into account the evaluation priorities as per pan-European criteria of sustainable forest management which include:

- *preservation and appropriate development of forest resources and their contribution into global carbon circulation,*
- *preservation of healthy condition and of forest ecosystems vitality,*
- *preservation and support of forest productive function (wooden and non-wooden products),*



- *preservation, protection and appropriate development of forest ecosystem biological diversity,*
- *preservation and appropriate development of protection functions in forest management (especially soil and water protection functions),*
- *preservation of other social and economic functions and conditions.*

### D-P-S-I-R causal framework of environmental indicators in forestry



## List of indicators

DPSIR reference	Aggregated indicators	No.	Individual indicators
Driving forces	Forest management and using	1.	<a href="#">Share of forestry on GDP production</a>
		2.	<a href="#">Trend in area of forest land</a>
		3.	<a href="#">Structure of ownership and utilisation relationships in forestry</a>
Pressure	Forest utilisation	4.	<a href="#">Timber felling</a>
		5.	<a href="#">Utilisation of forest resources</a>
		6.	<a href="#">Dendromass production and consumption in forestry</a>
	Forest regeneration	7.	<a href="#">Changes in forest covering</a>
		8.	<a href="#">Natural regeneration share of total annual forest regeneration</a>
	Injurious factors	9.	<a href="#">Forests damage caused by immissions</a>
		10.	<a href="#">Abiotic injurious agents</a>
		11.	<a href="#">Biotic injurious agents</a>
		12.	Fires in forests
	Environmental efficiency of forestry	13.	<a href="#">Environmental efficiency of forest management with regard to dendromass production and consumption</a>
		14.	<a href="#">Environmental efficiency of forest management with regard to fuel consumption</a>
	State	Forest state and resources	15.
16.			<a href="#">Age composition of forests</a>
17.			<a href="#">Standing timber volume</a>
18.			<a href="#">Carbon stock in forest biomass and soil</a>
19.			<a href="#">Forest biodiversity and its endangerment</a>
Impact	Forest health	20.	<a href="#">Forests condition by degree of defoliation</a>
	Forest functions	21.	<a href="#">Forests categorisation</a>
		22.	<a href="#">Capture of CO<sub>2</sub> emissions by forest ecosystems</a>
Responses	Nature protection	23.	<a href="#">Forests and protected areas</a>
		24.	<a href="#">Overlapping of forests and NATURA 2000 areas</a>
	Instruments of forest tending	25.	<a href="#">Forest certification</a>
		26.	State subsidies in forestry

### 3. IMPLEMENTATION OF ENVIRONMENTAL POLICY INTO THE FOREST MANAGEMENT

The implementation of environmental policy into forest management takes place both at the European and national level. Slovakia has fully participated, in the spirit of the pan-European process, not only in the European but also global initiatives related to the implementation and enforcement of sustainable forest management application in forests. Slovakia thus fully supports and actively influences the pan-European forestry process at the local, national and international level. The conclusions of all five minister conferences have been prepared at the national level and implemented into the main directions of Slovak forestry policy.

#### 3.1. Policy framework of environmental policy implementation into the forest management in the EU

**Forestry** has not been the priority area of the EU until recently. Similarly to the White Book, the Common Agricultural Policy of the EU has not devoted any particular attention to this area. A separate **uniform forestry strategy at the EU level** has not existed for a long time. The aims related to the development of forestry have always been based on the immediate needs of the society. One of the reasons for the absence of a separate policy was also the fact that the forestry in the EU member states is closely related to rural development, whereas forestry represents one of the tools for rural and regional development, and also the majority of these states is typical of small proportion of forests due to massive deforestation or extensive areas in the past.

Despite this, protection, management and sustainability of forests is in the centre of attention of the already existing common strategies such as the Common Agricultural Policy and rural development, strategy for environment and biodiversity, common trade policy, internal market policy, strategies in the area of research, industry, cooperation and energy development.

During **1964-1988** the European Community adopted several measures focused on the development of forestry sector. However, these measures were not systematic and they were always a direct component of the Common Agricultural Policy. The measures were concerned with the harmonisation of legislation, development of forests and forestry, **protection of forests against unfavourable impacts of air pollution** and danger of forest fires as well as forest research.

During **1988-1992** the European Community adopted a more comprehensive attitude towards its own forestry projects. In September 1988 the European Commission submitted to the EU Council the **Common Forestry Strategy** and the **Forestry Action Programme**. These documents were adopted by the EU Council in 1989 and they were concerned with the following areas:

- forestation of agricultural land,
- development and optimum use of forests in rural areas,
- production of cork,
- **forest protection.**

The year of **1992** has brought a significant breakthrough in the EU attitude towards the issues related to the development of forestry sector. The decisions adopted in some of the main areas significantly changed the wording of the **Forestry Action Programme** (measures related to forest protection against unfavourable impacts of air pollution and danger of forest fires). The significance of these measures has increased especially due to the adoption of directives no. 2157/92 and 2158/92 as amended. They have defined the measures related to the following:

- **air pollution** (need of regular monitoring of damage to forest due to air pollution, requirement to revitalise damaged forest).

The condition of European forests has been monitored by the European Commission together with UNECE for more than 17 years. This monitoring is focused on the cross-border impact of immissions on forests with a two-level approach.

- **forest fires** (classification of land according to the level of fire risk, preparation of forest fire protection plans, analysis of fire causes, creation of EU information system in this area, creation of common database of forest fires).

In 1992 the EU adopted further 3 directives the aim of which was to support forestry measures in agriculture.

**After 1992** the EU adopted further measures related to forestry such as:

- creation of a single European Forestry Information and Communication System (**EFICS**, 1994) in order to collect, coordinate, standardize, process and spread information about the forestry sector and its development. It was in place until 2002, then it was proposed to continue with the preparation of information system based on the Internet,
- co-financing of forestry research from the existing EU research and development programmes funding in the area of agriculture and environment.

In relation to the issue of forests, the Union considers as very important to **support forestry sector development**, as it represents an important element for the preservation of job opportunities in rural areas, protection of natural environment and improvement of health condition of damaged forests, preservation of social and recreational functions of forests, support of ecologically, economically and socially sustainable management, support of international cooperation when protecting forests.

The EU devotes considerable attention to the **specific forestry issues** which focus on the following:

- preservation of biodiversity (so-called NATURA 2000 network contributes to this),
- wood as a renewable energy resource,
- forest certification (process of independent verification that the forest are managed in a sustainable way; based on the conclusions of the UN environment and development conference and minister conferences on forest protection in Europe).

**In 2002** the European Commission and the European Parliament introduced a common initiative in order to create a new programme aimed at the monitoring and protection of European forests. The aim of this programme called **Forest Focus** is to **improve forest protection** and to contribute to a better understanding of the **irreplaceable role of forests within the context of the environment** as a whole. The programme should initially take place during 2003-2008. The programme will pay attention not only to the evaluation of air pollution impact on forests and on the monitoring of forest fire danger but also to the development of new activities related to the evaluation of the impact of climate changes on forest ecosystems and activities related to the implementation of forest-related measures into already existing EU strategies which deal with biodiversity, carbon storage and soil protection (Novotný et al. 2003).

During the last decade a significant shift in the creation of common integrated forestry policy of the Community was visible, when the European Commission was asked by the European Parliament and European Council to prepare a draft of the **EU Common Forestry Strategy** (EC regulation, 1998, provisions of which have been implemented into the *EU Council resolution no. 1999/C56/01 on EU forestry strategy*).

The resolution contains two main parts:

- first part defines the general framework (activities and commitments of the EC within international processes in the area of forestry, e.g. UNCED, MCPFE, forestry policies of member states and forestry activities of the Community),
- second part of EU strategy is focused on the:
  - most important activities of the Community related to forests and forestry including rural development policy,
  - participation in the process of minister conferences on forest protection in Europe and UNFF,
  - measures **focused on forest protection (immissions, forest fires)**,
  - European information and communication system – EFICS,
  - EU enlargement,
  - Issue of **biodiversity** and NATURA 2000,
  - **climate change**,
  - forestry and related industries,
  - forest certification,
  - coordination (Novotný et al., 2003).

Subsequently to the above strategy, the Commission has prepared, in cooperation with further involved parties, the [EU Forest Action Plan for the period of years 2007-2011](#) which was adopted on 15. 6. 2006. It provides for the framework of actions which are related to forest management at the level of the Community and member states and serves as a tool for the coordination of Community measures and member state policies in the area of forest management.

Its **general purpose** is to

***“support and improve sustainable forest management and forest multifunction role”.***

It is based on these **principles**:

- national programmes for forests as an appropriate framework for the implementation of international commitments related to forestry;
- increasing significance of global and intersectoral problems in forestry policy which requires better coherence and coordination;
- need to improve the competitiveness of EU forestry sector and better management of EU forestry;
- observance of subsidiarity principle.

When preparing the EU action plan in the area of forest management, the Commission and member states have created a **common forestry vision** and contribution of forests and forestry to modern society:

***Forests for Society – Long-Term Multifunctional Forestry,  
which fulfils also future social needs.***

The action plan has **four main purposes** in accordance with the proposed vision:

- Increase long-term competitiveness of forestry sector and improve sustainable use of forestry products and services
- Preserve and appropriately improve biodiversity, carbon storage, integrity, health and resistance of forest ecosystems in several geographical scales
- Contribute to life standard via preserving and improving of social and cultural dimensions of forests
- Improve coherence and intersectoral cooperation for the purpose of balancing economic, ecological, social and cultural aims at several organisation and institutional levels.

The action plan consists of a set of particular measures, whereas it considers the commitments adopted by the EU and member states in relevant international processes and minister conferences on the protection of forests in Europe. The strategy puts an emphasis on the multifunction role of forests, support of their sustainable management for society

development and its implementation. It also stresses the need to improve coordination, communication and cooperation in all the areas and policies related to the forestry sector.

A new **regulation for rural development** which was adopted for the period of years 2007-2013 introduced several important changes. It recognized an important role of the forestry sector in rural areas; and it re-arranged and upgraded specific forestry measures in order to support the integration of forestry in rural development in a better way. Member states and regions can include into their development programmes the sets of specific forestry measures which better correspond to their priorities and needs.

The basic strategic line of forestry worldwide is represented by **sustainable forest management**. Basic principles of sustainability were approved by the UN conference on environment and development (UNCED) in Rio de Janeiro in 1992. In the next years there were so-called conferences establishing processes taking place in various cities for the particular parts of the world – in case of Europe it was the **Pan-European Process** which is based on Minister Conferences in **Helsinki** (1993) and **Lisbon** (1998).

The basis for all these processes is represented by sets of so-called [criteria and indicators of sustainable forest management](#), however, there is no worldwide respected set of criteria and indicators. They must adapt to ecological, economic, social and institutional conditions of the particular country. The indicators are quantitative which means they are measurable (e.g. square area of forest and its development, reserve of wood and its development) and qualitative which are only descriptive (e.g. existence of required law, institutions and funding) (NFC).

The largest and the most important proportion on the creation and adoption of fundamental political decisions which from forestry development in Europe is performed by [minister conferences on European forest protection \(MCPFE\)](#). The fifth conference took place from November 5-7, 2007 in Warsaw. The summit presented the most up-to-date information on the condition of European forests and successes of European countries on their way to sustainable forest management. The result of the above conference is represented especially by the following adopted documents:

- Minister declaration (main idea: "Forest for Life Standard")
- Warsaw resolution 1: Forest, wood and energy
- Warsaw resolution 2: Forest and water.

The adopted resolutions relate to the most significant environmental problems, especially to climate change, increasing demand for renewable energy and risks which follow from availability and quality of water resources. These documents were signed by 40 countries.

The conference also announced a change in the structure of the General Co-ordinating Committee (GCC), whereas Slovakia has become one of the new members as well. Thus we have officially gained the possibility to influence and formulate the aims of forestry policy in Europe on a professional and highest level for the next period of seventeen years.

As a part of **summarising current condition and tendencies** in European forestry it can be stated that the forest management aims in many EU member states and other states, for various reasons, approach sustainable use, there are new aims (especially the strengthening of forest social function and of its significance for environment) apart from the traditional aims of sustainable wood production. EU forest management is perceived as a part of rural development and the following **main aims** have been defined in accordance with the above vision:

- *Increase long-term competitiveness of forestry sector and improve sustainable use of forestry products and services – **economic aim**.*
- *Preserve and appropriately improve biological diversity, carbon storage, integrity, health and resistance of forest ecosystems – **ecological aim**.*
- *Contribute to life standard by preserving and improving of social and cultural dimensions of forests and forestry – **social aim**.*

Another document on forestry at the EU level is represented by the **Green Paper on Forest Protection and Information on Forest in the European Union – Forest Preparation for Climate Change** adopted by the European Commission on March 1, 2010. It deals with main challenges which are related to forests and forestry in the EU, especially from the viewpoint of forest protection and performance of related information systems. The document presents the tools the use of which is currently fit for the protection of forests both at the level of member states and EU and it introduces several issues related to the possibilities of proposed future political measures. The adoption of the Green Paper followed from the conclusions of the White Paper of the European Commission on the adaption to climate change which was adopted in April 2009.

As the policy in forest management primarily belongs to the competence of member states, the expected public discussion should focus on the changing conditions for the management and protection of forests in Europe and further development of the European Union policy so that it makes more contribution to the policies and initiatives of member states in this area.

The Slovak Ministry of Agriculture also organised a discussion forum in cooperation with the Zvolen National Forest Centre in order to support public discussion on the issues of forest protection as an integral component of sustainable forest management, especially in the context of ongoing climate change. The conclusions of the forum will serve as a document for the preparation of a national position on the Green Paper.

### **3.2. Policy framework of environmental policy implementation into the forest management in the SR**

**Forestry strategy** is to support the aims of the EU policy, contribute to the fulfilment of international commitments adopted by member countries and Union, define the principles of free competition in accordance with the principles of free movement of goods, support competitiveness of forestry sector in the EU (forestry and related processing industry), contribute to the support of the potential for healthy renewal of rural and industrial employment and support the integration of sustainable development and environment protection principles into all the policies related to forests (Ministry of Agriculture of the Slovak Republic).

In accordance with the EU strategy, the **long-term forestry piers** in the Slovak Republic are as follows:

- 1<sup>st</sup> pier – **forest management sustainability** and development of forest production and welfare functions (functionally integrated within forest management),
- 2<sup>nd</sup> pier – strengthening of **role of forest management in landscape and nature**, in economic and social development of regions and rural areas,
- 3<sup>rd</sup> pier – **competitiveness of forest management** – increasing of its economic efficiency by using of natural potential, rational technologies and human resources (Ministry of Agriculture of the Slovak Republic, 2003b).

The main intentions and directions of the development of the particular policies the performance of which is to be secured are anchored in the **Governmental Programme Declaration**. These are the basic points for the processing of further conception materials of the individual areas or sectors. The Governmental Programme Declaration of 2010 regarding the agricultural sector which also includes forest management states:

*“The government of the Slovak Republic will deal with the arrangement of the ownership of land and forests of known and unknown owners, even of forests with the highest level of protection.*

*A forest is perceived by the Slovak government as an integral component of rural areas which needs to be managed according to sustainable principles so that it provides for active*

*recreational opportunities for the citizens. In this relation the limits for cyclists to access forest roads shall be abolished.*

*The Slovak Republic government will provide for efficient administration of state forest land so that it creates positive contribution to the society, for example, by using the method of public competition and auctions for business activities of the Lesy SR Company in order to achieve the highest prices of sold wood.*

*When managing forests, the Slovak government shall focus on the increase of the absorption ability of forests (ability of forests to retain water) in order to increase the flood protection function of forests.*

*Making the forest production more environment-friendly shall be supported by the Slovak government by means of EU funding.*

*The Slovak government shall support such management which will increase water retention in landscape.”*

The Slovak government approved in 1993 the **Strategy and Conception of Forestry Development in Slovakia** (Slovak government resolution no. 8/1993) and **Principles of State Forestry Policy in Slovakia** (Slovak government resolution no. 9/1993). The basis for the preparation of the above strategy was represented by the Minister Conference in Strasbourg and Helsinki. Another fundamental document in forest management is represented by the **Conception and Principles of Forestry Policy** (Slovak National Council Resolution no. 251/1993) (Ministry of Agriculture of the SR).

Slovak state forestry policy in its preamble describes forests as national wealth which is to be protected and enhanced. Therefore, even the most important conception intentions of Slovak forestry aim at the preservation, enhancement and sustainable forest management in Slovakia (Novotný et. al., 2003).

The Slovak Government Programme Declaration of 1998 was a basis for the preparation of the **Forest Management Development Programme in the Slovak Republic until 2010** which was based on the **Analysis of Development and Current Condition of Forest Management for years 1990-1998**. The programme serves as a starting point for the creation of a new concept of forestry policy which was submitted to the Slovak government in 2000. Programme aims which are to be achieved in forest management are conceived in accordance with the **Updated Action Plan for the Implementation of the National Strategy of Biodiversity Protection in Slovakia from 2003 to 2010**. This also takes into regard the **Pan-European Criteria and Indicators of Sustainable Forest Management** (Ministry of Agriculture of the SR).

Slovakia with its rich forestry history is actively participating in the **Pan-European Forestry Process** the crucial activity of which is represented by the Minister Conferences on forests (MCPFE) and which is based on the basic strategic line of forestry worldwide. The conclusions of the first four minister conferences have been dealt with on the national level and implemented into the main directions of forestry policy in Slovakia. The Lesoprojekt Zvolen has created, based on the impulse from the Ministry of Agriculture of the SR, a **proposal of criteria and indicators of sustainable forest management in Slovak forests** which would respect the pan-European document (Novotný et al., 2003).

The original intention of the forestry strategy and of the state forestry policy adopted in 1993 were only partially fulfilled which has caused the need to perform the measures based on the Slovak Government Programme Declaration to prepare the **Forestry Policy Concept until 2005** as a programme of forestry stabilisation in Slovakia. Forestry programme aims were, apart from other things, focused also on the arrangement of the ownership, management and **forest protection** (Ministry of Agriculture of the SR).

In November 2003 the Slovak government discussed and approved the **Medium-Term Concept of Agriculture Policy from 2004 to 2006: Forest Management**. The concept was based on long-term strategic aims of forestry based on global interests of human kind which



are focused on the preservation, **efficient protection and enhancement of forests** from supranational and global viewpoint, whereas one of the aims was to **provide for forest management in accordance with the principles of sustainable management** (Ministry of Agriculture of the SR, 2003b)

In relation to the previous concept and to the priorities and aims of soil management policy in the area of forest management based on a variety of EU documents (mostly strategic aims of the EU Action Plan for Forestry), documents of Slovak government, international agreements and treaties a new **Concept of Agriculture Development for the Period 2007-2013 – Forest Management** was prepared and approved by the Slovak government in its resolution no. 216 of March 7, 2007.

The **basic long-term objective** according to this concept is defined as:

*Provision of sustainable forest management based on the sustainable use of their economic, ecological and social functions for the society development, especially of rural areas.*

**3 main aims of forest management policy for the coming years** are formulated on its basis:

- *Improvement of economic viability of multifunctional forestry and sustainable use of forest products, goods and services (economic aims)*
- *Preservation and improvement of health condition, vitality and resistance of forest ecosystems and increasing of biological diversity (ecological aims)*
- *Contribution of forests and forestry to the increase of life standard by means of preserving and improving of their social and cultural aspects (social aims)*

The **priorities with environmental aspect** include:

support of the development of ecological technologies, support for the use of wood for energy purposes, support for ecological forest management, use of environment-friendly technologies, improvement of forest protection functions (protection of soil and water resources), preservation and improvement of health conditions of forests, reduction of the impact of climate change on forest management, provision of forest functions other than production ones (soil protection, climate and social functions), provision of fire protection in forests.

*The National Forestry Programme, National Strategic Plan of Development of Rural Areas in the SR for the Period 2007-2013, Programme of Rural Development for the Period 2007-2013 and state aid – measures will serve as **tools for the performance** of the above aims in the area of forest management in the future period.*

One of the tools for the strengthening of cohesion and synergies within the forestry sector with other sectors should be represented by **national forestry programmes**. This requirement follows from the *Conference of UN on Environment and Development, Guidelines of Intergovernmental Panel on Forests (IPF), Intergovernmental Forum on Forests (IFF)* as well as from the Programme of UN Forum on Forests (UNFF) and Forestry Strategy for EU (Ministry of Agriculture of the SR, 2003a). The concept of the National Forestry Policy has become an important **tool** for the:

- achievement of sustainable forest management in the way which respects national sovereignty, corresponds with the specific national conditions,
- application of intersectoral attitude to forestry policy and
- implementation of international commitments related to forestry.

The Slovak government approved in its resolution no. 549 of June 27, 2007 [National Forestry Programme of the Slovak Republic](#). It is **based** on national and European forestry and political documents (EU Forestry Strategy, EU Action Plan for Forests, Concept for the Development of Agriculture for the Period 2007-2013 – Forest Management), and also on the international commitments of SR (resolution MCPFE), global processes concerning forests (UNFF), international conventions (Convention on Biological Diversity - CBD, Convention on Climate Change - UN FCCC, Kyoto Protocol etc).

**Structure** of National Forestry Programme (priorities of environmental or related nature are in bold):

<ul style="list-style-type: none"><li>• <b>Strategic aim 1: Support of ecological forest management</b> <i>Priority 1: Support environment-friendly forest management</i> <i>Priority 2: Support development and use of environment-friendly technology</i> <i>Priority 3: Support the preservation, improvement and increase of biodiversity</i></li> <li>• <b>Strategic aim 2: Improvement and protection of environment</b> <i>Priority 4: Reduce the impact of climate change and support the adjustment of forests to the impacts of climate change</i> <i>Priority 5: Increase forest protection</i> <i>Priority 6: Develop forest monitoring</i></li> <li>• <b>Strategic aim 3: Improve life standard</b> <i>Priority 7: Preserve and improve forest protection functions</i> Priority 8: Increase the contribution of forests and forestry into the development of economy of rural areas</li> <li>• <b>Strategic aim 4: Increasing of long-term competitiveness</b> Priority 9: Increase long-term competitiveness and economic viability of multifunction forestry Priority 10: Support the research and technology development in order to improve the competitiveness of forest management Priority 11: Evaluation and marketing of forest non-wooden products and services <i>Priority 12: Support of use of forest biomass for energy production</i> Priority 13: Support the cooperation between the owners of forest land and improve the quality of education and training in forestry</li> <li>• <b>Strategic aim 5: Strengthening of cooperation, coordination and communication</b> Priority 14: Provide for the implementation of international commitments related to forests and forest management when performing the aims of the national forestry programme <i>Priority 15: Strengthen intersectoral cooperation and coordination between policies affecting forests and forest management</i> Priority 16: Provision of justified interests and needs of the owners of forest land and of the society Priority 17: Support the use of wood from forests managed in a sustainable way Priority 18: Support environmental education and systematic work with the public in order to achieve a positive change in public understanding of forest management significance</li></ul>
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Further (newer) **important documents** in the area of forest management include:

- **Prognoses and visions of the development of Slovak agriculture, food industry, forestry and rural areas – part Forestry (2007)**
- **[Action Plan of National Forestry Programme of the Slovak Republic \(2008\)](#)**  
It is designed for the period of years 2009-2013, it follows the content and structure of the National Forestry Programme of the Slovak Republic and it defines its framework aims via particular measures.
- **Forestry Development Strategy (2008)**  
It was prepared with the efficiency until 2025, it contains 18 priorities of the National Forestry Programme of the Slovak Republic, it is related to the up-to-date forestry political and prognostic documents in order to secure its mutual relatedness. The strategy also formulates the analysis of the issue of particular priorities, existing limits, obstacles, strengths and weaknesses; it defines the direction of development and the aims and it explains their significance for the Slovak forestry. Finally, it defines the proposed measures (tools and means) for the performance of proposed aims (Forestportal.sk).

The National Forest Centre, Forestry Research Institute Zvolen prepared in the 1<sup>st</sup> half of 2009 the characteristics of the current crisis situation:

- **Analysis and quantification of impacts of world financial and economic crisis in forestry in the Slovak Republic and proposed measures for its solution.**

Shortly, it will be necessary to participate in the process of the preparation and adoption of the **Global Convention on Forests** as a basic political document which provides for the protection and efficient use of all the types of forest communities on the planet.

#### 4. WHAT IS THE PRESENT STATE AND DIRECTION OF FOREST MANAGEMENT IN THE SR?

**Forest management** is a broad field of human activity which deals with the preservation and enhancement of forests and with the use of their benefits in favour of the owners and of the society. It is mostly related to agriculture, although very different from it. The Slovak Republic with a 41% proportion of forests belongs to the most forested countries in Europe.

The current position of forest management within the Slovak Republic, but also worldwide, is a result of historical development generated mainly by social and political factors. **Slovakia** has changed during the last century from a typical agricultural country to agricultural and industrial country. The extensive and ecological way of using and cultivating of land in biological areas has changed, with the introduction of mechanisation, automation and wider application of scientific knowledge and research findings, to an intensive type of industrial character. This has resulted in a considerable threat to the ecological balance of landscape and shift of agricultural and forestry activity into further, so-called preparatory areas (engineering and chemical industry, urbanised environment etc.).

After 1990 there was a remarkable **shift** in the understanding of and behaviour towards forests and their resources from an exclusively production approach (wood production) to the recognition of provision of balance of all (thus also other than production) functions of forests. In fact the **forests** are not only of enormous economic potential, but also of multi landscape, ecological, cultural, social and environmental significance. They belong to the most varied and most widespread ecosystems in the world. Forests are the source of wood; they offer recreational opportunities and environment for wild flora and fauna; they protect water resources and soil; they retain impurities. They support employment and traditional use as well as biological diversity. Forests and forestry represent one of the main pillars of sustainable development of the society, especially of rural areas. Nevertheless, wood, the main product of forest management production activity up to now, is a local, renewable and environmentally "clean" raw material.

A dominant and long-term **problem in forestry** is, however, represented by a fundamental conflict between the private and public interests of the owners and cultivators of forests on one hand and state on the other hand. The state has started to perceive forest management exclusively as one of economic (production) areas which must provide for its existence by means of producing material assets. It was also for this reason why the state aid for forest management (as state financial intervention) for action in public interest was considerably reduced (in 2008 it has only achieved 4.6% of year 1990 in fixed prices, in 2005 it was only 3%). On the other hand, the public requirements for the provision of **other than production functions of forests** and **nature protection** have increased (square area of protected forests has increased to 31.7%, whereas forests designed exclusively for wood production represent only 6.5% and nature protection limits relate to 57.1% of forest square area – the largest proportion of all European states).

Provision of these welfare functions and services requires considerable financial costs and also due to the limitation of ordinary management (especially in protected areas) the organisations which manage forests incur enormous financial losses which are not compensated or only insufficiently compensated. Thus, forest management is also an environmental area which provides for welfare services as a suffered burden which is in conflict with the proclaimed market economy. This is the main reason why forest management in Slovakia has undergone a long-term crisis or downturn since 1990 (*Novotný, J., Moravčík, M., Konôpka, J., 2010*).

By means of individual indicators which characterise the above tendencies it is possible to characterise the condition and development of forest management in Slovakia since 1990. A detailed characteristic is available at [www.enviroportal.sk/indikatory/](http://www.enviroportal.sk/indikatory/).

## List of forestry and environmental indicators relevant for the characteristic of the condition and main tendencies in forest management

DPSIR reference	Aggregated indicators	Individual indicators
Driving forces	Forest management and using	Share of forestry on GDP production
		Area trend in forest land
		Structure of ownership and utilisation relationships in forestry
Pressure	Forest utilisation	Timber felling
	Forest regeneration	Changes in forest covering
	Injurious factors	Forests damage caused by immissions
		Abiotic injurious agents
		Biotic injurious agents
State	Forest state and resources	Tree species composition of forests
		Age composition of forests
		Standing timber volume
Impact	Forest health	Forests condition by degree of defoliation
Responses	Instruments of forest tending	Legal instruments in forestry

### 4.1. Trends in forest management

The **proportion of GDP** created by forest management within the total GDP of the Slovak Republic has been decreasing in the long term, despite fluctuations during 2004-2006, when the sale of wood produced after the autumn natural disaster of 2004 has been manifested. The creation of GDP in forest management is currently influenced by the global economic crisis (from mid-2008). It is still below the level of 1% (1990 – 0.97%, 2009 – 0.33%), which is a rather low proportion. If taking into account the contributions of welfare functions and wood processing industry (which is currently not included in the calculation) it would represent approx. 3% of the Slovak economy GDP. However, it is necessary to note that several production industries depend on forest management (wood processing industry – participates on GDP with more than 7%, water management and agriculture). (Indicator [Share of forestry on GDP production](#))

Forestry in the Slovak Republic has undergone a long development. The largest changes include those after 1989, when almost 100% state **ownership of forests** has been gradually transferred to private persons, cities, municipalities, church etc. Further important impacts include international initiatives which are aimed at the preservation of **sustainable forest management**. They include first of all Minister Conferences on the protection of forests in Europe, intergovernmental panel on forests, intergovernmental forum on forests, UN conference on environment and development etc. The intentions and aims of forest management have been also influenced by the **changes in forest management**, especially the decision on the priority of undergrowth method. The increase in the proportion of natural renewal can be also considered as positive. Coniferous trees form 40% of Slovak forests, whereas the proportion of foliate trees is 60%. The square proportion of age levels is developing positively which can be manifested in the future as a slight increase in the production opportunities in the following decennia.

These positive facts are also evaluated non-governmental organisations (WWF) which have rated Slovak forests as to their level and form of management as 3<sup>rd</sup> in Europe (following to Switzerland and Finland). The situation is different with regard to the health condition of forests and their protection. According to the monitoring of health condition of forests, almost one third of all the trees show the signs of damage which is worse than the European average.

#### 4.1.1 Arrangement of forest ownership structure

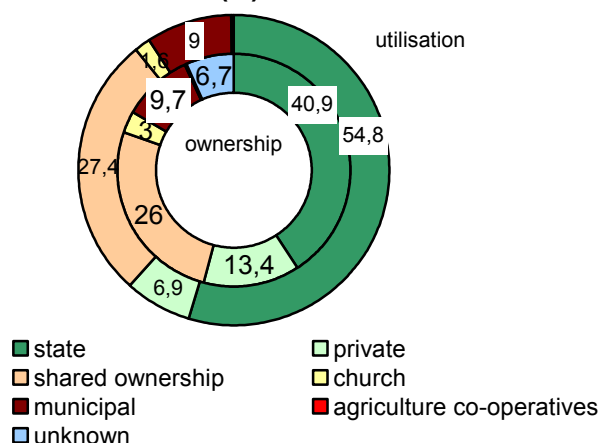
An important part of the reforms after 1989 was also represented by the transformation of the ownership relationships towards forests which basically included the returning of the ownership to the original owners. Resolving of ownership relationships with regard to forests is still one of the main strategic priorities in the area of forest management.

The structure of forests (stand area) according to ownership and use is constantly changing because the arrangement of ownership and use of forests has not been finalised as per restitution laws as yet. In spite of these facts there have been positive results in the area of reduction of property injustice in the area of forest management since 1992.

The **state ownership** in 2009 was **40.9%** (791,660 ha) of stand area in the Slovak Republic, whereas as much as **54.8%** (1,059,940 ha) of stand area was in state **use**. In comparison with the previous years the area of forests used by state organisations is gradually reduced. The remaining area is used by non-state – private, cooperative, church, agricultural, municipal and unknown entities.

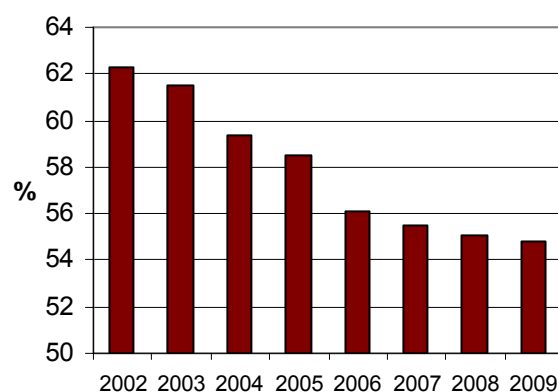
Forest land, the ownership of which **has not been completely identified** or documented, whereas the eligible persons have not demonstrated any interest in taking them, represent **approx. 5.6%** of stand area in the Slovak Republic.

**Structure of forest ownership and utilisation in the SR in 2009 (%)**



Source: NFC Zvolen; Processed by: SEA  
(Indicator [Structure of ownership and utilisation relationships in forestry](#))

**Development of the proportion of the stand area used by state organisations (%)**



#### 4.1.2 Sustainable forest management

The principle of sustainable management in forests has become the basic principle of forestry in Slovakia, whereas the notion of sustainability is not a new one in forestry. This principle was defined at the Minister Conference on the protection of forests in Europe in Helsinki in 1993 as the “*management and use of forests and forest land in the manner and scope which would preserve their biodiversity, production capability, regeneration potential, vitality and capability to fulfil, now and in future, significant ecological, economic and social functions on the local, national and global level and which would not cause any damage to other ecosystems*”.

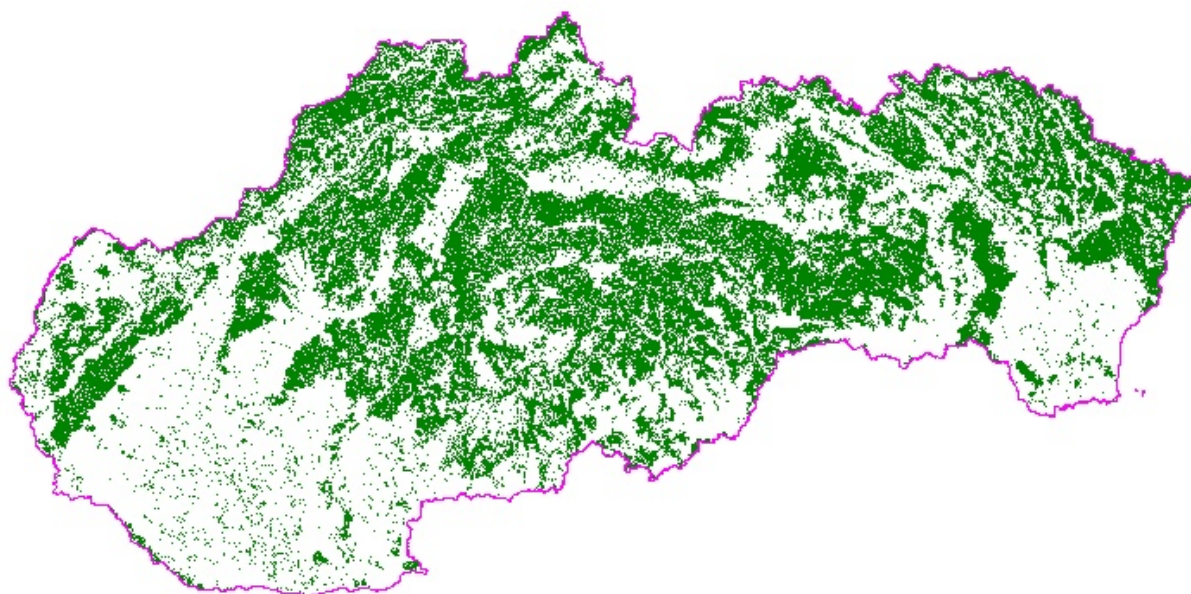
#### Development of forest area in Slovakia

The area of forests in Slovakia is stable, whereas it is constantly increasing from the long-term viewpoint (increase of approx. 13% compared with 1960). At present it accounts for

2,009 ths.ha, which represents **41%** out of the total area of the country. The stand area accounts for approx. **96.4%**.

The gradual **increase of the forest land area** has been mainly caused by the foresting of land which cannot be used for agricultural purposes, by the reclassification of agricultural land covered by forest plants (so-called white areas) as well as by gradual harmonisation of forest land register with the real estate register when renewing forest management plans, whereas this tendency will continue in future as well.

### Forest coverage of Slovakia



Processed by: SEA  
(Indicator [Trend in area of forest land](#))

### Changes in forest covering

Contrary to the statistical data, according to the results of the Corine Land Cover (CLC) the area of forests was reduced during the period 1990-2000 by 580.3 km<sup>2</sup> due to the reclassification of **forests to woodlands/shrubs** (areas after tree cutting and forest damage – natural disasters). On the other hand, transitional woodlands/shrubs have naturally developed into forests with the area of 529.7 km<sup>2</sup>, out of which 354.3 km<sup>2</sup> is represented by foliate forests, 128.3 km<sup>2</sup> by coniferous forests and 47.3 km<sup>2</sup> by mixed forests. However, on the whole there was a total **decrease of 25.9 km<sup>2</sup> of mainly coniferous forests** since 1990 according to CLC. The CLC project results imply that the most significant changes in the landscape cover of Slovakia during the period 1990-2000 were identified in the forest landscape. There was a decrease of coniferous forests, increase of transitional woodlands/shrubs (231.63 km<sup>2</sup>), but also areas of desolate, shrubby formations growing on meadows and heterogeneous agricultural areas. (Indicator [Changes in forest covering](#))

### Timber felling

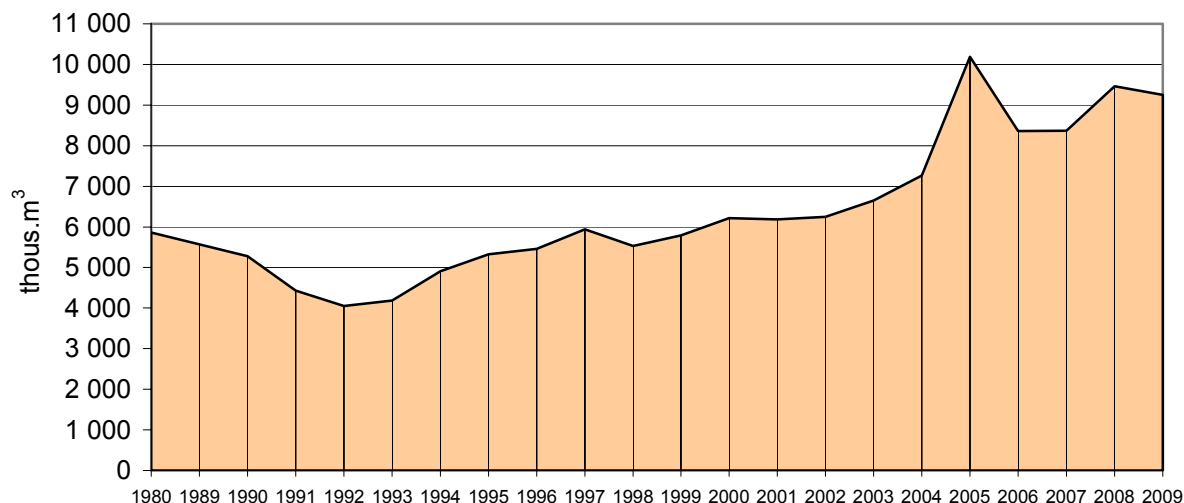
Timber felling in Slovak forests is of long-term **increasing tendency**, it has grown since 1990 from the value of more than 5.2mil.m<sup>3</sup> up to **9.2mil.m<sup>3</sup>** in 2009. The development of felling is, however, influenced in the long term by the volume of **incidental felling** which varies from 35 to 65%.

Timber felling in 2009 reached 9,248.1 ths.m<sup>3</sup>, out of which the coniferous wood is represented by 6,183.4 ths.m<sup>3</sup>. The proportion of incidental felling on the total timber felling is represented by **60.4%**, out of which 84.8% is represented by coniferous wood. Especially

due to the large volume of incidental felling, the volume of the total planned timber felling in valid forest management plans in 2008 was exceeded by 18.1%.

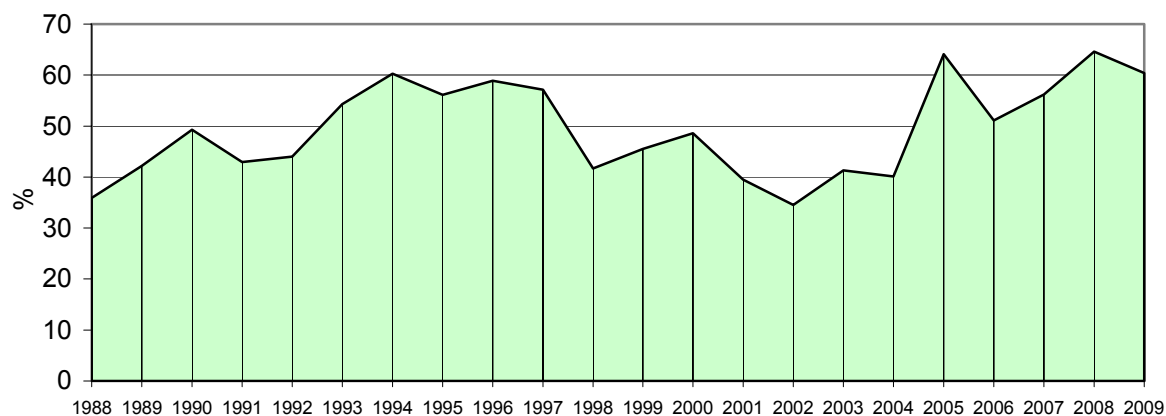
In the next decades there will be a shift in the age levels which are above the norm (as to the area and volume of standing volume) towards the age of felling maturity. Thus, it can be estimated that the total felling volume will gradually increase during the period of next 30-40 years. The volume of tending felling will be of decreasing tendency.

### Trend in timber felling (thous.m<sup>3</sup>)



Source: NFC Zvolen; Processed by: SEA

### Trend in proportion of incidental felling on the total timber felling (%)



Source: NFC Zvolen; Processed by: SEA  
(Indicator [Timber felling](#))

### Tree species composition of forest

The assessment of tree species composition of Slovak forests with regard to the preservation of biodiversity and fulfilment of forest functions, especially against the impacts of climate change, is one of the aims of forest management strategic priorities in order to provide for the management of forests according to the principles of sustainable management.

In the **original tree species composition** of forest in the territory of Slovakia the majority of trees were broadleaved (79.3%), not coniferous. At present, the proportion of broadleaved trees in Slovakia accounts only for 59.5% with the highest proportion of beech (31.2%) and oak tree (13.4%) and coniferous trees account for 40.5 % with the highest proportion of spruce (25.9%). The proportion of the main broadleaved trees (beech, oak tree) and fir tree

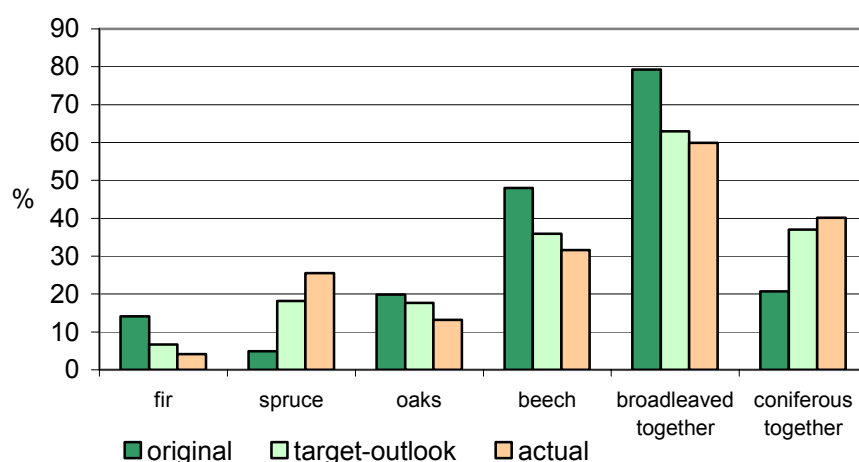


was reduced due to a long term preference of spruce and other coniferous trees (pine trees, larch).

However, the situation in Slovak forests from the viewpoint of ecology is, in fact, rather favourable as to the species composition. In order to increase the biodiversity of forest ecosystems, which considerably increases the ecological stability of forests, continuous fulfilment of all the functions of forests and of the requirements for wood production and with regard to the expected climate change, the preference of broadleaved trees will probably prevail, especially by means of natural renewal in suitable natural conditions which are taken into account in the **target-outlook** tree species composition. Any changes in the species structure of forests, however, require a long-term process.

The currently increasing proportion of beech by 0.2% compared to 2008 is a **positive tendency** and the decreasing proportion of spruce in the same volume.

#### Original, target and actual (2009) representation of selected trees (%)



Source: NFC Zvolen; Processed by: SEA  
(Indicator [Tree species composition of forests](#))

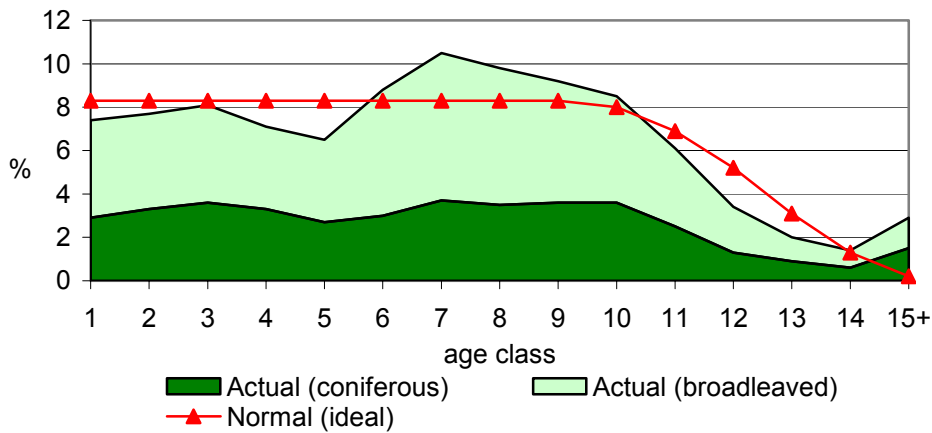
#### Age composition of forests

From the viewpoint of the preservation of biodiversity and fulfilment of all the functions of forests it is necessary to monitor the age composition of trees as well.

A gradual shift of the vegetation representation to higher levels is observed from the viewpoint of the age composition. The actual age composition of forests in the SR is, however, partially different from the normal (theoretical) one. Especially the representation of medium-age (5-9) and oldest (14-15+) age levels is above the normal representation.

As shortly there will be further shift of age levels with above the norm representation to the age of felling maturity, the increase of felling opportunities can be expected for the period of more than 50 years. The scope of this increase will also depend on the condition of future felling vegetation. The insufficient area of current vegetation younger than 50 years can have unfavourable consequences for the amount and balance of felling after this period.

### Actual (2009) and ideal age structure of forests (%)



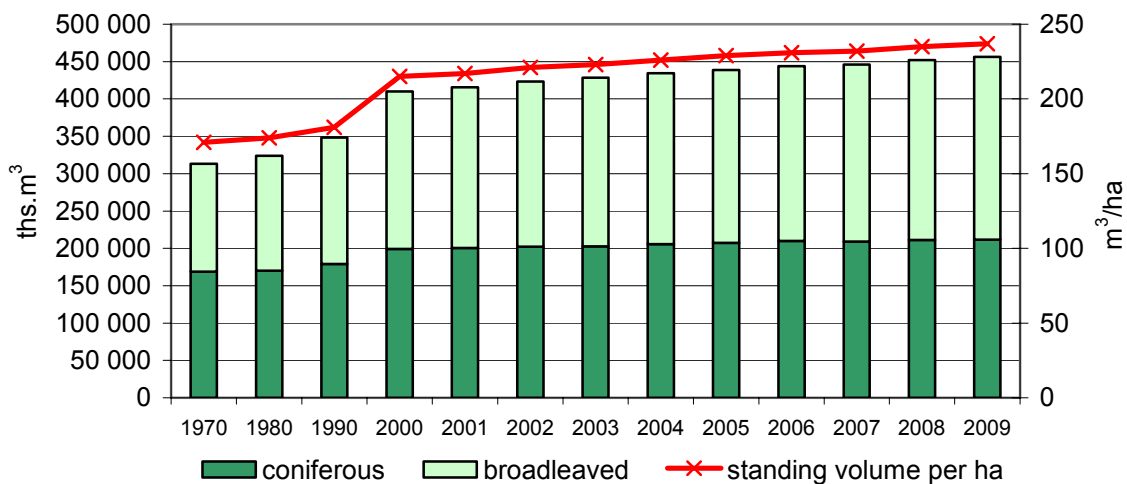
Source: NFC Zvolen; Processed by: SEA  
(Indicator [Age composition of forests](#))

### Standing volume

The standing volume in the forests of the SR has been **increasing** in the past decades and in 2009 it reached 456 mil.m<sup>3</sup> d<sub>bh</sub>>7 cm under bark. Since 1990 the total standing volume as well as the average standing volume per hectare has increased by 31%, whereas since 1994 the standing volume of broadleaved exceeds the standing volume of coniferous. The average standing volume **per ha** currently represents **237m<sup>3</sup>**.

The increase in standing volume results in a disproportion between the increment and felling which is mainly caused by a higher than the norm proportion of pre-felling 50-100 year old forest stands and lower proportion of felling stands.

### Trend in standing volume (thous.m<sup>3</sup>; m<sup>3</sup>/ha)



Source: NFC Zvolen, SO SR; Processed by: SEA  
(Indicator [Standing timber volume](#))

### 4.1.3. Forest health

#### Damage of forests by air pollutants

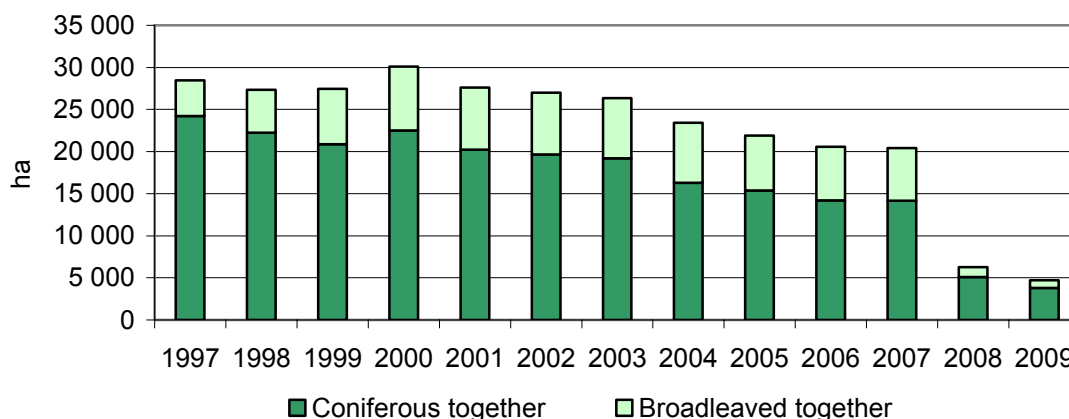
The factors which influence the condition and development of forest management also include its health and vitality. One of the basic strategic aims is, therefore, to make the forests damaged by air pollutants healthier and to increase the efficiency of the integrated forest protection.

The air pollutants (immission) damage of forests in the past years has been **slightly decreasing** which is related also to the decreasing development of particular matter emissions (solid substances, SO<sub>2</sub>, NO<sub>x</sub>, CO) which is also reflected in the decrease of incidental felling due to immissions. The level of acid deposition on forests and forest soil is still very high (whereas the deposition of sulphur is still a little higher than the deposition of nitrogen) and it will take further decades until the ecological balance in forests is renewed.

No further **soil acidification** (meaning the decrease of pH) was found during the last decade, however, regionally, the acid deposition threatens less buffer soils and forest ecosystems and a long-term problem is represented by the contamination of soil with heavy metals, especially close to their emission sources.

The immissions **damaged** 62 ths.m<sup>3</sup> of wood matter in 2009, whereas 51 ths.m<sup>3</sup> of wood matter has been processed up to now. A harmful effect of immissions on forest stands has been considerably reduced for the past 10 years. Immissions cause an annual damage in the amount of 15 mil. euro to forests.

#### Damage of forests by air pollutants (ha)



Source: SO SR; Processed by: SEA  
(Indicator [Forests damage caused by immissions](#))

Due to a synergic effect of the complex of harmful agents and ongoing climate change there is a vast **extinction of spruce grove** which assumes an extensive character and affects all age classes. The largest damage occurred in the Kysuce, Orava, Tatra and Spiš region. The existing situation can be characterised as the most serious problem in coniferous areas at present which seriously threatens the provision of welfare and production functions of forests in the affected regions and areas.

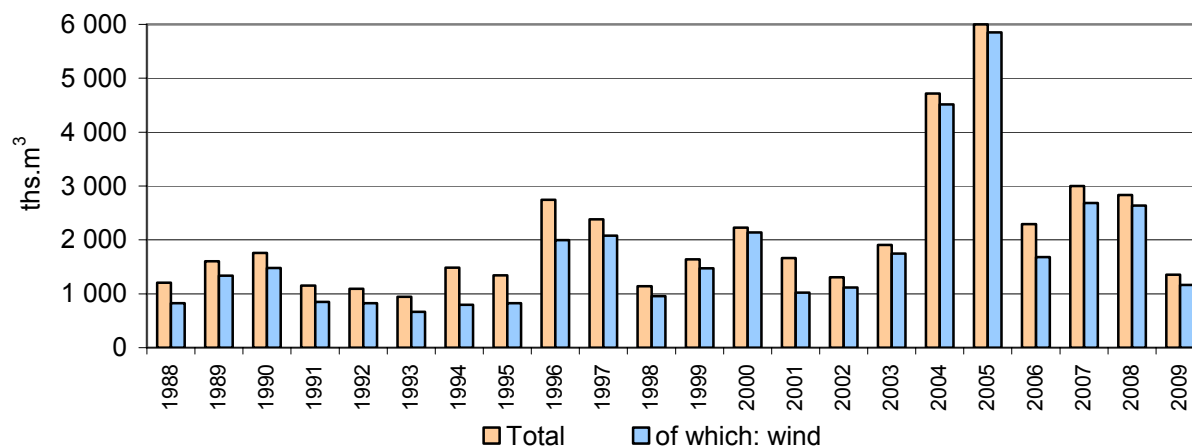
Only approx. 20-25% out of the total volume of depositions of air pollutants in Slovakia originates from local sources. The majority of pollution thus **originates abroad**, mainly in industrial areas of neighbouring countries.

#### Abiotic injurious agents

A high percentage of coniferous and broadleaved trees is damaged and thus more susceptible to natural disasters. The damage to forests is mostly performed by abiotic injurious agents (wind, snow, drought, frost etc.) out of which the highest representation (85.8% in 2009) accounts for **wind storms** (1,163.0 ths.m<sup>3</sup> of damaged wood). 91% out of the total volume of 1,355 ths.m<sup>3</sup> of wood matter damaged by abiotic injurious agents in 2009 was processed, whereas 113 ths.m<sup>3</sup> remained unprocessed.

The consequences of injurious agents can be also identified by the volume of **incidental felling**. Its volume reached 5,586 tis.m<sup>3</sup> (60.4% out of the total amount) in 2009.

### Injury of forest stands by abiotic agents (thous.m<sup>3</sup>)



Source: MoA SR; Processed by: SEA  
(Indicator [Abiotic injurious agents](#))

The occurrence of abiotic agents and their consequences on forest stands cannot be forecasted more accurately, they mainly depend on meteorological phenomena. From long-term viewpoint it can be expected that the damage will grow in future. Especially the spruce forest is susceptible to damage, whereas the damage arises mostly in autumn and winter period.

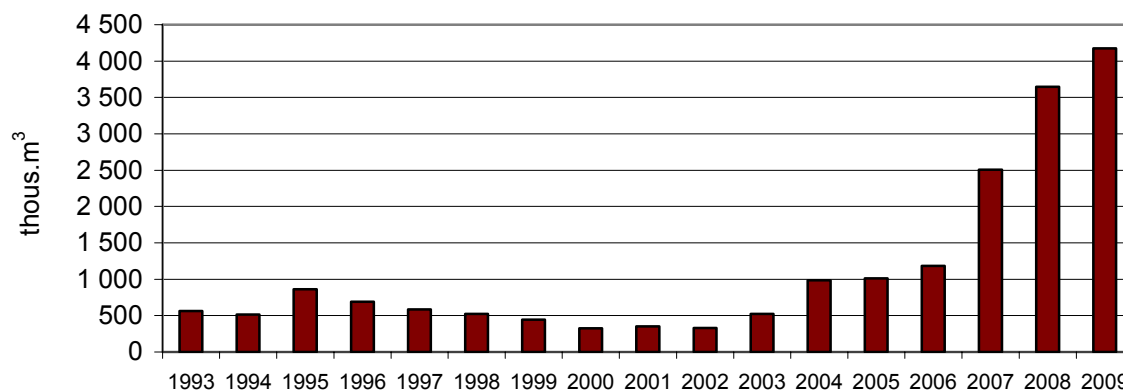
### Biotic injurious agents

Out of biotic injurious agents the most significant group is represented by **bark beetles**. In 2009 they attacked **4,174.4 ths.m<sup>3</sup>** of wood matter (it is the highest figure since 2003), out of which the highest proportion is represented by spruce bark beetle (more than 81%). There is a total amount of 24% of unprocessed damaged wood matter (similarly, the highest figure for the past 17 years). The situation with the damage of stands by bark beetles and woodborers can be basically described as very unfavourable.

**Phytopathogenic microorganisms** damaged **386 ths.m<sup>3</sup>** of wood matter in 2009 (out of this 84% by honey fungus) which in comparison with the previous year represents an increase by 32.6%. Altogether 87% of damaged wood matter was processed.

The damage caused by **game** in forest stands has been continuously increasing since 1999, which corresponds to the increase of the spring stock of deer game. The total estimated damage was twice as much as in the previous period and it reached the value of 987,676 euro which is the highest figure for the past 20 years.

### Damage of forest stands by bark beetles and woodborers (thous.m<sup>3</sup>)



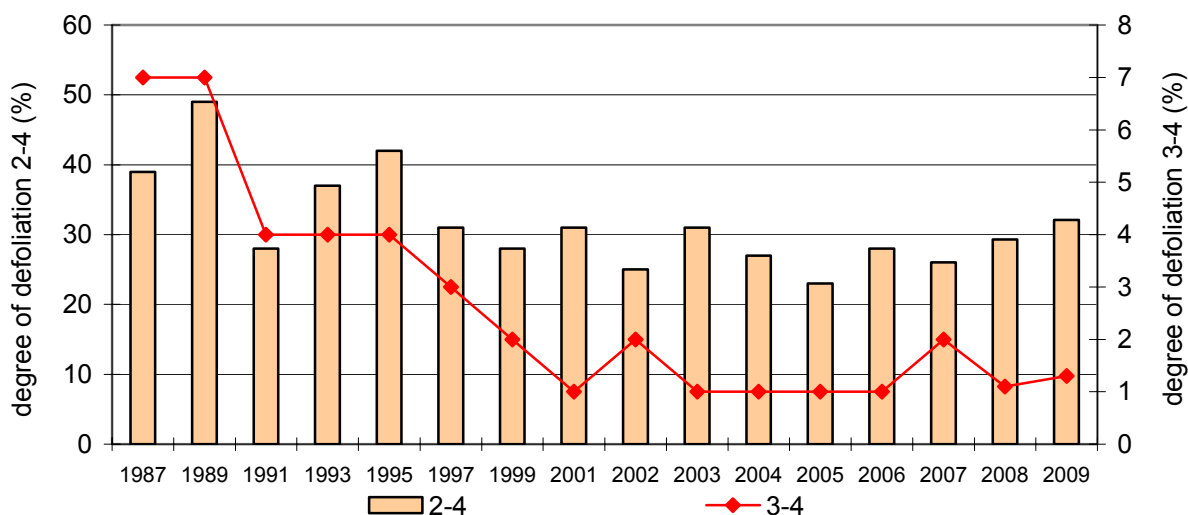
Source: NFC Zvolen; Processed by: SEA  
(Indicator [Biotic injurious agents](#))

## Forest health condition

Year 1989 can be considered as the most critical one with as much as 49% of trees was classified as grade 2-4 of forest damage (defoliation of trees up to 26-100%).

In the recent years the health condition of forests has **improved**, whereas it can be considered as **stabilised**. The fluctuations in the particular years have been caused mainly by climate factors and weather. At present, 32% of trees show the signs of damage which has been largely caused by immissions. The most damaged **trees** included the oak tree, fir tree and spruce, the least damaged was the hornbeam.

### Trend in forest defoliation (%)



Source: NFC Zvolen; Processed by: SEA  
(Indicator [Forests condition by degree of defoliation](#))

### 4.1.4 Increasing economic efficiency of forest management

**Sales and revenues** of forest management in 2009 dropped by 23%, although the volume of sold wood increased by 3%. This was caused mainly by a 22% decrease of the price of sold wood.

The amount of **costs** in the economy of forest management currently affects, apart from other things, also the total scope of cultivation works and protection measures. Long-term effect of immissions especially on mountain forests in Slovakia negatively influences their health condition and it has far-reaching consequences which are manifested in the decrease of growth, quality and receipts for wood. The **timber sale** is a crucial item for the covering of the above costs and for the preservation of forest functions and employment in forestry. The consequences of the action of anthropogenic agents are also manifested in the alarming increase of incidental felling which represents a high percentage of the total performed felling. Wind and snow storms are significant, but also regional spreading of bark beetles and woodborers.

Nowadays a considerable decrease in the support of forestry via state funding was observed as well. The **support from public sources** has reached 33.1% of 1990 level in current prices and only 5.4% in fixed prices of 1990. For this reason the newest and ecological technologies in forest management which provide for the application of finer management methods are not applied sufficiently and neither the ecologic nor the social functions of forests are sufficiently compensated. The increased costs must be covered from the receipts for wood matter or the welfare functions of forests are not provided as requested. There was

a decrease in the amount of financial resources for research and development by the Ministry of Agriculture of the SR as well.

Economy and efficiency of business activity of **non-state forests** has started to influence forest management in Slovakia more, as the difference in the area managed by non-state subjects compared with state forests is only 17%.

The competitiveness of forest management by the particular forest management subjects as a whole can be accurately assessed also on the basis of the **economic results** of forest production or of the whole production activity. In 2009 it reached the value of 13.49 mil. euro which is, however, by 44% less than in the previous year.

The forest management points, within its expected future, at the **increasing of competitiveness** and economic viability of forestry, especially by the strengthening of financial mechanisms and performing of efficient measures in order to increase the contribution of forests to rural development and reduction of the impact of the crisis on forest management and wood processing entities. This includes the start-up of economic transformation of forest management in order to become, instead of just a wood supplier, an important supplier of paid welfare services for the society as well as the creation of suitable conditions for the use of EU funding within the rural development scheme for the period of years 2007-2013.

In order to provide for the competitiveness of forest management the National Forest Centre has prepared the *“Analysis and quantification of financial and economic crisis impacts on forestry in the Slovak Republic and proposed measures for its solution”*. The Ministry of Agriculture of the SR submitted proposals for solution to the Slovak government and adopted special measures together with the related organisations. Public funding aid has also partially contributed to the resolving of the situation in forest management which amounted to 13,487 ths. euro in 2009 (by 3,097 ths. euro more than in 2008).

## 4.2 Legislative instruments in forest management

One of the main tools for the performance of forest management strategy is the forestry legislation.

### Act no. 326/2005 Coll. on forests

The new act no. 326/2005 Coll. on forests effective as of September 1, 2005 is based on the social function of forests as one of the most important components of the environment and at the same time as a producer of a renewable raw material - wood. It is related to the rich tradition of the past legislation on forestry and at the same time it is aimed at the provision of a modern concept of sustainable forest management. The increase of requirements for other than production functions of forests enabled the harmonisation of the interests of the society and forest owners (compensation of property loss due to the limitation of ownership rights). It adjusted the methods of professional and differentiated forest management, its financial provision, it deals with the state participation in the enhancement of forest management which is necessary from the viewpoint of provision of irreplaceable functional effects which are in the interest of the whole society (specifies the possibility of public funding) and it removed the legislative disunity of the forestry issue.

The act corresponds with the respective EU legislation. From the viewpoint of the attention which the act pays to the requirements on the preservation of biological diversity, production and renewal capability and functional efficiency of forests complete corresponds with the worldwide used concept of sustainable forest management as well as with the international treaties and conventions which are binding for the Slovak Republic.

Its amendments are included in the following legal regulations: act no. 275/2007 Coll., 359/2007 Coll., 360/2007 Coll., 540/2008 Coll., 499/2009 Coll. and 117/2010 Coll. effective as of May 1, 2010.

### **Further legal regulations in forest management**

A list of binding legal regulations for the area of forest management together with a brief description of their environmental aspects is available at:

<http://enviroportal.sk/legislativa/>

## 5. WHAT IS AN IMPACT OF FOREST MANAGEMENT ON ENVIRONMENT IN THE SR?

On the whole, to speak about the impact of forest management on the environment (especially in the negative sense – which is justified in case of other economic sectors) is not relevant with regard to its specific position. This is mostly due to the fact that the main organic production tool in forest production is the forest which is a complicated ecological system consisting of and influenced by a series of natural agents and which is basically one of the components of the environment and landscape. Forest ecosystems play a key role and they have an irreplaceable place in the creation and protection of environment in the landscape and in the preservation of ecological stability of the area. That is why it is hardly possible to speak about negative impacts of the forest management sector on the environment (while maintaining conception and legislative measures) as it is obvious in case of other economic sectors. Forestry has always been more based on ecological principles than agriculture or other sectors.

Forest management as a basic eco-stabilisation factor not only of Slovakia but from the European viewpoint took an active participation in the creation of environment. The conclusions of five minister conferences on the forests protection in Europe were adopted and elaborated. The UN conference on environment and development in Rio de Janeiro also adopted important documents in relation to forest management. With regard to the special position of forest management and interrelatedness of forests with the surrounding landscape, its impact on the environment is mostly positive.

This also follows from the performance of the measures included in the forestry conception of the Slovak Republic in accordance with the EU strategy and long-term strategic aims of forestry based on the global interests of the humankind which assumes the introduction of sustainable forest management, increased ecologisation of activities, development of biodiversity of forest communities and strengthening of welfare functions of forests as such.

Forest management which fulfils the criteria of nature protection is, however, possible, if the increased cost and damage incurred by their owners and users is compensated. Any potential negative environmental impacts of the sector are/can also follow from its limited economic possibilities as a part of which the forest management is to provide for the welfare functions of forests as well as the environmental requirements. They can also follow from the condition and operation of the traffic network and felling activities.

### 5.1 Initial situation

As a result of large geographical variety of Slovakia in a relatively small territory there is a wide scale of forest vegetation grades which include a rich spectrum of forest types. Commercial forests occupy 69.8% and their area has had a decreasing tendency since 1990, but on the other hand, the proportion of protective forests and special purpose forests has increased. The highest naturalness level includes more than 28% of the stand area of Slovak forests. From the viewpoint of ecological stability of forest ecosystems it is possible to state that Slovakia has almost 20% of ecologically stable and 48% of largely ecologically stable forest ecosystems.

The significance of forests, as the main component of natural and landscape environment, is and will be growing. Therefore, the soil protection and water management functions of forest stands will be further strengthened (their positive effects for the regulation of water flow, water retention), as well as their irreplaceable function from the viewpoint of nature and landscape protection (they offer shelter, substrate and food for many specialised types of organisms). This will also strengthen the health and recreational function of forests (they create a special kind of forest microclimate and produce oxygen). This will be mainly the creation of special-purpose forests which provide for favourable environment in the vicinity of



medical and preventive care facilities, in the protective zones of natural healing resources, mineral waters and in the protective zones of water resources (tanks). Furthermore, the forest parks and parks near cities will be extended. A gradual ecologisation of forest management will provide for the harmony between the production and welfare functions of forests.

The next chapters deal with the relationship between forest management and surrounding environment and its impact.

**List of forestry-environmental indicators relevant for the characteristic of the relationship between forest management and environment**

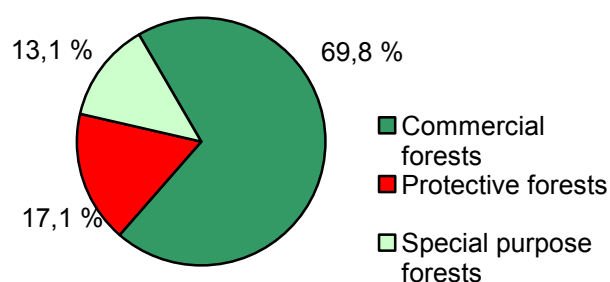
DPSIR reference	Aggregated indicators	Individual indicators
Pressure	Forest regeneration	Natural regeneration share of total annual forest regeneration
	Forest utilisation	Utilisation of forest resources Dendromass production and consumption in forestry
State	Environmental state of forests	Carbon stock in forest biomass and soil
		Forest biodiversity and its endangerment
Impact	Forest functions	Forests categorisation
		Capture of CO <sub>2</sub> emissions by forest ecosystems
Responses	Nature protection	Forests and protected areas Overlapping of forests and NATURA 2000 areas
	Instruments of forest tending	Forest certification

**5.1.1. Importance of forest functions**

**Development of forest categorisation in Slovakia**

The up to now development of forest categorisation in Slovakia shows a long-term decrease of the area of commercial forests to the detriment of forests used for other than production purposes. From 2000, however, we have repeatedly recorded their slight increase (in 2009 it was 69.8%). On the contrary, as a result of increased requirements for the fulfilment of welfare functions there has been an **increase in the area of protective forests** (from 7.9% in 1960 to 17.1% in 2009). In recent years their area is stabilised, however, it is assumed that their area will slightly increase. The area of special-purpose forests with regard to their specific social need was at first growing before it has been reduced – especially due to the leaving out of the subcategory of forests influenced by immissions from special-purpose forests.

**The current representation of forest categories (%)**



Source: NFC Zvolen; Processed by: SEA  
(Indicator [Forests categorisation](#))

## Capture of CO<sub>2</sub> emissions

The proportion of forest management on the production of carbon dioxide is negligible. On the other hand, forest stands considerably **captures** carbon dioxide, whereas their area in the SR represents approx. 41% of the territory. The annual **capture of CO<sub>2</sub> emissions** in the territory of Slovakia is rather variable and it ranges from 1,000 – 5,000 kilotons of CO<sub>2</sub>, which represents a decrease of total emissions of carbon dioxide in Slovakia by 2 – 7%. In **2008** the capture of CO<sub>2</sub> by forest ecosystems represents more than 1,701 Gg. (Indicator [Capture of CO<sub>2</sub> emissions by forest ecosystems](#))

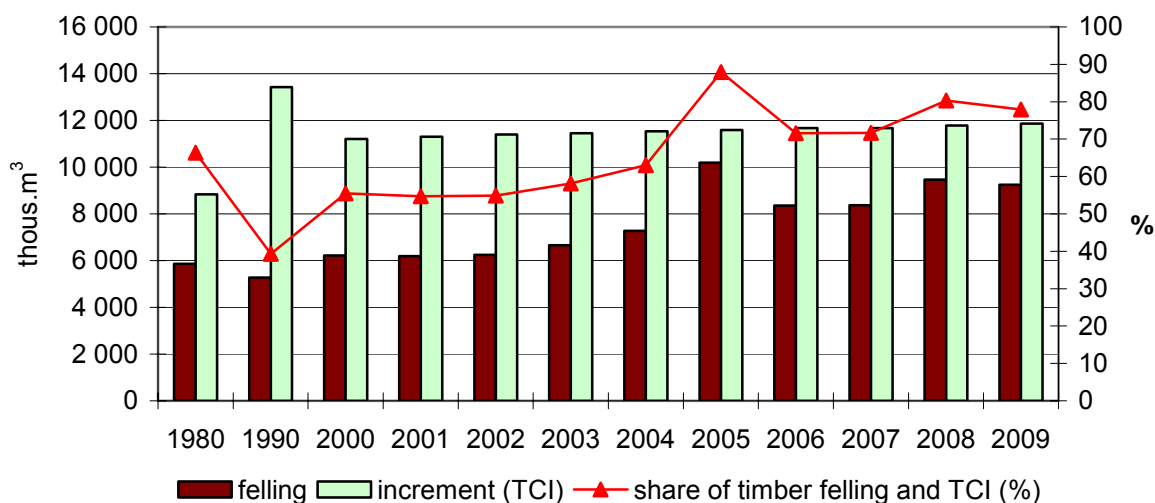
### 5.1.2. Forest utilisation

#### Utilisation of forest resources

The main strategic priority in forestry is also the provision of forest management in accordance with the principles of sustainable management which can be evaluated, apart from other things, based on the intensity of forest resources use. This represents the **proportion between the forest increment and felling**.

This proportion has finally increased from 39.3% (1990) to 77.9% (2009) and this was mainly due to excessive incidental felling caused by natural disasters. The forests utilisation in Slovakia can be considered as sustainable, as the felling is lower than the annual increment, however, the maximum volume of timber felling should not exceed 60% of volume of the total current increment.

#### Proportion between the timber felling and total current increment (thous.m<sup>3</sup>; %)



Source: NFC Zvolen; Processed by: SEA  
(Indicator [Utilisation of forest resources](#))

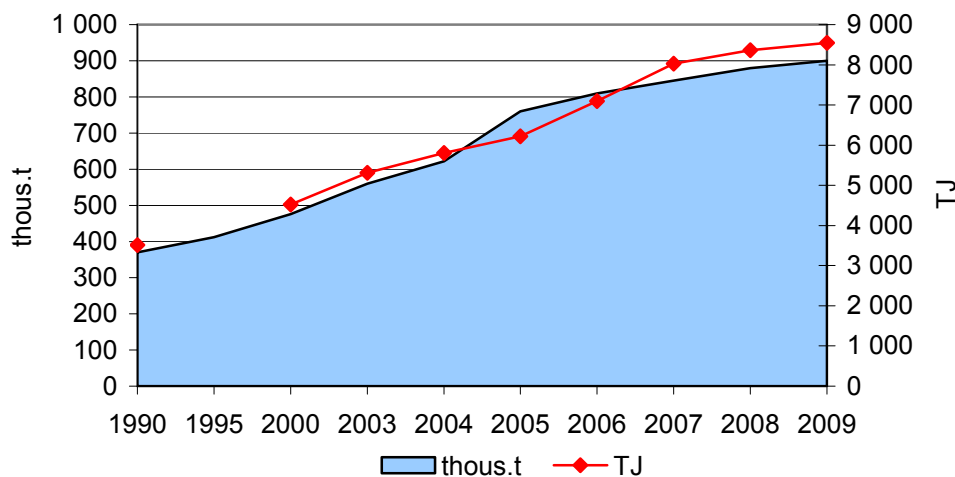
#### Production and consumption of dendromass in forestry

The **consumption** of fuel biomass as well as its **production** (900 ths. tonnes in 2009) has a long-term increasing tendency. The use of forest biomass for energy purposes in the Slovak Republic, as well as in forest management as such is still very much behind the potential possibilities from the viewpoint of resource use, energy efficiency and related environmental and economic benefits, whereas the total exploitable **potential** of fuel dendromass is up to 9% of the consumption of primary energy resources, especially for the production of heat and electric energy. The current proportion of fuel dendromass on the total consumption of primary energy resources in Slovakia is approx. 2.1%, out of this the proportion of forest fuel dendromass is 1%.

In order to support the energy use of biomass as the most important renewable energy resources, the EU Action Plan for Biomass was approved in 2005. The aim in year 2020 was the achievement of 12% of biomass proportion on the total consumption of primary energy resources in the EU. With regard to the current tendency in the growth of foodstuff production and thus in the need of agricultural soil use, the wooden biomass is at least from the medium-term viewpoint more perspective renewable energy resource than the agricultural biomass.

In the recent year, the interest for energy use of wood especially by the public has been increasing.

#### Annual amount of dendromass for energy use produced in forest management (thous.t; TJ)



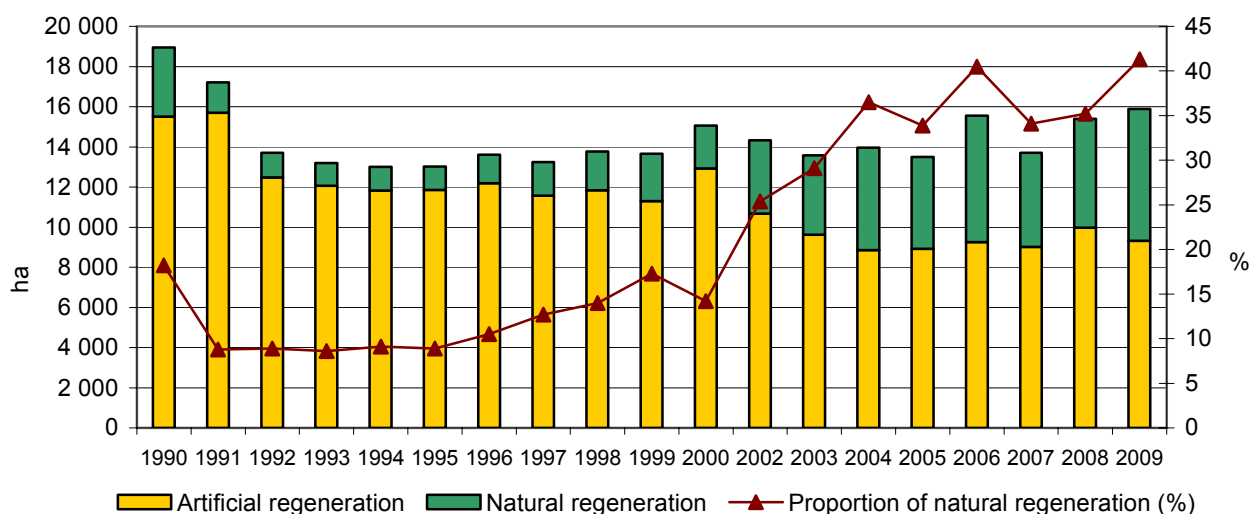
Source: NFC Zvolen; Processed by: SEA  
(Indicator [Dendromass production and consumption in forestry](#))

### 5.1.3. Development of forest biodiversification

#### Development of forest stands regeneration

Recently it was mainly preferred due to economically efficient felling and better use of mechanised work to have a higher proportion of artificial regeneration (achieved proportion was up to 80%). The development in the forest regeneration shows that the total scope of regeneration and artificial regeneration of forest stands is decreasing. Currently, a special emphasis within sustainable forest management is placed on the **increase of the proportion of natural regeneration**, which has virtually doubled in the period 1990 - 2009 and currently it represents **41.8%**. However, at the moment we are not at the same level as the developed countries from the viewpoint of forestry with comparable orthographic conditions and we are gradually approaching their level (40 – 88%). Furthermore, there is a negative tendency in the increase of **clearings** which has increased by 1,417 ha compared with 2008 up to **26,857 ha**.

## Development of forest regeneration in the SR (ha; %)

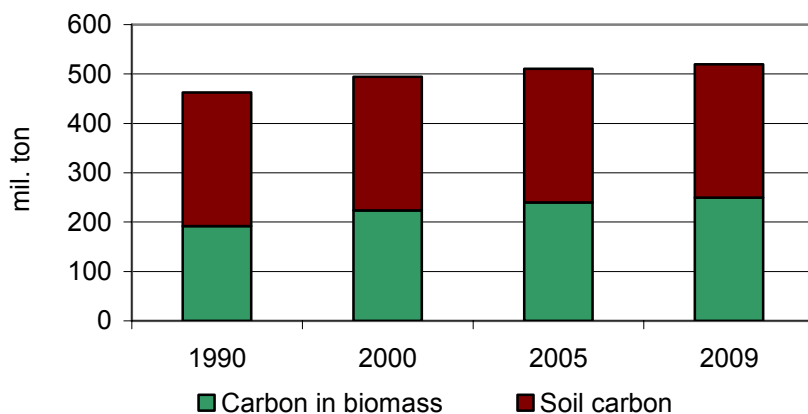


Source: NFC Zvolen; Processed by: SEA  
 (Indicator [Natural regeneration share of total annual forest regeneration](#))

## Carbon stock in forest ecosystems

From the beginning of the century, a part of agricultural soil has been transformed into forest soil. Forests are capable, thanks to a large volume of wooden biomass, to accumulate large volumes of carbon and in this way they reduce the volume of CO<sub>2</sub> in the atmosphere. In the period 1950-2009 the amount of **carbon captured in forests** in the Slovak Republic has increased by more than 50 Tg, especially in case of broadleaved trees which is the consequence of the extension of forested area and increase of standing volumes per hectare.

### Carbon stock in forest ecosystems (mill. tonnes)



Source: NFC Zvolen; Processed by: SEA  
 (Indicator [Carbon stock in forest biomass and soil](#))

## Forest biodiversity and its endangerment

The **biological diversity of forest ecosystems** belongs to the priorities of current forestry and to the main roles of forest management at the beginning of new millennium. The development towards species and age diversity of forests is important in this regard. One of the indicators of forest functionality is that the forest biotopes are still home to the largest number of vertebrates on the European continent.

It is very important for the implementation of sustainable forest management to monitor endangered forest species. There is no special database with such species in Slovakia as yet. The largest number of critically endangered species in Slovakia comes from the biotopes which are globally threatened in the whole Europe.

The data collected by UN/ECE/FAO within their new global evaluation of forests in temperate and boreal zone (TBFRA 2000) is available on the species bound to forest environment. These data show that 20-50% of mammals and 15-40 % of birds bound to forest biotopes are classified as endangered species.

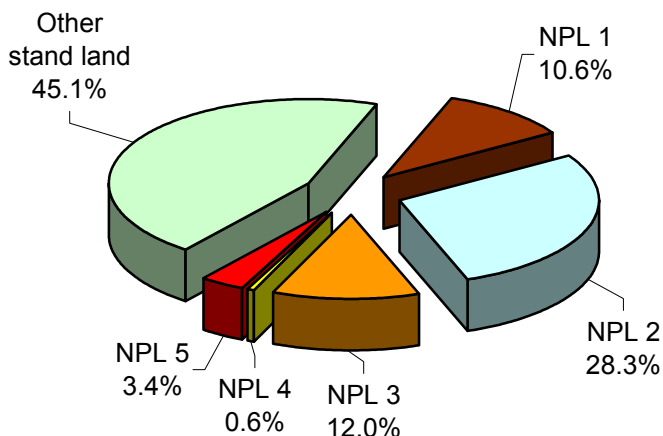
In order to provide for appropriate protection, enhancement and sustainability of forest biodiversity it is important to systematically monitor and evaluate its condition. In this regard Slovakia as a signatory of minister conferences on the protection of forests in Europe must use the national indicators for the evaluation of the *“Preservation, protection and appropriate increase of biological diversity of forest ecosystems”*. (Indicator [Forest biodiversity and its endangerment](#))

### Forests and protected areas

Forests have an irreplaceable place in the creation and protection of nature and landscape and they are a valuable component of special protected areas. The protected areas are declared for the purpose of protection of the most important natural heritage, whereas often they are parts of forest ecosystems which are in good condition. **Woodiness** of special protected areas of nature is **72.6%** (whereas the woodiness of protected landscape areas represents 71%, national parks 72% and small-sized protected areas 74.3%), which implies the huge importance of forest ecosystems in these areas.

The total **area of protected areas** in the Slovak Republic represents 23.1% of the Slovak territory and approx. **37%** of the **area of forest land** (whereas the protected landscape areas represent 19%, national parks 14% and small-sized protection area 4% of the territory of forest land). In this situation the forest management and nature protection are in conflict of interests, whereas the total proportion of forests with nature protection limits represents 55%.

### Proportion of nature protection levels (NPL) in the Slovak forests (%)



Source: MoE SR; Processed by: SEA

Forest management is limited in the protection level 2 to 4, which mainly concerns the use of pesticides and fertilisers, construction of forest paths and other objects, gathering of forest fruits and performance of hunting rights, whereas it is completely out of question in the strictest protection level 5. Long-term experience shows that the situation with nature protection is not ideal, as the particular limits are too general and they often do not correspond with the requirements of organisms or biotopes which are the subject of

protection in the particular protected areas. The excessive scope of protected area network of forest land is to be re-evaluated including its zonation, apart for other reasons also due to the restraint of ordinary forest management and related damage.

### Large-sized protection areas in the SR and its woodiness



Processed by: SEA  
(Indicator [Forests and protected areas](#))

### Overlapping of forests and NATURA 2000 areas

Within the **NATURA 2000** network, the forest lands (FL) in proposed Special Protection Areas (SPA) represent **53%** and in the proposed Sites of Community Importance (SCI) **86.7%** of their area. The protection of these areas is performed depending on the level of their protection (level 2 – 5) with increasing limitation/restrictions of various activities or management. According to the directives of NATURA 2000 there is, however, only the purpose which is important – namely, the favourable condition of species and biotopes from the viewpoint of nature protection, thus there are no defined particular measures (they are fully within the competence of the EU member states). In many forest areas of NATURA 2000 there is no need to change the current management method, because it was the very reason which has led to the existence of the subject to be protected and the area to be defined. However, not all the purposes of nature protection can be achieved by sustainable forestry. The existence of untouched areas without any economic activity is necessary and important, especially from the scientific viewpoint (as reference area).

#### Area of forest lands in NATURA 2000 territories (ha)

Protected areas (PA)	Total area (ha)	Area of FL (ha)	Proportion of FL in SCI (%)	Proportion of FL from total FL (%)
<b>SCI</b>	573,690	<b>497,295</b>	<b>86.7</b>	24.75
of which: SCI – within the national network of PA		429,719		
<b>SCI – outside the national network of PA (protection level 2)</b>		67,576		<b>3.36</b>
<b>SPA</b>	1,236,545	<b>655,622</b>	<b>53.0</b>	32.63
of which: SPA – within the SCI and national network of PA		443,578		
<b>SPA – outside the SCI and national network of PA (protection level 1)</b>		212,044		<b>10.55</b>

Source: MoE SR, ŠNC SR  
(Indicator [Overlapping of forests and NATURA 2000 areas](#))

### Situation with forest certification (Area of certified forests)

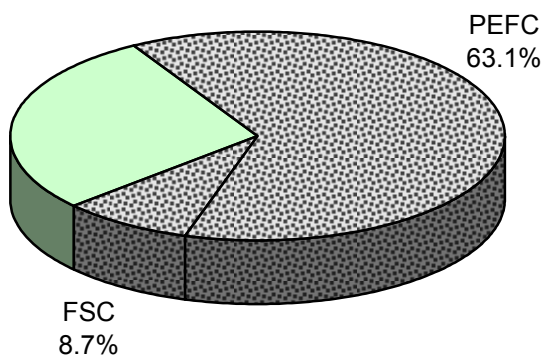
One of the ways to protect natural richness, which forests undoubtedly belong to, is to support the consumption and use of wood and wooden products originating from such resources which are managed in a sustainable way. This support is performed by **forest certification**, whereas the evaluation is performed by an independent third party, as to whether the forest management corresponds with the ecological, economic and social standards according to the internationally accepted criteria. If it complies, the forest owner will be given a certificate which contains the evaluation results.

The certification of forests or forest products is a direct economic tool for the enforcement of certain principles of forest management in practice: important wood processing companies require certified wood and their wood products are also certified, which means that the customer knows that the future of forest was not threatened due to their production.

Forest certification in the SR is performed via 2 most widely schemes in Europe: PEFC and FSC. In 2009, **PEFC** (Programme for the Endorsement of Forest Certification) certified **1,266,417 ha** of forests (**63.1 %** of Slovak forests area), which represents an increase in their area compared to 2008 by 45,682 ha. The Slovak market currently disposes of approx. **4 mil. m<sup>3</sup> of wood** which originates from the resources certified under PEFC.

Under **FSC** (Forest Stewardship Council) there were 7 valid certificates of forest management in 2009, out of which 2 are group certificates (Gemer Regional Owners Association of Non-State Forests). Overall, there are **20 subjects** certified under FSC which manage forests with the area of **174,086 ha**. The number of FSC certificates and the certified area remained the same compared with the end of 2008.

#### Area of certified forests in the SR (from total forest lands area)



Source: NFC Zvolen; Processed by: SEA  
(Indicator [Forest certification](#))

## 6. IS THE ECO-EFFICIENCY OF FOREST MANAGEMENT IMPROVING IN THE SR?

Currently, there is a lack in the intersection of the particular sector policies the fulfilment and mutual action of which would head towards sustainable development. Thus, there is a need to respect an integrated approach to eliminate environmental problems and integrated management of their control.

The success of the environmental policy implementation into economic activity sectors can be characterised also by correlation dependence between the economic indicators of the particular sector (expressed by GDP/GVA indicators) and environmental indicators with negative consequences for the environment (e.g. by the trend of emissions of air, water pollutants, by exploitation of natural resources, energy etc.), or also positive consequences. Roughly, the particular economic activity sector is becoming environmentally efficient, if its economic growth is provided with minimum negative environmental consequences and improvement of positive environmental consequences.

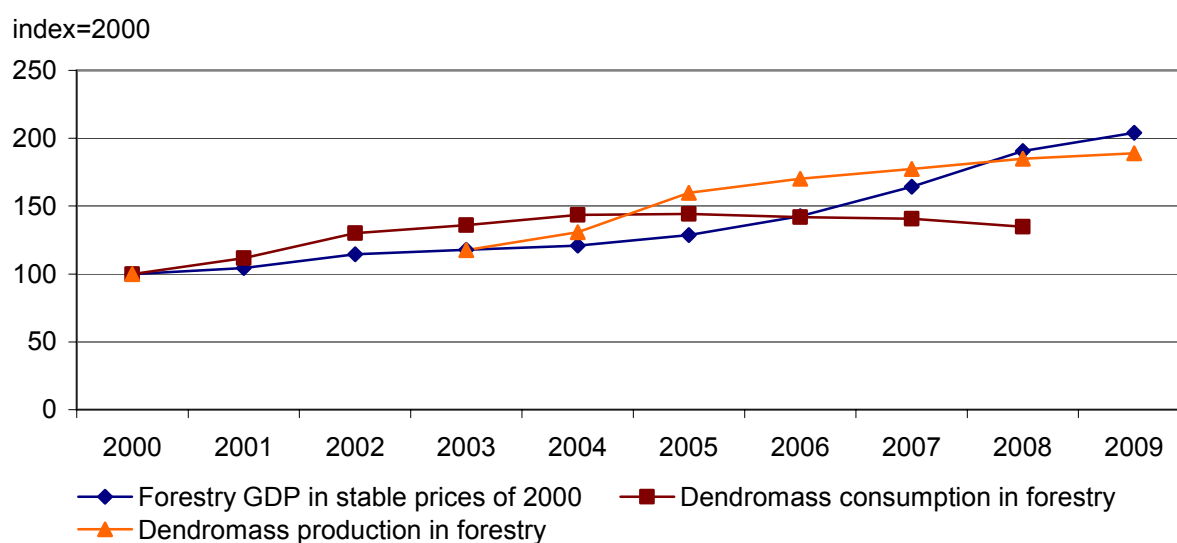
On the whole, to speak about environmental efficiency of forest management based on the evaluation of negative impacts on economic progress is not very relevant and possible with regard to its specific position towards other economic sectors (a forest is both production means and environment) and also for the lack of sufficient data for such an evaluation.

### 6.1 Eco-efficiency of forest management with regard to dendromass production and consumption

Dendromass production in forest management (900 ths. tonnes in 2009) with a growing GDP of forest management has been increasing in the long term which is a positive tendency of environmental efficiency of forest management with regard to dendromass production.

Its consumption within forest management shows, however, a slight decrease since 2005 (22.9 ths. tonnes in 2008), which can be evaluated, with a growing GDP, as a partially negative tendency of environmental efficiency of forest management with regard to dendromass consumption.

#### Eco-efficiency of forest management with regard to dendromass production and consumption



Processed by: SEA

(Indicator [Eco-efficiency of forest management with regard to dendromass production and consumption](#))

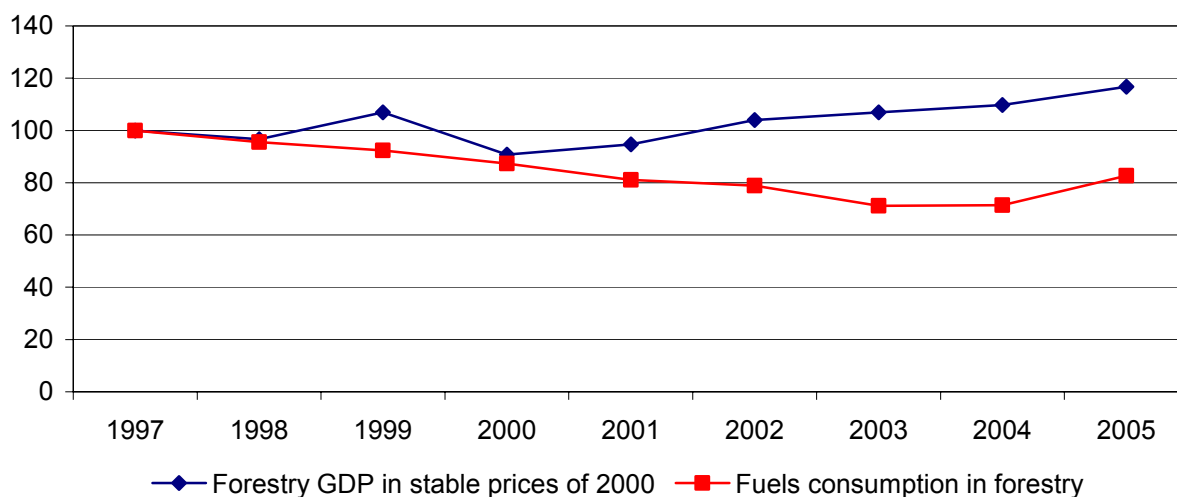


## 6.2 Eco-efficiency of forest management with regard to fuel consumption

The evaluation of environmental efficiency in relation to the total consumption of fuels in forest management can be considered as partially positive, as the consumption of fuel in forest management has been gradually decreasing (with the exception of year 2005), which indicates more moderate impacts on the environment, whereas the GDP in the forest management sector is gradually growing. Newer data on the fuel consumption in forest management is, unfortunately, not available.

### Environmental efficiency of forest management with regard to fuel consumption

index 1997



Processed by: SEA

(Indicator [Eco-efficiency of forest management with regard to fuel consumption](#))

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## Abbreviations

CLC	Corine Land Cover
DPSIR	Driving force - Pressure - State - Impact - Response
EC	European Commission
EEA	European Environment Agency
EU	European Union
EUROSTAT	Statistical Office of the European Union
FAO	Food and Agriculture Organization of the United Nations
FL	Forest Lands
FSC	Forest Stewardship Council
GDP	Gross domestic product
GVA	Gross Value Added
MCPFE	Ministerial Conference on the Protection of Forests in Europe
MoA SR	Ministry of Agriculture of the Slovak Republic
MoE SR	Ministry of Environment of the Slovak Republic
NATURA 2000	Ecological Network of Protected Areas in the Territory of the European Union
NFC	National Forest Centre
OECD	Organisation for Economic Co-operation and Development
PA	Protected Areas
PEFC	Programme for the Endorsement of Forest Certification
SCI	Sites of Community Importance
SEA	Slovak Environmental Agency
SNC SR	State Nature Conservancy of the Slovak Republic
SO SR	Statistical Office of the Slovak Republic
SPA	Special Protection Areas
SR	Slovak Republic
TBFRA	Temperate and Boreal Forest Resource Assessment
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNECE	United Nations Economic Commission for Europe
UNFF	United Nations Forum on Forests
WWF	World Wildlife Fund