



GREEN REPORT

REPORT ON THE STATUS OF FORESTRY IN THE SLOVAK REPUBLIC 2008

2008

GREEN REPORT

Ministry of Agriculture of the Slovak Republic



REPORT ON THE STATUS OF FORESTRY IN THE SLOVAK REPUBLIC 2008
GREEN REPORT

ENGLISH VERSION

Bratislava, December 2008

ISBN 978 - 80 - 8093 - 065 - 3



Ministry of Agriculture of the Slovak Republic

REPORT ON THE STATUS OF FORESTRY IN THE SLOVAK REPUBLIC 2008

GREEN REPORT

Bratislava
2008



REPORT ON THE STATUS OF FORESTRY IN THE SLOVAK REPUBLIC 2008

GREEN REPORT

Published by: Ministry of Agriculture of the Slovak Republic in cooperation with the National Forest
Centre – Forest Research Institute Zvolen
First edition

300 copies

177 pages
Not for sale

Printed by: National Forest Centre

Copyright © Ministry of Agriculture of the Slovak Republic in cooperation with the National Forest
Centre – Forest Research Institute Zvolen 2007

ISBN 978 - 80 - 8093 - 065 - 3



CONTENTS

ACKNOWLEDGMENTS	7
FOREWORD	8
ACRONYMS AND ABBREVIATIONS	10
1. INTRODUCTION	12
1.1 General overview of Slovak forest sector	13
1.2 Global and European initiatives on forests	15
1.3 National forest policy	17
1.4 Regulatory framework	18
2. FOREST FUNCTIONS	20
2.1 Production functions	20
2.2 Ecological functions	21
2.3 Social and cultural functions	22
2.4 Forests by their prevailing functions	23
3. FACTORS AFFECTING FOREST PRODUCTION	26
3.1 Climatic conditions	26
3.2 Ground level air pollution	26
3.3 Climate change and forests	27
4. FOREST CONDITION AND ITS DEVELOPMENT	30
4.1 Investigation and monitoring of forest condition	30
4.1.1 Forest stand description	30
4.1.2 National Forest Inventory and Monitoring	30
4.1.3 Comprehensive Investigation of Forest Condition	31
4.2 Natural conditions	31
4.3 Forest area	32
4.4 Tree species composition and forest origin	33
4.5 Age structure	35
4.6 Spatial structure	37
4.7 Biological diversity and ecological stability of forests	37
4.8 Growing stock and carbon sequestration	39
4.9 Forest health and vitality	41
5. FOREST DISTURBANCES AND THEIR IMPACT	45
5.1 Abiotic disturbance	45
5.2 Biotic disturbances	46
5.3 Anthropogenic disturbances	50
6. FOREST RESOURCES MANAGEMENT	54
6.1 Gene pool and reproductive material	54
6.1.1 Inspection of reproductive material	54
6.1.2 Sources of forest reproductive material	54
6.1.3 Management of forest seed stock	56
6.1.4 Forest nurseries	57
6.2 Silviculture	58
6.2.1 Forest regeneration	58
6.2.2 Treatment of young forests	59
6.2.3 Cleaning operations	59
6.2.4 Thinning	60
6.3 Silvicultural systems	61
6.4 Felling operations	62
6.4.1 Timber felling	62
6.4.2 Actual felling and available commercial growing stock	64

6.4.3	Timber transportation	65
6.4.4	Forest road network	66
6.5	Forest protection	67
6.5.1	Forest Protection Service	67
6.5.2	Preventive measures	68
6.5.3	Disturbance measures	69
6.5.4	Fire control	70
6.6	Certification of sustainable forestry	71
6.6.1	PEFC certification	71
6.6.2	FSC certification	72
6.7	Technical normalization in forestry	72
7.	TIMBER TRADE	75
7.1	Domestic timber supply	75
7.2	Timber export & import	77
7.3	Timber consumption	79
7.4	Timber prices	79
7.5	Timber price factors	82
8.	FORESTRY ECONOMICS	85
8.1	Macro-economic conditions	85
8.2	Sectoral and national statistics	86
8.3	Sectoral earnings and revenue	88
8.3.1	Timber sale returns	88
8.3.2	Other earnings and revenue	89
8.4	Public and EU funding	90
8.5	Sectoral costs	92
8.5.1	Material costs including depreciation	93
8.5.2	Personnel costs	93
8.5.3	Production costs	93
8.6	Exploitation of production factors and economic result	95
8.6.1	Value of production factors	95
8.6.2	Rate of production factor exploitation	96
8.6.3	Sectoral economic performance	96
8.6.4	Economic result	98
8.6.4.1	Economic result of state subjects	98
8.6.4.2	Economic result of non-state subjects	99
8.7	Economic tools	100
8.7.1	Prices of key production factors	100
8.7.2	Taxes	100
8.7.3	Credits	101
8.7.4	Levy for forest property exclusion	102
8.7.5	Fines and sanctions for the violation of enforced regulations	102
8.7.6	Compensations for forest property damage	103
8.7.7	Compensations for restriction of ownership rights	103
8.8	Investments	104
8.8.1	Operations and supplies for commercial development	104
8.8.2	Machinery and equipment investments	104
8.9	Aggregated Forestry Economic Account (AFEA)	105
8.10	Socio-economic statistics and employment	107
8.10.1	Acquisition of socio-economic data	107
8.10.2	Labour and job motivation	107
8.10.3	Sickness and occupational injuries	108
9.	ORGANIZATIONAL AND INSTITUTIONAL STRUCTURE	112
9.1	State administration on forestry and game management	112
9.2	Ownership and management of forests	113
9.3	Subjects managing and commercially exploiting forests	114

9.3.1	State forests	114
9.3.2	Non-state forests	115
9.3.3	Commercial sector	116
9.4	Professional forestry bodies	116
9.4.1	National Forest Centre	116
9.4.2	Other state funded forestry entities	118
9.5	Interest groups and associations	119
9.5.1	Slovak Forestry Chamber	119
9.5.2	Associations of non-state forest owners	120
9.5.3	Association of Forest Sector Employers	120
9.5.4	Slovak Hunting Union	120
9.5.5	Council for Economic and Social Understanding in the Forest Sector	121
9.5.6	Slovak Forest Certification Association	121
9.6	Forestry Information System and forestry statistics	121
9.6.1	Forest Sector Information System	121
9.6.2	Other information systems under the Forestry Information System (FIS)	122
10.	RESEARCH, EDUCATION, CONSULTING AND PUBLIC RELATIONS	124
10.1	Forest research	124
10.2	Forestry education	125
10.3	Advisory and consulting services	127
10.4	Public relations	128
11.	INTERNATIONAL INITIATIVES	132
12.	INDUSTRIES AND INITIATIVES ASSOCIATED WITH FORESTS AND THEIR FUNCTIONS	137
12.1	Nature and landscape protection	137
12.2	Water management	141
12.3	Technical amelioration and minor watercourses	143
12.4	Wood-processing sector	143
12.5	Use of wood and other renewable resources for energy production	145
12.6	Hunting	146
12.7	Rural development	148
12.8	Recreation and wellness	150
12.9	Land use reform	151
13.	FULFILMENT OF THE PROGRAMME MANIFESTO OF THE SLOVAK GOVERNMENT AND TASKS RESULTING FROM FORESTS – RELATED GOVERNMENTAL PROCEEDINGS	154
13.1	Interim report	154
13.2	Review of strategic objectives of the Concept of Agrarian Development for 2007–2013	156
14.	FULFILMENT OF THE PROGRAMME MANIFESTO OF THE SLOVAK GOVERNMENT AND TASKS RESULTING FROM FORESTS – RELATED GOVERNMENTAL ... PROCEEDINGS	157
15.	ANNEXES	158
15.1	Tables	158
15.2	References	175
15.3	Contributors	176

ACKNOWLEDGMENTS

The preparation of this publication required the efforts of many people, both NFC experts and individual external experts from various contributing agencies. Special thanks go to M. Moravčík who coordinated the effort and compiled the document working closely with authors of particular chapters and technical support staff.

Writing, editing and reviewing of the report involved the following NFC and the Ministry of Agriculture personnel: Jozef Konôpka, Jozef Tutka, Vladimír Čaboun, Mikuláš Černota, Miroslav Kovalčík, Ingrid Kriššáková, Roman Longauer, Juraj Macko, Ludmila Marušáková, Július Novotný, Milan Oravec, Pavel Pavlenda, Tibor Priwitzer, Marián Radocha, Milan Sarvaš, Zuzana Sarvašová, Matej Schwarz, Peter Siakel, Miriam Sušková, Roman Svitok, Vladimír Šebeň, Igor Štefančík, Anna Tučeková, Mária Žiaková, Marián Ondrejčák, Pavel Toma, Peter Hulman, Katarína Šimová, Juraj Balkovič, Boris Greguška, Jozef Dóczy, Zdenko Lajda and Eva Hušťáková. The list would not be complete without acknowledging the support staff who worked hard to make the publishing of this report possible.

We are also grateful to those who contributed photographs: Vladimír Čaboun, Matej Schwarz, Vladimír Šebeň, Alexander Halák, Ludmila Marušáková, Milan Zúbrik, Slavomír Jendek, Martin Moravčík, Viera Petrášová, Miriam Sušková and Jozef Vladovič.

Last, but not least, we appreciate the graphic design work done by Luboš Frič and Lubica Pilná and the translation of the report by Zuzana Kmeťová.



FOREWORD

Dear readers,

This year, I have the honour to present to you the 16th Report on the Status of Forestry in the Slovak Republic 2008, popularly known as the Green Report. The Report provides a brief overview of the most recent challenges and successes of Slovak forestry and includes a broad range of different statistical data of economic, social and environmental relevance. Similarly to previous reports, it suggests trends instrumental in the assessment of measures aimed at enhancing sustainable management of forest resources.

Slovak forests are natural heritage that reflects long-term status and development of the society in the national, Pan-European and global context. Current biological diversity and integrity of forest ecosystems is chiefly the result of relentless work of many generations of dedicated foresters who very early recognized the importance of forest planning and systematic protection. Thanks to their efforts, we can now witness improving forest land area and growing stock. These successes have not gone unnoticed to international organizations ranking Slovakia among countries with the most advanced forestry in Europe.

Despite the aforementioned positive development, there are many challenges to face. One of the most serious is associated with growing concerns over declining forest health. Spruce forests and forests with over 50 per cent of spruce in particular are at risk of mass dieback. Implemented forest protection measures are costly and require additional resources. Large – scale bark beetle outbreaks compel implementation of protection measures to control populations in infested forests. If combined

with timely preventive measures, they can prevent further spreading and decline of spruce forests otherwise inevitable. Spreading of these species was triggered by a disastrous storm event from 19 November 2004.

From my position of the Minister of Agriculture, I acknowledge forestry as one of the sectoral pillars together with agriculture and food production. The Report and its statistical overview confirm the fact that forest professionals strive to ensure sustainable development of forest resources and accept the need for the conservation of biological diversity and enhancement of forest functions whilst meeting current needs of our society and, even more importantly, needs of our children and their children.

I sincerely trust that the Report you have been presented with will convince you that our forests are in good hands and that it will serve as a good source of information to a wide range of audience.



Stanislav Becík
Minister of Agriculture

ACRONYMS AND ABBREVIATIONS

ACS	Agricultural Consulting System	ITEFWMS	Institute for Training and Education of Forestry and Water Management Staff of SR, Zvolen
AFC	Air Fire Service	JRC	Joint Research Centre
AFSE	Association of Forest Sector Employers	LUR	Land Use Reform
ANFO	Associations of non-state forest owners	MA SR	Ministry of Agriculture of the Slovak Republic
ARDS	Agency for Research and Development Support	MCPFE	Ministerial Conferences on the Protection of Forests in Europe
ARD-SOP	Sectoral Operational Programme "Agriculture and Rural Development"	ME SR	Ministry of the Environment of the Slovak Republic
AS	Approved stands	MFE SR, s.e.	Military Forests and Estates of the Slovak Republic, state enterprise Pliešovce
AVZ	Altitudinal vegetation zone	MI SR	Ministry of Interior of the Slovak Republic
BZ	Buffer zone	NFC	National Forest Centre
CEGA	Cultural and Educational Grant Agency	NFC-FRI	National Forest Centre – Forest Research Institute
CEN	European Centre for Normalization	NFIM	National Forest Inventory and Monitoring
CEPF	Confederation of European Forest Owners	NFP	National Forest Programme
CFE	Centre for Further Education	NGO	Non-governmental organization
DFO	District Forest Office	NIML	National Inventory and Forest Monitoring
EAFRD	European Agricultural Fund for Rural Development	NNM	National nature monument
EAGGF	European Agricultural Guidance and Guarantee Fund	NNR	National nature reserve
EFC	European Forestry Commission FAO	NP	National park
EN	European Norms	NR	Nature reserve
EU	European Union	NSPRD	National Strategic Plan of Rural Development
EUSTAFOR	European State Forest Association	PFI	Permanent Forest Inventory
FAE Ulič, s.e.	Forests and Estates Ulič, state enterprise	PLA	Protected landscape area
FAO	Food and Agriculture Organization of the United Nations	PMS	Partial Monitoring System Forests
FC	Forestry College	PP	Nature monuments
FCL	Forest crop land	PPI	Pulp & paper-making industry
FE	Forest Enterprise	PS	Protected sites
FF	Faculty of Forestry of TU Zvolen	RDP	Rural Development Plan
FI	Furniture-making industry	RFO	Regional Forest Office
FIS	Forestry Information System	RSM	Research Station and Museum of SF TANAP
FNT	Forest nature trial	SAFGM	State administration on forestry and game management
FP	Forest area (forest plot)	SCEA	Sectoral Classification of Economic Activities
FPS	Forest Protection Service	SCI	Site of Community Interests
FRB	Fire and Rescue Brigade	SFCA	Slovak Forest Certification Association
FRM	Forest reproduction material	SF TANAP	SF TANAP State Forests of TANAP
FSDU	Forest spatial division unit	SFMP	Summary Forest Management Plan
FST	Forest site type	SGA	Scientific and Grant Agency
FSTMU	Management unit of forest site types	SHU	Slovak Hunting Union
FTU	Forest tenure unit	SNAS	Slovak National Accreditation Service
GAV	Gross added value	SNC	State Nature Conservancy of the Slovak Republic
GDP	Gross domestic product	SO	Seed orchards
GRF	Gene reserve forests	SOP	Sectoral Operational Programme
HA	Hunting association	SPA	Special Protection Area
IAESTE	International Association for the Exchange of Students for Technical Experience	SS	Seed stands
IAF	International Agreement on Forests	SSPA	Small-scale protected area
IEEAF	Integrated Environmental and Economic Account for Forests	ST	Plus trees
IFE SAS	Institute of Forest Ecology of the Slovak Academy of Sciences in Zvolen		
IFSA	International Forestry Students' Association		

STN	Slovak Technical Norm	TI	Timber industry
SUTN	Slovak Institute of Technical Normalization	TU Zvolen	Technical University Zvolen
TC	Timber Committee	UNECE	United Nations Economic Commission for Europe
TC UNECE	Timber Committee of the United Nations Economic Commission for Europe	UNESCO	United Nations Educational, Scientific and Cultural Organization
TCI	Total current increment	UNFF	United Nations Forum on Forests
		WPI	wood-processing industry



1. INTRODUCTION

1.1 General overview of Slovak forest sector

Total forest area in 2007 was 2 007 thousand hectares (ha) of which forest crop land formed 1 932.9 thousand hectares. At the same time, forest cover deducted from the area of forest land was estimated at around 41 per cent. Since the enforcement of the new Forest Act, total area of special-purpose forests continues to decrease; the trend can chiefly be attributed to the abandonment of the subcategory of pollution-damaged forests. Recent decrease in the area of commercial forests, which currently form 68.2 per cent of the Slovak forest resource, has since 2000 turned into net increase by 1.9 per cent. No changes were recorded in the category of protection forests.

Slovak forests are known for their richly diverse species composition with beech being the dominant forest cover (31.2 per cent) followed by spruce (25.9 per cent) and oaks (13.4 per cent). At present, management preferences focus on the establishment of more resistant, biodiversity rich mixed forest stands with greater ecological values. Split by main species groups reads as follows: conifer forests 31 per cent, broadleaved forests 50 per cent, mixed forests 19 per cent.

2007 figures for growing stock have shown a continual increase in the volume of timber available in forests. The stock was estimated at 445.9 million m³ of >7cm inside bark timber. Average hectare stock was put at 232 m³. Increase in the growing stock is believed to be a combined result of the following factors: abnormal spatial and volumetric distribution of mostly premature, 50 to 100 year old, stands; more accurate stock inventory based on new growth tables; and finally, so far largely unexplored impact of global environmental changes, particularly climate change and increasing levels of nitrogen depositions and CO₂.

Volume of felled timber interannually increased to 8 367 million m³ – the second largest volume ever recorded in Slovakia, second only to 2005 10.2 million m³ of largely calamitous timber from catastrophic windthrow in November 2004. The ongoing trend is projected to continue as current age structure of Slovak forests favours further growth in felling volumes.

Recent felling volumes are due to abnormally high occurrence of annual incidental felling larger than a long-term sustainable level. Since 2000 the annual felling volume has on average been 16.7 per cent above planned with maximum increase of 27.8 per cent recorded in 2005–2007. Record volumes improve short-term forest revenues, yet compromise



Figure 1 Slovak forests are known for a high diversity of tree species.

future felling potential of over exploited forests. High volume of incidental felling is linked to general decline in forest condition and largely disproportionate presence of unstable conifer forests, sprucewoods in particular.

Growing felling volumes in the period 2006–2007 also contributed to a mild increase in the volume of planting activities. At the same time, implementation of shelterwood system together with an increased rate of soil disturbance resulted in a slight improvement of natural regeneration statistics (40.5 per cent in 2006 compared to 34.1 per cent a year later). As for tending, the volume of realised operations lags behind planned figures. In 2007, the volume of cleaning operations in non-state forests accounted for only 70 per cent of the volume planned. Results of such under management are expected to significantly compromise future quality and yields of untreated stands. The volume of thinning is, similarly to cleaning, falling behind the plan – only 75 per cent of the expected bulk. Thinning deficit is chiefly attributed to the postponement of planned intermediate felling to provide capacity for priority removal of calamitous timber. Nonetheless, total actual volume of intermediate felling is long-term above the figures planned.

A gross part of the forestry generated income comes from timber sale, which accounts for almost 79 per cent of realised sectoral earnings and revenue. In 2007, more than 1.5 million m³ of timber was exported abroad of which only 0.285 million m³ was timber sold by forest owners themselves or subjects managing forests. Remaining 1.25 million m³ of timber was sold abroad by other subjects, timber merchants in particular. Direct export of felled timber without added value benefits, which currently accounts for almost 19 per cent of the national timber resource, is grossly disadvantageous for both domestic wood processors and forestry subjects.

In the future, Slovak forestry shall work towards its competitiveness in the field of marketable goods, public-beneficial forest services and related know-how. Efforts shall continue to reinforce the principles of ecological and economic sustainability and effectiveness of the industry. It is thus imperative to aim for additional sources of funding through a gradual increase of economic revenues by placing monetary values on previously unmarketed forest goods and services provided to society (internalisation).

Earnings and revenue of the industry, given in current prices, are on a continual increase. A largely similar trend has been observed in recent economic results achieved by the industry (that is except for 2003). In 2007, the achieved economic result amounted to 1 061 million SKK – a decrease when compared to 2006. The decline was greater in state forest as opposed to non-state forests. Subsidies from public sources rose only marginally when compared to 2004 and 2005 and in current prices reached the level from 2003 and 2006.

The rate of forest sector's contribution to the national macro-economic result dropped down to 0.46 per cent despite positive trends in gross domestic product (GDP) figures. At the same time, the industry contributed almost 1.7 billion SKK in taxes to state and municipal budgets.

Restoration of forest ownership rights based on enforced restitution law is still pending completion. The largest proportion of unresolved forests is in the category of non-state forests. These forests are either small-size private forests or forests in a so-called community ownership largely impossible to identify in the field. There is also a group of forest owners who somewhat have failed to apply for the reinstatement of their ownership rights. Compared to 2003, the area of forests utilised by private owners have increased.

On the other hand, the area of forests in use of state subjects has been gradually falling. Forest ecosystems represent dominant and exceptionally valuable components of protected areas. At present, the national network of protected areas is too generous and includes also mankind altered ecosystems in which restoration of original biodiversity is largely disputable. Present zonation of protected areas reflects efforts of some conservationists to disproportionably enlarge the area of intervention free A zone regardless of condition of particular ecosystems. In the past, similar approach turned majority of mountain forest reserves into “main culprits” behind bark beetle infestation of adjacent stands. Most recently, further management restrictions have been associated with the implementation of Natura 2000. Creation of national network has impacted management not only in newly designated protected areas but also in the “old” protected areas under the 2–4th level of protection. The area of protected land is, compared to the country and forest land area, largely above European and global average and together with related management restrictions tops contemporary economic capacity of Slovakia.

1.2 Global and European initiatives on forests

United Nations Forum on Forests (UNFF)

The Seventh Session of UNFF recommended the Economic and Social Council to adopt the following documents:

- Draft resolution of the Non-legally binding instrument on all types of forests, and
- Multi-year programme of work of the United Nations Forum on Forests for the period 2007–2015.

The documents reconfirmed conclusions of UNFF 6, especially the Four Global Objectives on Forests set for IAF. They aim to:

- use SFM to halt worldwide loss of forest cover;
- enhance forest-based economic, social and environmental benefits and contribution of forests to the achievement of internationally agreed development goals;
- significantly increase the worldwide area of protected forests and other areas of sustainably managed forests;
- reverse decline in the volume of official developmental assistance allocated for SFM and mobilize available financial resources.

The session further confirmed global priorities of international forest policy and established basic agenda of the Forum till 2015. In order to achieve consensus on major issues, EU and other participating parties were forced to step back from their original positions. From the original text of non-binding instrument, a number of points had to be omitted including the reinforcement of political obligation on its implementation and proposal for the implementation of instrument in developing countries through a special advisory board of experts.

The instrument recognises sustainable forest management as a dynamic and evolving concept of global importance and puts the obligation of its achievements on a par with the obligation to meet the Four Global Objectives on Forests. Despite a general denial of the proposed SFM concept, the instrument presents a brief outline of the concept including its main objectives. The draft resolution obliges the Forum to develop voluntary global financial mechanism which would provide framework for all types of forests. The



Figure 2 Climate change and controversial nature conservation decisions have a detrimental impact on forest health and forest functions (e.g. water management).

proposal should be adopted at UNFF 8 to facilitate mobilisation of mechanisms supporting implementation of SFM, global objectives and the Instrument.

Multi-year programme of work specifies time and task framework of the Forum and includes the following: thematic plan for its particular sessions; interim progress report; achievement of global objectives; and overall review of the effectiveness of international forest arrangement.

The 5th Ministerial Conference on the Protection of Forests in Europe (MCPFE), 5–7 November 2007, Warsaw, Poland

The Conference provided a platform for dialogue among European ministers responsible for forests, non-governmental organisations as well as representatives of research community, forest industries, other stakeholders and observers on major political challenges related to European forests.

The Warsaw Summit provided a common venue for the presentation of up-to-date reports on the condition of European forests and SFM achievements. The Conference committed herself to adopt the following documents:

- Ministerial Declaration
- Warsaw Resolution 1. Forests, Wood and Energy
- Warsaw Resolution 2. Forests and Water

The Conference theme „Forests for Quality of Life“ highlighted the most contemporary challenges facing European forests and their sustainable management. The Resolutions adopted at the Conference embraced requirements for political response and decisions on the issues of promotion of wood as a renewable source of energy and the role of forests in water protection in the context of global climate change. The documents were signed by 40 European countries. In addition, Conference participants adopted two other Ministerial Statements - Ministerial Statement on Pan-European Forest Week 2008 and Ministerial Statement on Forest Fires.

Rotation in the GCC (General Co-ordinating Committee) and MCPFE chairmanship

meant the chairmanship went from Poland to Norway, the host of the 6th MCPFE. At the Conference, Germany and the Slovak Republic (replaced outgoing Austria) became the new members of GCC.

EU Forest Action Plan

The EU Forest Action Plan was adopted on 15 June 2006. It has been prepared in close cooperation with the Member States and in consultation with stakeholders. It provides a coherent framework for forest-related initiatives at the Community and Member State level for 2007–2011. The overall objective of the Plan is to support and enhance sustainable forest management and the multifunctional role of forests. It aims to:

- enhance long-term competitiveness of forestry industry and sustainable utilisation of forest goods and services;
- enhance and protect biodiversity, carbon sequestration, integrity, vitality and resilience of forest ecosystems;
- contribute to the quality of life by protecting and enhancing social and cultural dimensions of forests;
- foster cross-sectoral coordination and communication to balance multi-level economic, ecological and socio-cultural objectives.

The Plan consists of a set of specific measures proposed by the Commission to be implemented in close collaboration with the Member States. It should facilitate coordination between particular Community and Member States initiatives. In order to improve competitiveness of the industry, the EU have introduced a number of financial instruments including the European Agricultural Fund for Rural Development (EAFRD), LIFE+ (financial instrument for the environment), 7th Framework Programme (FP7), and the Intelligent Energy-Europe (IEE) programme.

The new regulation on rural development adopted by the Commission for the period 2007–2013 recognises, among others, also the importance of forestry sector for rural development. Specific forestry measures incorporated in the regulation were reorganised and upgraded to better integration of forestry into rural development strategies. The Member States and regions are free to incorporate into their rural development programmes any set of specific measures better reflecting their needs and priorities.

1.3 National forest policy

Contemporary objectives and priorities of national forest policy are defined by the Concept of Agrarian Development for 2007–2013 (CAD) – chapter Forestry (CADF), and National Forest Programme (hereinafter only nfp). These documents are based on adopted international political initiatives on forests and corresponding obligations of the Slovak Republic. The nfp lists five strategic objectives (SC); these are further divided into 18 priorities. The SC are aimed to:

1. promote ecological forest management;
2. enhance and protect the environment;
3. contribute to the quality of life;
4. enhance long-term sectoral competitiveness;
5. promote coo-operation, coordination and communication.

The nfp was approved by the Decision of the Slovak Government No 549/2007 and subsequently passed on for the approval by the National Council of the Slovak Republic (Decree No 531/2007). The Council recommended the Government to develop and submit for approval the NFP Action Plan.

1.4 Regulatory framework

The following generally binding legal norms regulating forestry issues were endorsed and came into effect in 2007:

- Act No 295/2007 Coll adapting and amending Act No 193/2005 Coll on plant medical care in the wording of the pursuant regulations.
- Act No 360/2007 Coll adapting and amending Act No 326/2005 Coll on forests and on amendment of Act No 217/2004 Coll on forest reproductive material and on amendment of other acts in the wording of the Act No 545/2004 Coll.
- Government Order No 369/2007 Coll on specific support measures in agriculture.
- Act No 543/2007 Coll on role of state administration in providing subsidies in agriculture and rural development.



2. FOREST FUNCTIONS

Enhancement and sustainable utilisation of multiple forest services and benefits belongs to one of the most challenging global and regional issues of contemporary forestry. In the preparatory phase of the EU Forest Action Plan the Commission and Member States created a common vision of future forestry which reads: “*Forests for society: long-term multifunctional forestry that fulfils present and future societal needs and fosters existence / livelihood dependent on forestry.*”

2.1 Production functions

Production of high quality timber without compromising other important ecological and social functions represents the primary management objective in commercial forests. At present, these forests cover 1 318.1 thousand hectares, i.e. 68.2 per cent of total national forest crop land.

Majority of commercial forests meet the concept of multifunctional forests when in addition to their production function they also fulfil a number of other ecological and social functions (Table 2.1–1). Delivery of multiple services and benefits is secured through the implementation of specific measures of integrated forest management. Only 6.7 per cent of all forests is of a purely production type.



Figure 3 On top of their production function, majority of commercial forests also deliver a whole range of ecological and social services and benefits.

Table 2.1–1 Functional types and their area in commercial forests

Function	Functional type	Area	
		ha	%
Production	Production	129 271	6.7
	Erosion control-production	682 705	35.3
	Water conservation-production	123 200	6.4
	Deflation control -production	8 908	0.5
	Recreation-production	225	0.0
	Nature conservation-production	63 330	3.3
	Air pollution mitigation-production	310 216	16.0
	Game husbandry-production	77	0.0
	Gene resource conservation – production	162	0.0
Total		1 318 094	68.2

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

Note: Per cent of particular functional types is computed from the total forest area.

2.2 Ecological functions

All forests regardless their type naturally provide a multitude of ecological benefits and services – forests where these are the main management objective are classified as protection forests. Their functional typing depends on natural in-situ conditions. These forests are primarily managed to ensure continual fulfilment of ecological functions (e.g. water and soil protection, biodiversity, landscape conservation). These are forests of great societal value which foster soil, water, biodiversity and infrastructure protection. At present, they cover 329.5 thousand hectares; i.e. 16.9 per cent of total forest crop land.

Table 2.2–1 Functional types and their area in protection forests

Function	Functional type	Area	
		ha	%
Erosion control	Erosion control	19 302	1.0
	Production-erosion control	19 511	1.0
	Water conservation-erosion control	10 107	0.5
	Water purification-erosion control	28 672	1.5
	Recreation-erosion control	190	0.0
	Spa/wellness-erosion control	125	0.0
	Nature conservation-erosion control	53 018	2.7
	Air pollution mitigation-erosion control	117 702	6.1
	Game husbandry-erosion control	304	0.0
	Gene resource conservation – production	95	0.0
Total		249 027	12.9
Water conservation	Water conservation	271	0.0
	Production-water conservation	300	0.0
	Erosion control-water conservation	29 929	1.5
	Nature conservation-water conservation	34 075	1.8
	Air pollution mitigation-water conservation	7 789	0.4
Total		72 364	3.7

Table 2.2–1 – Functional types and their area in protection forests

Function	Functional type	Area	
		ha	%
Avalanche control	Avalanche control	92	0.0
	Water conservation-avalanche control	2 378	0.1
	Air pollution mitigation-avalanche control	2 463	0.1
Total		4 933	0.2
Streamside protection	Streamside protection	341	0.0
	Air pollution mitigation-streamside protection	450	0.0
Total		791	0.0
Deflation control	Deflation control	1 668	0.1
	Game husbandry-deflation control	10	0.0
	Air pollution mitigation-deflation control	738	0.0
Total		2 417	0.1
TOTAL		329 530	17

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

Note: Per cent of particular functional types is computed from the total forest area.

2.3 Social and cultural functions

Social functions are primary in forests declared special-purpose forests by state forestry administration. These forests provide a specific range of societal benefits and services to public or its particular groups. Fulfilment of societal needs to a various degree modifies or restricts management options in order to enhance particular beneficial services such as water purification, recreation, nature conservation, spa & wellness, education & research, etc. This category of forests currently covers 285.3 thousand hectares – i.e. 14.8 per cent of total forest crop land.

Table 2.3–1 Functional types and their area in special-purpose forests

Function	Functional type	Area	
		ha	%
Water purification	Water purification	1 801	0.1
	Air pollution mitigation-water purification	10 978	0.6
Total		12 779	0.7
Recreation	Recreation	787	0
	Production-recreation	3 221	0.2
	Erosion control-recreation	4 314	0.2
	Water conservation-recreation	3 234	0.2
	Nature conservation-recreation	1 629	0.1
	Air pollution mitigation-recreation	14 385	0.7
Total		27 570	1.4
Spa & wellness	Spa-wellness	241	0
	Production-spa-wellness	345	0
	Erosion- spa-wellness	1 932	0.1
	Water management-spa-wellness	380	0
	Air pollution mitigation-spa-wellness	454	0
Total		3 352	0.2

Table 2.3–1 – Functional types and their area in special-purpose forests

Function	Functional type	Area	
		ha	%
Nature conservation	Nature conservation	19 516	1.0
	Air pollution mitigation-nature conservation	16 279	0.8
	Gene resource conservation-nature conservation	402	0
Total		36 197	1.9
Air pollution mitigation	Air pollution mitigation	989	0.1
	Erosion control-air pollution mitigation	65 549	3.4
	Water conservation-air pollution mitigation	13 079	0.7
	Avalanche control-air pollution mitigation	168	0
	Water purification-air pollution mitigation	107	0
	Recreation-air pollution mitigation	4 324	0.2
	Nature conservation-air pollution mitigation	594	0
	Production-air pollution mitigation	1 120	0.1
	Water purification-air pollution mitigation	19 741	1.0
Total		105 671	5.5
Game husbandry	Game husbandry	235	0
	Production-game husbandry	8 566	0.4
	Erosion control-game husbandry	7 890	0.4
	Air pollution mitigation-game husbandry	2 759	0.1
Total		19 451	1.0
Education & research	Education&research	7 766	0.4
	Air pollution mitigation-education-research	2 568	0.1
	Other special & unspecified functions	66 049	3.4
	Air pollution mitigation-other special functions	3 415	0.2
Total		79 798	4.1
Gene resource conservation	Production-gene resource conservation	132	0
	Erosion control-gene resource conservation	82	0
	Nature conservation-gene resource conservation	288	0
Total		502	0
Special-purpose forests total		285 318	14.8
TOTAL		1 932 942	100.0

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

Note: Per cent of particular functional types is computed from the total forest area.

2.4 Forests by their prevailing functions

Act No 326/2005 Coll on forests divides forests according to their prevailing functions into commercial, protection and special-purpose forests. In addition to other regulatory changes, the Act also for the first time excludes forests damaged by pollution from the category of special-purpose forests; this measure decreased their area by 1 per cent compared to 2004. As for total area of commercial forests, this fell by 2.9 per cent compared to 1990 but rose 1.9 per cent compared to 2000. In recent years, their area has been continually increasing. Area of protection forests remains largely unchanged.

Table 2.4–1 Forest category area and forests available for timber production

Forests	1980		1990		2000		2006		2007	
	1 000 ha / %				ha / %					
Commercial	1 439.1	77.3	1 367.1	71.1	1 273.8	66.3	1 304 760	67.5	1 318 094	68.2
Protection	183.8	9.9	258.5	13.5	306.7	16.0	328 526	17.0	329 530	17.0
Special-purpose	187.6	10.1	230.9	12.0	340.9	17.7	298 763	15.5	285 318	14.8
Land for afforestation	51.1	2.7	65.2	3.4	—	—	—	—	—	—
Total	1 861.6	100	1 921.7	100	1 921.4	100	1 932 049	100	1 932 942	100

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.



Figure 4 Relic pinewoods belong to one of the most extreme types of protection forests.



3. FACTORS AFFECTING FOREST PRODUCTION

3.1 Climatic conditions

The territory of Slovakia belongs to a mild climatic zone and lies in the transition zone between oceanic and continental climate. Local climate is profoundly influenced by altitude and morphology. The weather is typical for a high degree of changeability with local differences in intensity and duration of extreme weather events.

Last decade has brought a number of weather extremes (droughts, floods, wind storms, etc.) majority of which caused substantial damage to many industries of national economy, forestry including. Weather records have shown that 2007 followed in the trend set in previous years – i.e. was substantially hotter than average. July in particular was extremely hot, the hottest on records, with many temperature highs left broken. In the warmest southern regions of the country, average day temperatures topped 40 °C – Hurbanovo with 40.3 °C was seconded by Dudince with 40.2 °C. Accumulated volumes of energy subsequently led to devastating storms and wind storms causing substantial damage to forests and local infrastructure.

3.2 Ground level air pollution

Since the 1990s, the volume of solid particulates and SO_2 has been steadily decreasing. In 2007, regional levels of SO_2 computed to S concentration varied between 0.27 $\mu\text{g.m}^{-3}$ and 2.00 $\mu\text{g.m}^{-3}$. Nevertheless, a threshold limit of 20 $\mu\text{g.m}^{-3}$ of SO_2 per year and winter season was not exceeded.

Traffic in particular was responsible for increased levels of nitrogen oxides and CO in the atmosphere. Emissions of NO_x have shown a slight decrease during 1990–2007. The largest volume of carbon (CO) emissions came from iron and steel works. Since 1990, these emissions have shown a positive downward trend chiefly as a result of reduced fuel consumption and implementation of advanced, environmentally friendly technologies. Concentrations of *nitrogen oxides* recorded at regional stations and computed to pure N varied between 0.59 $\mu\text{g.m}^{-3}$ and 2.80 $\mu\text{g.m}^{-3}$ in 2007. The yearly limit of 30 $\mu\text{g.m}^{-3}$ considered safe for vegetation was not thus exceeded. As for CO emissions from major industrial points, these decreased only moderately; nevertheless, atmospheric concentrations of *carbon monoxide* were generally so low that none of the monitoring stations reported exceedance of limiting values.

The increase in tropospheric ozone concentrations observed in industrially developed regions of northern hemisphere till the late 1980s was largely contributed to growing emissions of *ozone precursors* (NO_x , VOC , CO) emitted by traffic, energy industries and other industrial activities.

As for emissions of other pollutants in Europe, these have shown a downward trend since 1996 – reduced volumes positively improved also average precipitation acidity in Slovakia. General improvements in pollution loads have benefited tree species and forests except for high mountain locations where the risk of forest damage due to increased levels



Figure 5 Forests damaged by pollutants suffer from a various degree of defoliation.

of tropospheric ozone remained high. From the viewpoint of vegetation period related average ozone concentrations, 2007 can be considered photochemically active with average annual concentrations approaching record values from 2003.

Continuing acidification of forest soils was chiefly attributed to sulphur and nitrogen depositions. Current condition of forest soils is largely the result of ground level pollution from previous decades. Soil acidification processes were most intense in higher altitudes and regions with more substantial local sources of acid emissions. The pH assessment indicated that an estimated 25 per cent of forest soils belonged to a very acid reaction band (pH < 4.5), further 40 per cent to acid (pH 4.5 – 5.5), 17 per cent to moderately acid (pH 5.5 – 6.5), 5 per cent in neutral (pH 6.5 – 7.2) and 13 per cent to a moderately alkaline reaction band (pH 7.2 – 8.0). Contamination of soils by heavy metals and alkaline pollutants persists particularly in areas close to large emissions sources.

3.3 Climate change and forests

Changes in global climate triggered by emissions of greenhouse gases represent the most serious environmental concern in the history of mankind. The principal international regulatory mechanism on the protection of global climate – the Framework Convention on Climate Change (UN FCCC), was adopted by the United Nations Conference on Environment and Development in Rio de Janeiro (1992) also known as the Earth Summit. Its main ambition is to stabilise concentrations of greenhouse gases at levels indifferent to global climate.

The most important greenhouse gas in the atmosphere is *water vapour* (H_2O). This gas is believed to be responsible for roughly two thirds of the total greenhouse effect. Its atmospheric concentration is not directly impacted by human activities as it is rather determined by natural water cycle in the landscape. Contribution of *carbon dioxide* (CO_2) to the combined greenhouse effect is estimated at 30 per cent whilst *methane* (CH_4), *nitrous oxide* (N_2O) and *ozone* (O_3) jointly account for 3 per cent.

Mankind induced contribution also includes synthetic substances, such as *HFCs* (*hydro fluorocarbons*), *PFCs* (*perfluorocarbons*) and *SF₆* (*sulphur hexafluoride*). The greenhouse gas emissions peaked in the late 1980s. After the temporary decline emissions have recently started to grow again chiefly as a result of new investments in industrial production, increased traffic volumes and changes in fuel structure.

In the past century, the territory of Slovakia grew significantly warmer (average annual temperature rose by 1.1 °C, particularly in winter) and drier (total annual precipitation dropped by 5.6 per cent). Similar trends were observed in relation to relative air humidity (<5 per cent) and average snow cover duration. Other climatic variables (potential and actual evaporation, soil moisture, global radiation, radiation balance) further support the theory of gradual drying of the territory. With growing potential evapotranspiration and falling soil moisture southern regions are predicted to suffer the worst of consequences. Values for solar radiation remained grossly unchanged.

In order to provide a comprehensive assessment of potential impact of climate change on health and vitality of Slovak forests, a number of climatic models have been developed to determine climatic amplitudes of natural distribution range of particular tree species and amplitudes of their factual distribution. The latter mentioned were derived from satellite imagery. The amplitudes were projected towards future following regional climate change scenarios. Subsequent comparison of the acquired data provided for the assessment of spatial shift of distribution ranges corresponding with natural and current distribution of particular tree species. The analysis was performed for the following tree species: beech, oak, spruce, larch, fir, and pine. Its results clearly indicate that spruce in particular displays a marked divergence between its bioclimatic demands and its actual distribution.

One of the possible ways of combating detrimental impact of climate change on forests is the implementation of management practices reinforcing their vitality and resilience. It is believed that improvement of forest biodiversity, particularly with respect to species, age and structure diversity, rather than radical changes of forest communities can mitigate and/or reverse climate induced forest decline.

Predictions based on climatic models suggest dramatic interannual differences in summer weather development – i.e. extremely hot or unseasonably cold temperatures. Winters, on the contrary, are predicted to be generally warmer than average. In addition, projected extreme droughts are expected to intensify the risk of forest fires.



4. FOREST CONDITION AND ITS DEVELOPMENT

4.1 Investigation and monitoring of forest condition

4.1.1 Forest stand description

Detailed investigation of forest condition (restricted to forest stands on forest land) provides up-to-date data necessary for the development of forest management plans. The data are gathered for particular forest division units (compartment, crop group, storey, standards left after regeneration cut) separately; the data are primarily used to review the plan of management measures. Data are usually updated on a cyclical basis. Investigation is carried out in a 10-year cycle – i.e. one tenth of the territory is reviewed each year using growth tables and ocular estimate methods. Gathered data are stored in databases and further processed into aggregated files used for reporting and compilation of various documents including the Compendium of Forestry Statistics, Aggregated Forest Management Plan (AFMP), and Permanent Forest Inventory (PFI). Aggregated data refer to various time levels and have different time relevance (1–10 years). Their accuracy and reliability is to a large extent unknown and it is impossible to secondarily calculate which prevents objective assessment and comparison of available data.

4.1.2 National Forest Inventory and Monitoring

The National Forest Inventory and Monitoring (NFIM) is a selective statistical method of forest condition inventory. It has two levels – national and regional, and provides data for all forests regardless of land category (forest, non-forest).

In 2007, works continued on the processing of data gathered in 2005. The data were inspected and compiled into a comprehensive document comprising a range of information including strategy, data collection methodology, storage guidelines, and basic selection of aggregated data. Given the shortness of time, it was not possible to compile the full investigation report. Due to the complexity of acquired data, it will take some time to process, analyse, and comment data and prepare their thorough analysis.

NFIM provided a comprehensive set of data on forests correct to 31 December 2005. Acquired data represent a highly valuable information resource for decision makers and various reports referring to Slovak forests. Accuracy and reliability of provided outcomes meets the quality expected at the beginning of investigation. The NFIM

data for forest land area closely match those from AFMP based on different investigation methods. The volume of growing stock obtained from NFIM is 23 per cent higher than that entered in FMPs which can be explained by differences in data acquisition methods, lower



Figure 6 National forest inventory included also the estimate of deadwood volumes.

limiting dbh, data for all forest stand layers, and differences in recorded age structure. In addition, the difference is also associated with a 5-year average variation in up-to-dateness of compared variables.

Experience from abroad has showed much greater differences in the volume of growing stock obtained from first national inventories, e.g. + 40 per cent in Austria and + 33 per cent in the Czech Republic. In Germany, it is generally believed that results obtained from national forest inventory and forest planning is incomparable since these methods substantially differ in purpose. Larger volumes of growing stock generally obtained from forest inventories do not automatically translate into increased felling volumes since inventoried stock refers to a wider set of trees some of which will not survive to felling age.

The aim of NFIM is not to replace long-established methods of forest investigation used for plan reviews and forest condition monitoring but rather to complement them since each method has a special purpose and differs in the accuracy of data provided for different division units. The methods do not exclude each other and their outcomes provide for comparison and addition.

4.1.3 Comprehensive Investigation of Forest Condition

The Comprehensive Investigation of Forest Condition (CIFC) is the name used for the survey into natural, societal, technical and economic conditions of forest management (§ 31 of MA SR Regulation No 453/2006 Coll on forest management planning and forest protection). In principle, CIFC is a statistical investigation based on sampling plots.

The set of investigated data includes parameters of ecological nature related to site conditions and forest health. The investigation also provides review of site maps and functional forest categories in pre-selected forest stands which include newly afforested land and areas proposed by forest owners and land managers for re-categorisation. The investigation is cyclical (10-year cycle) and covers only stands on forest land.

The main outcomes of CIFC include management models, reviewed forest site type and soil maps, reviewed forest categories and proposal of air pollution zones. These outcomes provide basis for forest investigation and management planning at a stand level.

4.2 Natural conditions

There are eight basic forest vegetation zones (VZ) recognised by Slovak forestry practice. These zones reflect variability of climatic conditions in forests based on altitude.

Natural conditions of particular sites are more or less stable and thus changes occurring with time are usually very gradual. Majority of these changes are triggered by acidification of soils resulting from acid rain and ongoing climate change. In lowland regions, somewhat radical drying of riverine sites is occasionally present. This process is usually connected with a channel development of particular watercourse. Site conditions may also change as a result of afforestation.

Majority of Slovak forests are located in mountain areas unsuitable for industrial forms

of agriculture for their extreme climatic and site conditions (steep slopes, shallow rocky soils, colder temperatures). Slovak rivers have gradually been regulated or dammed and their natural floodplain forests turned from a large part into arable land or built-up areas. Figure 4.2–1 clearly shows that majority of Slovak forests are situated on slopes with 11 – 60 gradient. Slopes with < 10 per cent gradient represent only 9.6 per cent of total forest land. Of these, majority are formed by aeolian sands, alluvium, karst plateaux, and high altitude uplands generally unsuitable for agricultural production. The steepest slopes so prone to erosion that permanent forest cover is a must represent only around 10 per cent of total forest land.

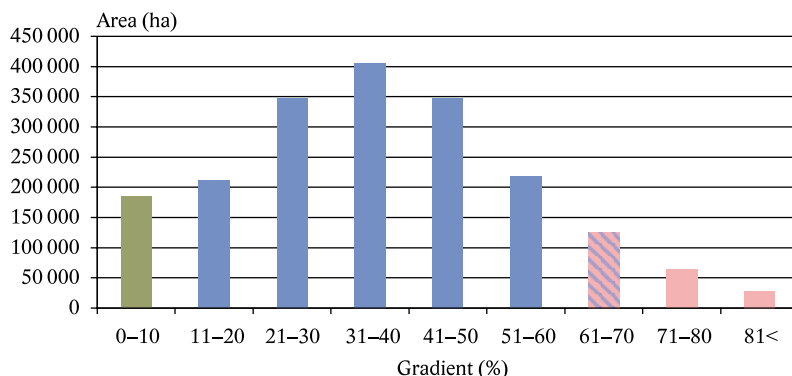


Figure 4.2–1 Forest area by slope gradient.

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NLC-FRI Zvolen.

4.3 Forest area

The area of forest plots (FP; generally referred to as “forest area”) and forest crop land (FCL) has since 1950 been continually growing. A slight interannual decrease in forest area observed in 2007 does not represent the denial of a long-term trend but rather a common variation resulting from annual review of FMP data on 1/10 of total forest area.

Table 4.3–1 Forest area and forest crop land

Type	1950	1960	1970	1980	1990	2000	2006	2007
	ha							
	% of area increase compared to 1950							
FP	1 771 166	1 775 644	1 918 571	1 952 656	1 976 538	1 997 961	2 007 006	2 006 601
	—	+4 478	+147 405	+181 490	+205 372	+226 795	+235 840	+235 435
	—	+0.25	+8.3	+10.2	+11.6	+12.8	+13.3	+13.3
FCL	1 763 056	1 769 012	1 826 564	1 861 642	1 921 705	1 921 414	1 932 049	1 932 942
	—	+5 956	+63 508	+98 586	+158 649	+158 358	+168 993	+169 886
	—	+0.33	+3.6	+5.6	+9.0	+9.0	+9.6	+9.6
Forest crop land available for wood supply							1 757 520	1 766 668

Source: Compendium of Slovak Forestry Statistics, NFC-IFRI Zvolen; National Forest Inventory 1949–1953, Forest Inventory 1960.

Prepared by: NFC-FRI Zvolen.

Except for FP and FCL, there is a certain percentage of farmland and other non-forest land covered by forest tree species (so-called “other wooded land”). NFIM put the area of other wooded land at 275 thousand hectares (with 3.7% accuracy deviation). The figure represents a several-fold increase in the area compared to previous figures. Forest cover (given as the total forest area inclusive of other wooded land-total country area rate) based on the NFIM data reached $44.3 \pm 0.4\%$. This figure represents a 3.4 per cent increase compared to area estimated from FP (40.9 per cent) and 4.9 per cent increase compared to FCL (39.4 per cent) estimate. FP and FCL are for tenure and management reasons divided into forest division units (FDU) called forest tenure units (FTU). These are divided into compartments; if needed, compartments are further divided into sub-compartments (age and composition distinctly differing parts) and temporary crop groups delineated only in regenerated stands.

Table 4.3–2 Average size of forest division units (ha)

	FTU, FU ^{a)}	Compartment	Sub compartment	Crop group
	ha			
2002	988	7.40	5.20	3.13
2003	883	7.32	5.12	3.08
2004	829	7.25	5.06	3.04
2005	881	7.19	4.98	3.00
2006	876	7.14	4.94	2.98
2007	911	7.07	4.89	2.98

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

Note: ^{a)} FU – forest unit; FMP valid since 1 January 2007 are designed for forest units.

4.4 Tree species composition and forest origin

Forests in Slovakia are typically tree species rich and are dominated by beech (31.2 per cent), spruce (25.9 per cent) and oak spp. (13.4 per cent).

Table 4.4–1 Tree species in Slovak forests

Tree species (%)									
SM	JD	BO	SC	KS	Σ I	DB	CR	BK	HB
25.9	4.0	7.1	2.4	1.1	40.5	10.9	2.5	31.2	5.8
JV	JS	AG	BR	JL	LP	TD	TS	OL	Σ L
2.0	1.4	1.7	1.4	0.8	0.4	0.4	0.5	0.5	59.5

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

Legend: SM – spruce; JD – fir; BO – pine; SC – larch; KS – dwarf pine; Σ I – total conifers; DB – oak; CR – Turkey oak; BK – beech; HB – hornbeam; JV – maple; JS – ash; AG – black locust; BR – birch; JL – alder; LP – lime tree; TD – domestic poplars; TS – hybrid poplars; OL – other broad-leaf; Σ L – total broad-leaf.

Table 4.4–2 indicates a gradual decrease in the area of conifer forests (less resilient spruce in particular) in favour of broad-leaf forests which are positive with respect to long-term efforts to enhance stability and vitality of forest ecosystems.

Coppice currently covers an estimated 35 thousand hectares – i.e. 1.82 per cent of total forest crop land; its total area has fallen by 6.3 per cent since 1980.

Table 4.4–2 Main tree species and their groups

Species	1970	1980	1990	2000	2006	2007
	%					
Conifer	41.3	42.5	42.3	41.9	40.8	40.5
Broad-leaf	58.7	57.5	57.7	58.1	59.2	59.5
Spruce	26.0	26.4	27.3	26.8	26.1	25.9
Fir	6.2	5.8	5.0	4.3	4.0	4.0
Pine	6.7	7.5	7.0	7.5	7.2	7.1
Beech	30.1	29.5	29.8	30.3	31.2	31.2
Oak + Turkey oak	14.4	14.4	14.2	13.6	13.4	13.4
Hornbeam	6.2	5.7	5.6	5.7	5.7	5.8

Source: *Compendium of Slovak Forestry Statistics 2008*, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.



Figure 7 Beech is the commonest tree species in Slovak forests.

Table 4.4–3 Coppice area (estimated from FCL)

Forest origin	Year				
	1980	1990	2000	2006	2007
	ha %				
Coppice	151 217	79 324	42 157	35 756	35 152
	8.12	4.13	2.19	1.85	1.82

Source: *Compendium of Slovak Forestry Statistics 2008*, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

Slovak forests also harbour a number of naturalised tree species. With the exception of invasive black locust uncontrollably spreading to forest and non-forest land the area of these species remains largely stable.

Table 4.4–4 Naturalised tree species on forest land

Species	%
Black locust	1.71
Populus x euroamericana (I 214 + Robusta)	0.38
Black pine	0.50
Other conifer: Douglas fir; grand fir; eastern white pine	0.07
Other broad-leaf: northern red oak; sweet chestnut; horse chestnut; ash-leaf maple	0.14

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

4.5 Age structure

Even distribution of age classes is imperative to sustainable and balanced timber production and fulfilment of other non-production forest functions. It is also an important management tool to balance the volume of forestry operations. Appropriateness of actual age structure is best assessed against a so-called optimal area of age classes. At present, Slovak forests display abnormal representation of middle (6–10) and highest (15+) age classes; the latter is most present in protection forests due to their generally longer rotation.

Table 4.5–1 Age structure (actual & optimal) in total and by species group

Actual age structure		Age class							
		Non-stocked forest land	1	2	3	4	5	6	7
Total	ha	11 540	138 264	157 372	149 673	138 219	129 644	179 901	199 111
	%	0.6	7.2	8.1	7.7	7.2	6.7	9.3	10.3
of which	CO	ha	—	55 586	67 972	67 747	62 682	51 994	61 407
		%	—	2.9	3.5	3.5	3.2	2.7	3.2
	BR	ha	—	82 678	89 400	81 926	75 537	77 650	118 494
		%	—	4.3	4.6	4.2	3.9	4.0	6.1
Age class		8	9	10	11	12	13	14	15+
Total	ha	190 478	186 621	163 290	109 084	61 755	38 220	25 607	54 163
	%	9.9	9.7	8.4	5.6	3.2	2.0	1.3	2.8
of which	CO	ha	72 779	74 926	69 428	43 420	23 813	16 289	11 359
		%	3.8	3.9	3.6	2.2	1.2	0.8	0.6
	BR	ha	117 699	111 695	93 862	65 664	37 942	21 931	14 248
		%	6.1	5.8	4.9	3.4	2.0	1.1	0.7
Optimal age structure		Age class							
		Non-stocked forest land	1	2	3	4	5	6	7
Total	ha	11 599	160 434	160 434	160 434	160 434	160 434	160 434	160 434
	%	0.6	8.3	8.3	8.3	8.3	8.3	8.3	8.3
		8	9	10	11	12	13	14	15+
	ha	160 434	160 434	154 635	133 373	100 513	59 921	25 128	3 867
	%	8.3	8.3	8.0	6.9	5.2	3.1	1.3	0.2

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

Note: CO – conifers; BR – broadleaves.

Table 4.5–2 confirms an upward trend in the average age of all main tree species resulting from current un-even distribution of age classes with abnormal area of intermediate forest stands.

Table 4.5–2 Average age of selected tree species

	Species								
	SM	JD	BO	SC	DB	BK	HB	JV	JS
	Age (years)								
2000	66.2	76.1	60.8	44.9	72.1	70.1	62.5	51.7	51.8
2001	66.1	76.0	60.8	45.1	72.4	69.8	62.5	51.3	51.4
2002	66.4	76.0	61.7	45.7	73.3	70.3	63.3	51.6	52.0
2003	66.6	76.3	62.7	46.3	74.4	70.6	63.7	51.7	52.4
2004	67.1	76.8	63.4	47.2	74.9	70.8	63.8	51.8	52.4
2005	67.6	76.8	63.8	47.7	75.4	71.0	64.1	51.8	52.6
2006	68.1	77.3	64.3	48.1	75.8	71.1	64.2	51.9	52.9
2007	67.9	77.2	64.5	48.2	76.4	71.3	64.2	51.7	53.2

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

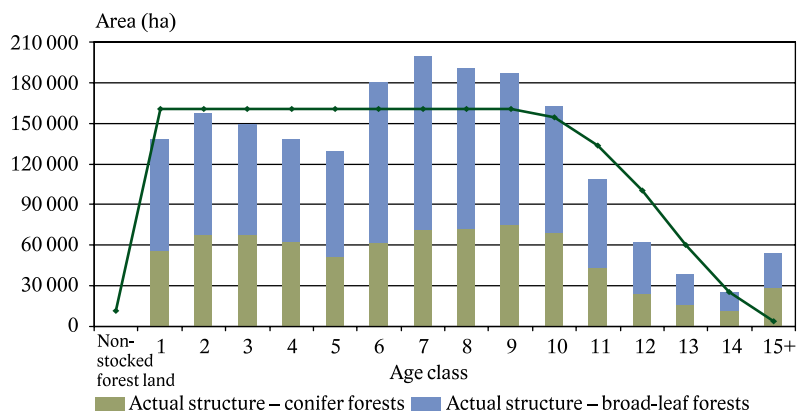


Figure 4.5–1 Actual & optimal age structure by species group (conifer & broad-leaf).

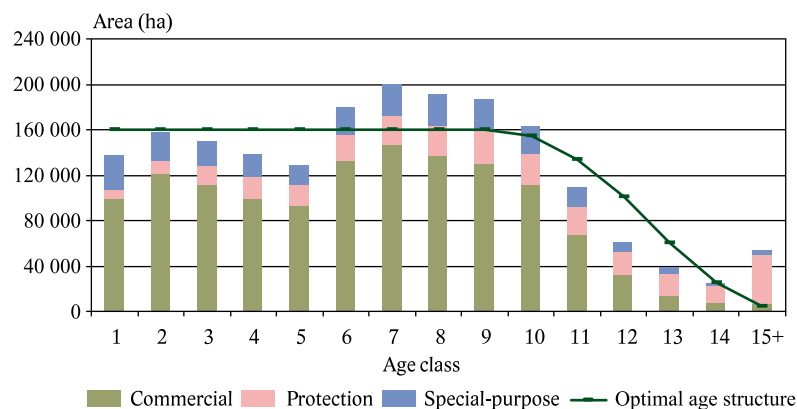


Figure 4.5–2 Actual & optimal age structure by functional forest category.

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

4.6 Spatial structure

If age and vertical differentiation of forests are considered, majority of Slovak forests belong to little differentiated single-storey stands (78.4 per cent). On the other end of the scale are three and multi-storey stands that account for only 2.3 per cent of all forests.

Table 4.6–1 Vertical structure by forest category

Category	Forest crop land area	Single-storey stands		Two-storey stands		Three- and multi-storey stands	
	ha		%	ha	%	ha	%
Commercial	1 318 094	1 049 916	79.7	241 981	18.3	26 197	2.0
Protection	329 530	242 761	73.7	77 007	23.3	9 762	3.0
Special-purpose	285 318	222 466	78.0	54 318	19.0	8 534	3.0
Total	1 932 942	1 515 143	78.4	373 306	19.3	44 493	2.3

Source: *Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.*

Prepared by: NFC-FRI Zvolen.

One of the most important indicators of spatial structure of forests is their stocking as it determines relative density or cover of forest stand area and its available production area. Maintenance of optimal stocking is vital for sustainable delivery of production and non-production forest services and benefits. In younger stands (up to the 5th age class) stocking is fairly balanced with only an occasional slight reduction; from the 6th class upwards it usually gradually increases. The average stocking level of Slovak forests is 0.8.

Table 4.6–2 Stocking by age class

	Age class															Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	
2000	0.88	0.90	0.87	0.83	0.81	0.78	0.77	0.76	0.75	0.76	0.75	0.74	0.71	0.70	0.69	0.80
2001	0.88	0.89	0.87	0.83	0.81	0.79	0.77	0.76	0.76	0.76	0.75	0.74	0.72	0.70	0.69	0.80
2002	0.88	0.89	0.87	0.83	0.81	0.79	0.77	0.76	0.76	0.76	0.76	0.75	0.72	0.70	0.70	0.80
2003	0.89	0.89	0.87	0.83	0.81	0.79	0.77	0.76	0.76	0.76	0.76	0.75	0.72	0.70	0.70	0.80
2004	0.89	0.89	0.86	0.83	0.81	0.79	0.78	0.77	0.76	0.77	0.77	0.76	0.73	0.71	0.70	0.81
2005	0.88	0.89	0.86	0.83	0.81	0.79	0.78	0.77	0.76	0.77	0.77	0.76	0.73	0.71	0.70	0.81
2006	0.88	0.89	0.86	0.83	0.81	0.79	0.78	0.77	0.76	0.77	0.77	0.76	0.73	0.71	0.70	0.80
2007	0.86	0.89	0.86	0.83	0.81	0.79	0.78	0.77	0.77	0.77	0.77	0.76	0.74	0.71	0.70	0.80

Source: *Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.*

Prepared by: NFC-FRI Zvolen.

4.7 Biological diversity and ecological stability of forests

Forests represent most complex terrestrial ecosystems on our planet and as such significantly contribute to the conservation of global biodiversity. Biodiversity can be defined as the variety and complexity of life on Earth at all scales including species, ecosystem and genetic (morphological and physiological) levels.

Ecological stability of forests is one of the main factors of sustainable development of forest sector since it underlies long-term delivery of multiple benefits and services provided

by forests. At an ecosystem level, optimum biodiversity adjusted to local conditions is favoured over so-called maximum biodiversity. Modern forestry emphasises a need for achieving minimum biodiversity enhancing ecological stability of forests. In the past, industrial production driven requests for larger volumes of timber were met by increasing the area of commercially grown spruce and pine at the expense of other species. In the 1950s, this trend changed as forest practitioners gradually realized the importance of site appropriate species composition and faced growing societal pressures to deliver multiple services and benefits available from forests. At present,



Figure 8 Rich diversity of species is a good indicator of forests' resilience and vitality.

the former can help forests to cope with significant changes of growing conditions initiated by ongoing climate change, natural disturbances and anthropogenic activities.

Stability and resilience of particular forest can best be described through its stand-based species diversity. Figures illustrating diversity of species composition are given in Tables 4.7–1 and 4.7–2. The former shows that the largest area of forest crop land is covered by broad-leaf forests – 49.9 per cent. Conifer and mixed forests cover 30.5 and 19 per cent, respectively; the remaining 0.6 per cent belongs to the category of temporarily non-stocked forest land. Forest stands formed by 3 and more tree species presently constitute an estimated 60 per cent of total forest crop land.

Table 4.7–1 Area of conifer, broad-leaf and mixed forest stands

Stands with conifer species presence of		Stands with broad-leaf species presence of		Mixed	Non-stocked forest land	Total
+91%	75–90%	+91%	75–90%			
ha / %						
464 074	125 956	819 989	143 779	367 604	11 540	1 932 942
24.0	6.5	42.4	7.5	19.0	0.6	100

Table 4.7–2 Area of forest stands by a number of tree species

No of species									
1	2	3	4	5	6	7	>8	Non-stocked forest land	Total
ha / %									
333 932	440 992	491 686	342 614	181 701	81 457	32 891	16 129	11 540	1 932 942
17.3	22.8	25.5	17.7	9.4	4.2	1.7	0.8	0.6	100

Source: *Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.*

Prepared by: *NFC-FRI Zvolen.*

Biological diversity and ecological stability of a particular forest is largely determined by the degree of its naturalness. The degree is based on a vertical structure of assessed forests and is used to divide forests into the following categories: natural, semi-natural, primarily semi-natural, transformed, and converted forests – plantations (Table 4.7–3). Vertical structure of forests might be improved applying appropriate tending and regeneration measures

Table 4.7–3 Forests by the degree of naturalness

Natural	Semi-natural	Primarily semi-natural	Transformed	Converted	Total
1 000 ha %					
94 ± 4	1 140 ± 15	380 ± 8	282 ± 7	0.3 ± 0.7	1 896 ± 22
4.9 ± 0.2	60.0 ± 0.8	20.0 ± 0.4	14.9 ± 0.4	0.2 ± 0.2	100

Source: NFIM, NFC-FRI Zvolen 2008.

Note: In its current form, the classification is not compatible with any of internationally accepted systems (e.g. FRA 2005; this should nevertheless change soon due to growing demands for reporting easy-to-compare data.

4.8 Growing stock and carbon sequestration

Recent figures suggest that the growing stock of Slovak forests have been on a steady increase. Data available for 2007 (correct to 31 December 2007) put the total stock at 445.9 (445 863 713) million m³ of timber inside bark. The average hectare stock was at the same time estimated at 232 m³ of the aforementioned timber.

Table 4.8–1 Trends in growing stock

Growing stock	1970	1980	1990	2000	2006	2007
million m ³						
Total	313.3	324.0	348.5	410.0	443.8	445.9
Scale and % of stock growth compared to 1970	—	+ 10.7	+ 35.2	+ 96.7	+ 130.5	+ 132.6
	—	+ 3.4 %	+ 11.2 %	+ 30.9 %	+ 41.7 %	+ 42.3 %
Per 1 ha (m ³)	171	174	181	215	231	232
Stock in forests available for timber production	Total				409.1	413.2
	of which				Conifer	190.8
					Broad-leaf	218.3

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

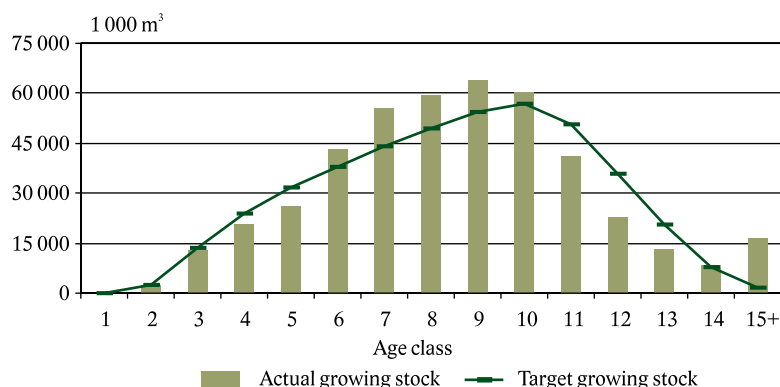


Figure 4.8–2 Actual and target growing stock by age class.

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

The increase in the volume of available stock has chiefly been attributed to an un-even age structure of Slovak forests typical for abnormal areal (Chapter 4.5) and volumar presence of mostly intermediate 50 – 100 years old stands. A more accurate estimate of growing stock based on new growth tables using domestic empiric material most improved stock in the first decennium (1992–2001) of its implementation (in case of FMUs with scheduled operations the effect might have lingered to 2005).

The document “Predictions and Visions of the Development of Agriculture, Food Industry, Forestry and Rural Regions in Slovakia” suggests that the positive trend set in previous years should continue to culminate in 2015–2020 reaching an estimated 450 million m³ of timber inside bark. After this period, the stock is assumed to take a downward turn.

Table 4.8–2 Growing stock by age class

Growing stock		Age class							
		1	2	3	4	5	6	7	8
Total	1 000 m ³	113	2 339	12 924	20 805	25 814	43 286	55 504	59 421
	%	0.0	0.5	2.9	4.7	5.8	9.7	12.4	13.4
Per 1 ha	m ³	1	15	86	151	199	241	279	312
Age class		9	10	11	12	13	14	15+	Total
Total	1 000 m ³	63 883	60 279	41 304	22 508	12 994	8 327	16 363	445 864
	%	14.3	13.5	9.3	5.0	2.9	1.9	3.7	100.00
Per 1 ha	m ³	342	369	379	364	340	325	302	232

Source: *Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.*

Prepared by: *NFC-FRI Zvolen.*

The actual volume of growing stock accrued in forests over a limited period of time (e.g. one year) is called a total current increment (TCI). Maximum TCI is observed in forests with a significant presence of high increment classes, i.e. in intermediate forests (3rd–6th age class). Nonetheless, TCI cannot be used as an indicator of allowable annual cut since its volume is determined by the structure of age classes. This is the reason why only an estimated 60 per cent of TCI volume can be harvested at present. Both total and hectare volumes of TCI continue to grow thanks to a positive actual age structure of Slovak forests and growing stock development. Nevertheless, foreseen gradual shift of stock towards higher age classes with lower average increment will bring its subsequent decrease.

Table 4.8–4 Total current increment

Indicator		Year					
		1980	1993	2000	2003	2006	2007
TCI	1 000 m ³	8 842	10 008	11 204	11 452	11 671	11 665
TCI per 1 ha	m ³	4.75	5.19	5.83	6.03	6.14	6.14

Table 4.8–5 Total current increment by forest category, species group and main species

Indicator	TCI (1 000 m ³)		TCI per ha (m ³)	
	2003	2007	2003	2007
Total TCI	11 451	11 665	6.03	6.14
Per category				
Commercial	7 911	8 373	6.20	6.39
Special-purpose	2 058	1 772	6.47	6.26
Protection	1 482	1 520	4.87	4.95

Table 4.8–5 – Total current increment

Indicator	TCI (1 000 m ³)		TCI per ha (m ³)	
	2003	2007	2003	2007
Species group				
Conifer	5 530	5 619	7.15	7.42
Broad-leaf	5 921	6 046	5.26	5.29
Spruce	3 980	4 031	7.83	8.11
Fir	531	537	6.67	6.91
Pine	800	817	5.71	5.97
Beech	3 458	3 584	5.87	5.97
Oak	947	950	4.50	4.56
Hornbeam	617	631	5.63	5.69

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

Table 4.8–6 Carbon stock (million metric tons)

	Carbon in live biomass		Carbon in dead biomass		Soil carbon	Total carbon
	Above-ground	Below-ground	Deadwood	Cull		
1990	133.9	28.8	12.5	16.7	270.5	462.4
2000	156.1	33.7	14.5	19.5	270.5	494.3
2003	165.4	35.9	15.7	20.7	270.5	508.2
2006	170.0	36.9	16.1	21.4	270.5	515.0
2007	170.8	37.1	16.2	20.6	270.5	515.2

Source: Compendium of Slovak Forestry Statistics 2008, NFC-IFRI Zvolen.

Prepared by: NFC-FRI Zvolen.

Upward trends in growing stock and forest area create preconditions for accelerated growth of carbon stock in all major balance categories. Figures reported to 31 December 2007 put the volume of carbon stock in Slovak forests at 515.2 million metric tons (515 208 333 metric tons) of which majority are sequestered in soils and above-ground tree biomass.

4.9 Forest health and vitality

Investigation of forest health and vitality is based on the level I and II monitoring networks. At present, there are 112 permanent monitoring plots (PMP) in a 16×16 km grid (extensive level I monitoring) and 7 PMP established in selected forest ecosystems (intensive level II monitoring). Both monitoring levels constitute a part of the European network of monitoring plots. The European Forest Monitoring Programme (EFMP), aim of which is to provide credible data on the state of forests in Europe and qualified insight into underlying causes and impacts of ongoing changes in forests and other associated ecosystems, has so far been acceded by 39 European countries.



Figure 9 Defoliation is a good indicator of forest health.

Assessment of forest health is currently based on the evaluation of forest crown condition. The evaluation uses a number of parameters most important of which is defoliation. Defoliation is estimated visually and reported in per cent of destroyed leaves rounded to 5 per cent. Estimated defoliation serves to class particular trees in one of the five defoliation categories (0–4). Curtail for the assessment of forest health is the per cent of trees in 2–4 defoliation categories with defoliation over 25 per cent. Trees with lesser defoliation are considered generally healthy.

Table 4.9–1 Per cent of trees in defoliation categories 2007

Defoliation category	0	1	2	3	4	1+2+3+4	2+3+4
% of defoliation	0–10%	11–25%	26–60%	61–99%	100%		
Beech	23.1	67.4	9.4	0.1	0.0	76.9	9.5
Oak	2.0	71.7	24.0	2.3	0.0	98.0	26.3
Hornbeam	22.2	58.1	19.7	0.0	0.0	77.8	19.7
Other broad-leaf	19.4	46.3	23.5	10.8	0.0	80.6	34.3
Broad-leaf total	18.5	64.9	14.9	1.7	0.0	81.5	16.6
Spruce	4.0	55.5	38.2	1.0	0.3	96.0	39.5
Fir	4.2	58.2	36.0	1.6	0.0	95.8	37.6
Pine	6.6	58.7	33.2	1.0	0.5	93.4	34.7
Larch	5.6	72.2	20.8	1.4	0.0	94.4	22.2
Conifer total	4.7	57.8	36.1	1.1	0.3	95.3	37.5
Total	12.6	61.8	24.0	1.5	0.1	87.4	25.6

Source: Monitoring of Slovak Forests. Forest Focus. PMS Forests. NFC-FRI Zvolen.

It is generally accepted that broad-leaf tree species better resist unfavourable environmental conditions than conifer species because of their foliage cycle. It is thus perhaps not surprising that hornbeam and beech are perceived as the least damaged tree species in Slovakia; on the other side of scale are conifer species like fir, pine and spruce.

Figure 4.9–1 shows the trend in average defoliation of main species groups (conifer, broad-leaf) and total defoliation since the beginning of the monitoring period including outlook to 2012. Entered figures were computed using data from all monitoring plots

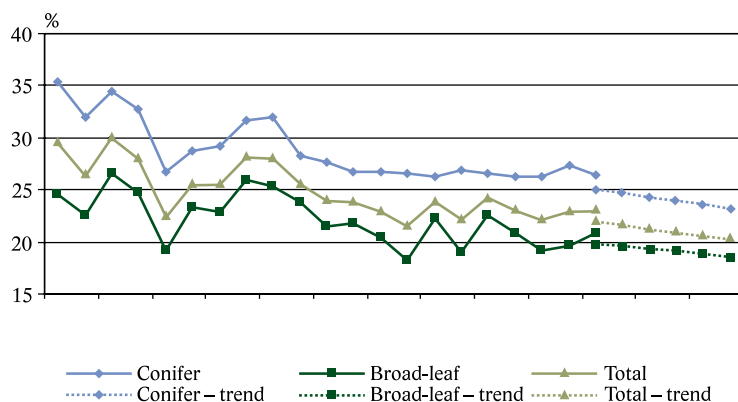


Figure 4.9–1 Trends in average defoliation and outlook to 2012.

Source: PAVLENDÁ, P. et al. 2007. Monitoring of Slovak Forests. Forest Focus. PMS Forests. NFC-FRI Zvolen

and thus provide representative averages for the entire country. Notwithstanding to that, vitality and health of forest ecosystems can vary considerably depending on their location. The data indicate that in the 1987–1996 reporting period the combined value of defoliation for all tree species was 20–30 per cent. In the past 11 years, however, average total defoliation has fallen under 25 per cent. Most recent results of defoliation and forest damage assessment indicate very little changes in vitality and health of forests in recent years – experienced interannual variations have primarily been associated with weather and climate factors.



5. FOREST DISTURBANCES AND THEIR IMPACT

5.1 Abiotic disturbance

The yearly overview of abiotic disturbances and the extent of their damage are given in Table 5.1–1.

Table 5.1–1 Forest damage by abiotic disturbances 2007 (m³)

Factor	Damaged	Removed	Pending removal
Wind	2 686 833	1 943 505	743 328
Snow	108 429	92 973	15 456
Rime	4 088	4 084	4
Drought and sunstroke	165 152	131 567	33 585
Waterlogging	406	406	0
Other	16 491	14 252	2 239
Total	2 981 399	2 186 787	794 612

Source: NFC-FRI Zvolen, 2008 (Form L 116).

Incidental felling owing to mechanical damage of forests by wind, snow and rime reached last year the volume of 2 041 thousand m³. Of this figure, 1 944 thousand m³ of timber was damaged by wind; compared to wind, snow and rime damage was rather insignificant at 93 and 4 thousand m³, respectively (Table 5.1–2).

Table 5.1–2 Incidental felling (m³)

	Wind	Snow	Rime	Total
2000	2 143 483	74 807	6 413	2 224 703
2001	933 670	31 242	466 743	1 431 655
2002	1 115 861	42 514	54 306	1 212 681
2003	1 607 474	16 004	20 338	1 643 816
2004	1 096 220	15 786	25 866	1 137 872
2005	5 177 337	33 059	3 931	5 214 327
2006	1 684 124	460 414	4 702	2 149 240
2007	1 943 505	92 973	4 084	2 040 562

Source: NFC-FRI Zvolen, 2008 (Form L 116).

In January 2007 (18–19 January), forests of central Europe were severely damaged by the windstorm Kyrill. The total volume of windthrow was estimated at 55 million m³ with most damage reported from Germany – 20 million m³, the Czech Republic – 10 million m³, and Austria – 2 million m³. When compared to the neighbouring countries, Slovakia was spared the worst damage with the loss of timber put at some 400 thousand m³. Majority of this volume was blown down by the storm on 23 August 2007 rather than Kyrill. Removal operations primarily dealt with the aftermath of 2007 disturbances rather remnants of catastrophic windthrow from November 2004. Most affected were conifer forests of the Liptov region (FE Liptovský Hrádok), and broad-leaf forests of the FE Rimavská Sobota, FE Rožňava, and FE Košice. In addition, the storm inflicted widespread damage to thin and often fragmented forests of Kysuce (FE Čadca), Orava (FE Námestovo) and Horehronie (FE Beňuš, FE Čierny Balog) regions. It is assumed that a similar scale of damage can be expected in the following years in connection with large-scale bark beetle outbreaks in spruce forests.



Figure 10 Windthrow left on sites usually results in large-scale bark beetle outbreaks.

Majority of incidental felling attributed to snow damage from 2005 and 2006 occurred in spruce forests of northern and central Slovakia (Kysuce, Orava and Horehronie regions). Despite its localised character, conditions in some regions of Slovakia prevented a complete removal of affected timber. To 31 December 2007, 759 thousand m³ of timber were left untreated in forests of FE Liptovský Hrádok, FE Beňuš, FE Čadca, and partly also FE Čierny Balog and FE Rimavská Sobota (broad-leaf forests).

As for other disturbances, in 2Q 2007 concerns were raised over physiological stressors of trees. Limited snow cover and spring precipitation shortages teamed together to produce drought ill-affecting fitness of forest trees and entire communities. These conditions sparked further decline of spruce forests, particularly in regions of Kysuce, Orava and Spiš. Lack of precipitation had a most adverse effect on forests in areas previously damaged by calamitous windthrow (Vysoké and Nízke Tatry Mts.) where the impact was most felt on sites with unresolved wind breakages and blown down trees. Warm and dry summer (mid July in particular) created favourable conditions for bark beetle outbreaks – these spread rapidly to deal yet another blow to already severely declining spruce forests.

5.2 Biotic disturbances

Bark beetles and wood borers

Table 5.2–1 illustrates the scale of forest disturbance by bark beetles and wood borers and the volume of damaged timber removed in 2007.

Table 5.2–1 Timber damaged by bark beetles and wood borers

Species	Timber volume (m ³)		
	Damaged	Removed	Pending removal
European spruce bark beetle	2 325 843	1 860 133	465 710
Pine bark beetle	166 769	150 319	16 450
Conifer ambrosia beetle	7 992	7 992	0
Pine shoot beetle and other similar species	3 177	3 119	58
European oak bark beetle	1 774	1 774	0
Fir bark beetle	1 292	1 292	0
Total	2 506 847	2 024 629	482 218

Source: NFC-FRI Zvolen, 2008 (Form L 116).

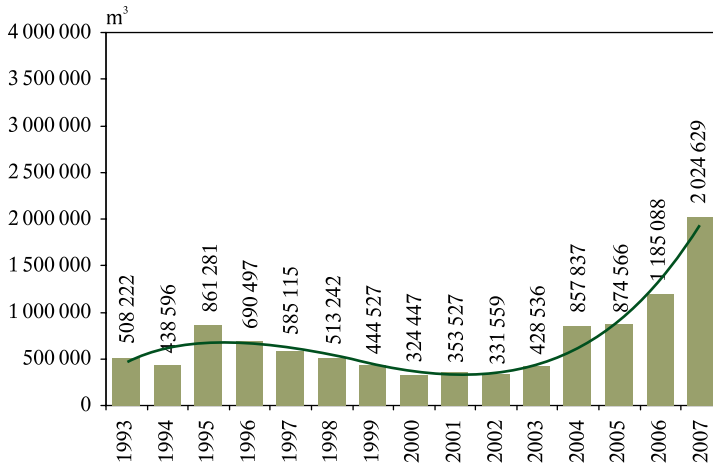


Figure 5.2–1 Volume of timber removed due to bark beetle and wood borer damage including outlook for 2008.

Source: NFC-FRI Zvolen, 2008 (Form L 116).

Temperature abnormal beginning of the vegetation period reported last year from many middle altitude regions of Slovakia favoured mass swarming of bark beetle species. Populations' development was further accelerated by a high volume of removal pending calamitous timber left in most vulnerable spruce forests. The volume of unremoved damaged timber came to an estimated 160 thousand m³. Intensive swarming of European spruce bark beetle was also recorded in regions affected by November 2004 windthrow. Since the wind blown timber was no longer attractive for the beetle, it spread to surrounding standing stands causing considerable damage to hundreds of hectares of forests in protected areas (Tichá and Kôprova Valleys, Hrebienok, ridges of the Nízke Tatry Mts. and Slovenské rudohorie Mts.). Dry and hot summer, often with record temperatures reaching between 30.3 – 40.2 °C, particularly weakened spruce forests in central Slovakia leaving them more susceptible to bark beetle damage. In this situation, beetle infested trees in non-intervention zones of protected areas served as "beetle reservoirs" for surrounding forests. The sites most affected by bark beetle devour included Tichá and Kôprova Valleys, Babia hora, Pilsko, some areas of the High Tatras Mts. (Hrebienok, Stežky, and Javorina), etc. These sites have also experienced mass decline of standing forests predicted to further continue. In addition, decline of spruce forests has also been reported from the Poľana region where the species primarily infested the ridge locations of the biosphere reserve

under the strictest 5th level of protection.

The damage is predicted to further spread to reach critical levels should abnormally hot weather from previous years continue in 2008. Spruce forests further declined also in the Gemer region (particularly at FE Rožňava and FD Betliar) where the measures implemented (including removal of infested standing trees and aerial spraying of 150 ha) proved to be largely ineffective. Extremely hot summer months sparked off mass decline of spruce forests around Kysuce and Orava. In a few months, spruce dieback spread fast south to hit forests in Kysucké Nové Mesto and Žilina districts. The outlook for 2008 is rather bleak – the density of pest populations is estimated to further increase largely because of large volumes of unremoved windthrow and the scale of bark beetle spreading in 2007. The pest shows clear tendency to invade timberline altitudes where forests fulfil important a number of non-production functions. Concerns have thus been raised about the safety of foresters, hikers and visitors because of hazard posed by snags.



Figure 11 European spruce bark beetle is the commonest pest of Slovak forests.

As for other pests, TANAP forests were affected by larch bark beetle *Ips cembrae* outbreak which spread to larch standards and forest edges left behind November 2004 windthrow. Specimens of arolla pine on reforested openings and around Tatra villages were severely affected by eight-toothed spruce bark beetle *Ips amitinus* and six-toothed spruce bark beetle *Pityogenes chalcographus*. Transplants of arolla pine, larch, pine and spruce on reforested openings were locally seriously damaged by large pine weevil *Hylobius abietis*. The pest also weakened specimens from natural regeneration. Adult pines were often damaged by engraver beetle *Ips acuminatus*, the pest made responsible for critical decline of relic pinewoods in the Slovenský raj NP. Forests in north-western Slovakia were reinfested by alochthonous northern bark beetle *Ips duplicatus*.

Leaf-eating and sucking pests

In 2007, populations of gypsy moth *Lymantria dispar* and oak pest Tortrix moth (*Tortricidae*) did not spread on a mass scale. Compared to previous years, only mild increase was reported in damage of oaks by mottled umber *Erannis defoliaria* and winter moth *Operophtera brumata*. There were a number of other pests extent of damage of which varied in size, location and seriousness of their attacks. Larch case bearer *Coleophora laricella* spread primarily in forests of FE Kriváň and FD Málinec. *Rhyacionia buoliana* caused localised damage in pine forests of Záhorie region. Mild increase in the presence of *Dreyfusia nordmannianae* was reported from MF Banská Bystrica, FE Beňuš, and FE Slovenská Ľupča. Aphid species larch woolly adelgid *Adelges laricis* and *Sacchiphantes viridis* sucking on spruce have become serious permanent pests of larch thickets. Their incidence has often reached a calamitous proportion and contributed to local/group dieback of forests on sites around Slovenská Ľupča, Beňuš, and Kriváň. Browntail moth *Euproctis chrysorrhoea*, a serious pest of broad-leaf forests, was in 2007 reported from Nitra, Levice and some other areas of southern Slovakia. Horse chestnut leaf miner

Cameraria ohridella, another serious pest to watch for, was reported to affect almost the entire population of horse chestnut in Slovakia. Spring swarming of this pest was fairly intense and partly aided by the weather since there were no colder spells to hamper it. In Záhorie region, damage by cockchafer *Melolontha sp.* imago grew to a considerable proportion especially because of very intense spring swarming. Most damage was reported from substantial tracts of oak forests in FD Holíč, FD Moravský Ján, and around Šajdíkove Humence nursery. Serious outbreak of oak flea beetle *Altica quercetorum* was reported from approximately 400 ha of oak forest in the Kosihy area where pest manifested itself through browning and drying of foliage.

Fungi pathogens and diseases

Table 5.2–2 provides overview of most serious fungi pathogens and diseases and volumes of timber removed in 2007 due to aforementioned factors.

Table 5.2–2 Forest damage by fungi pathogens and diseases (m³)

Type	Damaged	Removed	Pending removal
Rots	13 693	13 446	247
Fungus-borne vascular diseases	7 403	7 284	119
Needle casts	228	208	20
Canker	339	339	0
Honey mushroom	229 394	214 363	15 031
Total	251 057	235 640	15 417

Source: NFC-FRI Zvolen, 2008 (Form L 116).

In 2007, most concerns were raised in connection with continuing decline of spruce forests associated with honey mushroom *Armillaria ostoyae*. The fungus development was greatly encouraged by weather development in 2006 and 2007.

Localised decline of oakwoods was chiefly attributed to spreading of fungus-borne vascular diseases and *Armillaria* spp. induced by precipitation deficit and hot summer temperatures.

Reports from some regions of Slovakia (Považská Bystrica, Štós) indicated isolated decline of larch specimens damaged by early May frost. The decline was accompanied by severe defoliation and reduction in the volume of crown branches with root systems of dying and died trees showing honey mushroom *Armillaria ostoyae* infection.

The scale of black pine decline caused by diplodia blight *Sphaeropsis sapinea* and needle blight *Dothistroma septospora* remained largely unchanged. The most severe decline of pine forests was last year reported from areas around Trenčín, Nitra, Partizánske, Prievidza, Zvolen, Detva, Krupina, Rimavská Sobota, and Sorošky. Forests in the Košice region (Turňa nad Bodvou) and FE Levice (FD Želiezovce) were affected by dothichiza canker of poplar *Cryptodiaporthe populea*. The pest caused most damage in 1–2-year old plantations of *Populus x canadensis*. Saplings in oak plantations of Poľana were infected by oak root rot *Rosellinia quercina*.

Game

The scale of game contributed forest damage has since 1999 been on a continual increase. The increase has mostly been linked to high ungulates populations. The total damage costs were last year estimated at 12.4 million SKK.

Among most damaged were the forests around Prievidza where forest revenue losses were reported to reach 1.7 million SKK last year (FE Prievidza, HA Cígel, FHA Liešťany). The situation was particularly critical in forests of FD Bojnice (FE Prievidza) where the total damage reached an estimated 1 million SKK. Damage to beech forests caused by deer nibbling was most serious in the Malé and Biele Karpaty Mts., particularly in forests of FE Smolenice (232 thousand SKK) and the Military Forests and Estates Malacky (209 thousand SKK). Forests of the Biele Karpaty Mts. were seriously damaged by mouflon and deer bark-stripping. At Lesotur Stará Turá, bark-stripping damage reached an estimated 597 thousand SKK. In central Slovakia, the highest losses of forest revenue were reported from the Community Forests Martin (181 thousand SKK), Zvolenská Slatina (194 thousand SKK), forests of the Land Owner Association Hybe (127 thousand SKK) and FE Liptovský Hrádok (71 thousand SKK). In the High Tatra Mts., deer populations from 2004 windthrow sites moved to a more forested Podspády area where they caused an estimated 274 thousand SKK worth of damage by browsing. The total direct cost of a long-term game problem in the Levočské pohorie Mts., the Military Zone Javorina in particular, was in 2007 estimated at 1 452 thousand SKK. The cost by particular subjects was as follows: MFE Kežmarok – 126 thousand SKK; Municipal Forests Levoča – 517 thousand SKK; Ľubica village – 686 thousand SKK; Land Owner Association Ľubica – 123 thousand SKK. A substantial loss of forest revenue was also reported from the forests of Košice region (Pillban Ltd. – 111 thousand SKK).

5.3 Anthropogenic disturbances

Air pollution

In 2007, impact of emissions was most felt in the forests of Námestovo district where 6.9 hectares were referred to as pollution damaged. Other affected districts included Gelnica (5.5 hectares) and Kežmarok (3.4 hectares). Among species, spruce, fir and beech were listed as trees most prone to pollution damage. Emissions-induced decline of forests continued to concentrate in areas adjacent to industrial zones, steel works, magnesite, chemical and energy production facilities.

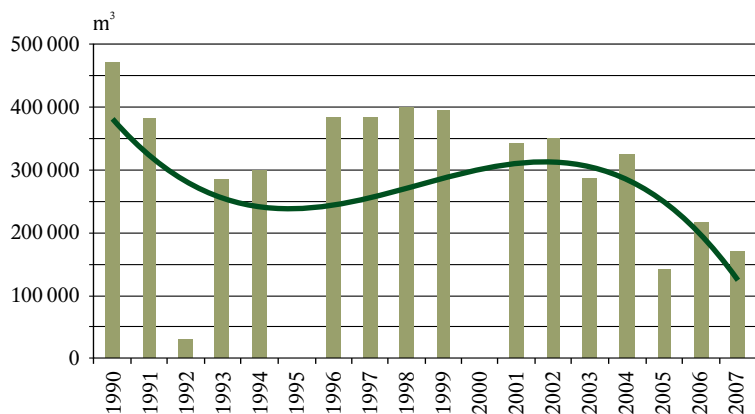


Figure 5.3–1 Volume of pollution damaged timber removed since 1990 and outlook for 2008.

Source: NFC-FRI Zvolen, 2008 (Form L 116).

The Report on Air Quality and Contribution of Particular Pollution Sources to Air Pollution in Slovakia (2003) indicates that emissions of basic pollutants have dropped considerably since 1990 – in case of solid particulates the reduction is more than five-fold. For other pollutants, statistics are similarly promising: five-fold reduction in SO₂, two-fold in NO_x, and one and a half in case of CO when compared to pre-1990 levels. Of the total emissions, only an estimated 20–25 per cent originates from local pollution sources – the remaining volume is trans-boundary emissions from industrial zones of neighbouring countries.

Forest fires

In 2007, the Fire Appraisal Institute reported 463 forest fires – a twofold increase compared to 2006. The cost of fire-incurred forest damage was estimated at 158 million SKK; there were no human casualties, though. The increase was chiefly attributed to mild winter conditions (snow shortage) and weather development in spring and summer months. The most serious fire broke out in state forests in the cadastre area of Staré Hory (FE Slovenská Ľupča) on 15 April 2007. The fire destroyed 116 hectares of forest with direct costs estimated at 5.9 million SKK. The largest number of forest fires was reported from districts of Spišská Nová Ves (36), Poprad (35), Martin (19), and Kysucké Nové Mesto (18). The fires resulted from the following events: grass burning (122), illegal fires in wilderness (104), and manipulation with open fire (65).



Figure 12 Windthrow left on calamitous sites in protected areas considerably increases the risk of forest fires.

Table 5.3–1 Forest damage by anthropogenic disturbances (m³)

Agent	Damaged	Removed	Pending removal
Air pollution	200 021	169 547	30 474
Fire	7 654	3 250	4 404
Timber theft	8 032	8 032	0
Total	215 707	180 829	34 878

Source: NFC-FRI Zvolen, 2008 (Form L 116).



6. FOREST RESOURCES MANAGEMENT

6.1 Gene pool and reproductive material

6.1.1 Inspection of reproductive material

The Centre for Inspection of Forest Reproductive Material, a specialised unit of NFC, performs, consistent with the Act No 217/2004 Coll on forest reproductive material and on adjustment to specific acts, the following tasks:

- approval and administration of the national register of FRM sources including inspection of their management;
- supervision and inspection of the collection, production, and handling of forest reproductive material;
- testing and inspection of clones and multiclinal varieties of forest tree species;
- administration of the national register of FRM producers;
- free advisory services in the field of forest seed collection and nursery stock for producers, forest owners and managers including trainings and workshops requested by state forestry administration and other forestry subjects.

The inspections completed in 2007 covered the following areas: management of FRM sources; review of horizontal and vertical FRM transfer (92 inspected subjects); production of FRM (seed collection and storage – 60 subjects, production of planting material – 171 subjects), seed quality (specialised seed laboratory accredited by ISTA performed the following number of seed tests: germination – 364 samples, purity – 300 samples, vitality – 70 samples, water content – 129 samples, pre-sowing treatment – 79 samples). The Centre also managed the national register of seed sources, the register of FRM licence holders, and the register of reproductive material producers. In addition, the Centre last year organised the 6th international workshop called Contemporary Aspects of Forest Nursery, Seed Management and Artificial Forest Regeneration, which was held in Liptovský Ján on 27 – 28 March 2007. Its 119 participants came from various branches of the sector and included the representatives of science & research, state administration and forestry practice.

6.1.2 Sources of forest reproductive material

Quality of FRM is seen as one of the most crucial aspects of forest planting effectiveness. Strict regulatory provisions specify that FRM can be obtained only from the approved sources which include the following: seed trees and clones (*plus trees*); seed orchards; seed stands; approved stands; clone mixtures and multiclinal varieties; and gene reserve forests.

Plus trees (ST) are trees of exceptional qualitative properties. In recent years, most look-out-for properties have become those associated with species resilience to particular disturbances. At present, there is a great demand for noble hardwoods seeds due to a shortage of suitable seed orchards of these species.

Seed orchards (SO) are purpose plantations set up to produce high quality seed material. In recent years, a number of European larch and Scots pine orchards have been closed due to their long-term surplus.

Table 6.1.2–1 Number and area of plus trees, seed orchards and seed stands

Species	Plus trees		Seed orchards			Seed stands	
	pcs	%	pcs	ha	%	ha	%
Norway spruce	226	5.3	3	4.0	2.1	281.6	36.2
Silver fir	159	3.7	1	2.3	1.2	90.5	11.6
Scots pine	822	19.2	23	56.9	30.4	55.4	7.1
European larch	924	21.6	34	97.7	52.4	46.7	6.0
Black pine	32	0.7	3	8.8	4.7	—	—
Arolla pine	54	1.3	4	6.3	3.4	—	—
Other conifer	266	6.2	1	0.3	0.2	—	—
Oak spp.	510	11.9	2	3.0	1.6	120.3	15.5
Common beech	38	0.9	—	—	—	183.6	23.6
Sycamore	137	3.2	2	1.7	0.9	—	—
European ash	206	4.8	3	1.8	1.0	—	—
Common alder	161	3.8	1	1.0	0.5	—	—
Small-leaved lime	102	2.4	1	1.5	0.8	—	—
Wych elm	140	3.3	1	0.5	0.3	—	—
Silver birch	—	—	1	0.4	0.2	—	—
Other broad-leaf	501	11.7	1	0.5	0.3	—	—
Total	4 278	100.0	81	186.5	100.0	778.1	100.0

Source: NFC-FRI Zvolen, 2008.

Seed stands (SS) are progeny of biologically and commercially most valuable populations of forest tree species displaying exceptional resistance, production and quality properties. Their area is considered sufficient and thus new stands are unlikely to be established in the foreseeable future.

Approved stands (AS) are stands approved for the seed collection. These stands are selected and approved following the application from a particular stand manager. Depending on the number of applications, the area of these stands interannually slightly differs. Due to management restrictions, restrictions free B stands greatly outnumber the category A stands.

Table 6.1.2–2 Area of approved stands by category and tree species

Species	Category area (ha)		Total
	A	B	
Norway spruce	2 947	15 681	18 628
Silver fir	412	3 889	4 301
Scots pine	351	2 764	3 115
European larch	141	1 090	1 231
Oak spp.	500	7 362	7 862
Common beech	2 342	23 007	25 349
Other species	121	1 281	1 402
Total	6 814	55 074	61 888

Source: NFC-FRI Zvolen, 2008.

Gene reserve forests (GRF) are in-situ protected gene sources designated to achieve self-reproduction and conservation of gene pool of valuable populations of tree species. To 31 December 2007, the Centre for Inspection of Forest Reproductive Material registered 101

GRFs on the total area of 29 821 hectares. The Centre last year also reviewed, confirmed and prepared for approval further 21 GRFs located in the State Forests TANAP. At the end of 2007, the old unit of the Forest Seed Bank (FSB) stored after the exclusion of low quality seed 298.3 kg of seed comprising 140 samples of five conifer species. The new unit currently stores 141.5 kg of seed comprising 22 samples of four conifer species. New seed material was collected following the *Guidelines for Establishment, Management and Utilisation of Gene Sources* issued in 2000.

6.1.3 Management of forest seed stock

Majority of forest seed stock are treated and stored by the Forest Enterprise (FE) Semenoles Liptovský Hrádok. In addition to storing the stock for state forests the facility also provides storage capacity for other forest subjects. There are also a number of privately operated storage facilities. Autumn collected seed crop of major tree species ranged from fairly low (silver fir, common beech) to average (oak spp.). Seed crop of other main species (Norway spruce, European larch, Scots pine) collected in winter 2007/2008 was comparably low.



Figure 13 Seed stand of common ash and narrow-leaved ash in Trstice.

Table 6.1.3–1 Forest seed stock and its comparison with optimal stock

Indicator	Species (kg)						
	Spruce	Larch	Pine	Dwarf pine	Fir	Beech	Oak
FE Semenoles stock	1 234	880	641	59	1 625	34 506	1 850
– out of which leased storage	591	228	200	50	30	390	—
Stock of other owners	444	112	38	14	605	9 973	1 200
Total stock	1 678	992	679	73	2 230	44 479	3 050
Optimal stock	2 037	1 163	1 591	90	5 580	56 317	unspecified
Difference	-359	-171	-912	-17	-3 350	-11 838	—

Source: NFC-FRI Zvolen, 2008, *State Forests of the Slovak Republic, s.e., Banská Bystrica, FE Semenoles Liptovský Hrádok*.

Table 6.1.3–1 provides the overview of seed stock correct to 31 December 2007. Despite the fact that the collection of spruce, larch and pine seeds continued well to the first months of 2008, limited crop did not give much hope for increasing the volume of stored stock. Compared to 2006, the stock of all major species except for larch decreased as a result of 2007/2008 poor harvest. Seed stock of spruce and pine marginally grew compared to fir seed stock which interannually fell by almost 50 per cent. Despite collection efforts the shortage of available broad-leaf stock continues to deepen with beech stock falling by almost 40 per cent and oak spp. stock by a staggering six fold in recent years.

6.1.4 Forest nurseries

To 31 December 2007, the Centre for Inspection of Forest Reproductive Material registered the following number of FRM handling licencees: 289 natural persons, 148 legal entities, and 44 natural persons holding the licence on behalf of other natural person. In the same period, the Centre received 161 applications for the registration of planting stock.

In 2007, the downward trend in both the total nursery area and actual production area of state nurseries set in previous years further continued. This trend has been associated with an ongoing re-assessment of nursery and seed production operations at the State Forests of the Slovak Republic, s.e. A very similar situation is in the state supervised production of forest transplants. In the non-state sector, on the contrary, the transplants production has been on an increase even though the actual production area has meanwhile shrunk.

Table 6.1.4–1 Total nursery area, production area and transplant stock

Indicator	Year						
	2001	2002	2003	2004	2005	2006	2007
Total nursery area (ha)							
State sector	484	600	521	520	485	453	317
Non-state sector	626	198	167	160	138	170	236
Total	1 110	798	688	680	623	623	553
Production area (ha)							
State sector	329	381	360	350	343	315	230
Non-state sector	435	151	116	119	100	123	135
Total	764	532	476	469	443	438	365
Transplant stock (1 000 pcs)							
State sector	113 802	149 731	120 232	111 582	91 649	85 364	80 618
Non-state sector	73 895	64 816	50 538	61 027	59 751	67 947	97 392
Total	187 697	214 547	170 770	172 609	151 400	153 311	178 010

Source: NFC-FRI Zvolen, 2008

Despite very little changes in the number of available FRM sources (their area has actually slowly been growing), forestry practice is under growing pressure to secure enough genetically appropriate FRM for reforestation and afforestation. Current stock shortages are primarily the result of poor management of seed collection in seed rich years. To a lesser degree, shortages are also associated with regional and altitudinal distribution of FRM sources.

Timely response to forestation urgencies and conservation of threatened gene pool is impossible to foster without the improvement of current seed collection efficiency. Without improvements, the continual supply of genetically and geographically suitable planting material is likely to fail. At present, seed crop is exclusively collected by the State Forests of the Slovak Republic, s.e. and the State Forests of TANAP. One of the main short-term objectives is thus to develop a customised funding model ensuring collection and storage of seed from threatened forest stands regardless of their ownership.

6.2 Silviculture

6.2.1 Forest regeneration

Main indicators and trends in regeneration are given in Tables 6.2.1–1, 6.2.1–2, and 6.2.1–3. The figures confirm the upward trend in the total volume of artificial regeneration. Improvements in the implementation of shelterwood system and soil disturbance increased the rate of natural regeneration to 30 per cent in 2007 (Table 6.2.1–3). The area of non-stocked forest land from the beginning of 2007 does not correspond with the 2006 figure due to a more accurate estimate of non-stocked area obtained from newly reviewed FMPs.



Figure 14 Wider implementation of the shelterwood system improves natural regeneration.

Table 6.2.1–1 Forest regeneration (ha)

Regeneration 2007	State subjects	Non-state subjects	Total
Non-stocked forest land in early 2007	13 583	7 826	21 409
Total area increment in 2007 split to:	7 748	6 987	14 735
Felling	6 393	5 997	12 390
Failed regeneration	1 096	812	1 908
Area resulting from section 7 of the § 6	98	24	122
Natural disasters	124	51	175
Natural regeneration excluding felling area	17	52	69
Other causes	20	51	71
Total area loss in 2007 split to:	7 528	6 209	13 737
Artificial regeneration	4 949	4 077	9 026
Natural regeneration	2 555	2 117	4 672
Other causes (District Office decision)	24	15	39
Non-stocked forest land in late 2007	13 803	8 604	22 407
– of which approved exceptions	1 349	712	2 061

Source: *Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.*
Prepared by: NFC-FRI Zvolen.

Table 6.2.1–2 Regeneration type (ha)

Non-stocked forest land decrease	New regeneration		Repeated regeneration	Total
	Planting/ sowing	Underplanting/ undersowing		
Artificial regeneration	7 042	127	1 858	9 027
Natural regeneration	4 616	10	45	4 671
Total	11 658	137	1 903	13 698
Other causes (District Office decision)	39	—	—	39
Total	11 697	137	1 903	13 737

Source: *Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.*
Prepared by: NFC-FRI Zvolen.

Table 6.2.1–3 Trends in forest regeneration (ha)

Regeneration type	1990	2000	2005	2006	2007
Artificial regeneration	15 500	12 923	8 922	9 256	9 027
Natural regeneration	3 464	2 134	4 582	6 305	4 671
Total	18 964	15 057	13 504	15 561	13 698
Natural regeneration (%)	18.2	14.2	33.9	40.5	34.1

Source: *Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.*

Prepared by: *NFC-FRI Zvolen.*

Forest soil tilling was performed on 7 787 hectares of artificially regenerated area and 1 393 hectares of naturally regenerated area.

Given a high proportion of felled area (chiefly due to incidental felling), experts predict continuous growth of planting operations using bare-root transplants and possibly also container seedlings and transplants. Planting currently accounts for approximately 90 per cent of performed artificial regeneration. Sowing (up to 10 per cent of the total volume) might be used on non-stocked forest land resulting from natural disturbances.

Ideally, improving natural regeneration figures should be accompanied by more efficient artificial regeneration with minimum losses implementing more advanced technologies, e.g. increased usage of container planting material, soil amelioration, and efficient protection and treatment of young plantations.

6.2.2 Treatment of young forests

Brush cutting and cleaning were in 2007 implemented on the total area of 10 789 hectares of which 7 373 hectares were in state tenure forests; the remaining 3 416 hectares were forests in non-state tenure. Measures to mitigate game damage were performed on 28 111 hectares. In addition, 346 hectares of plantations were fenced off (277 km) with 9 km of fence being erected to prevent cattle grazing. Weed control measures were applied on the total area of 36 945 hectares of plantations.

Additional data on the implementation of preventive measures against outbreaks and spreading of bark beetles, wood borers and other secondary pests are provided in Chapter 6, Sections 6.5.2 and 6.5.3.

6.2.3 Cleaning operations

Similarly to 2005 and 2006, the volume of cleaning operations performed in 2007 failed to reach prescribed volumes. This trend is highly undesirable since initial age classes are crucial for the overall development of forest stands. It is the time when timely and appropriate silvicultural measures (cleaning and thinning in particular) can substantially improve target structure and stability of treated forest stands. Failure to complete desired silvicultural measures or their untimely performance often significantly and irreparably compromises future vitality and development of affected forest stands.

Table 6.2.3–1 Planned and performed cleaning 2007 (ha)

Cleaning	State subjects	Nov-state subjects	Total
State subjects	16 843	12 491	29 334
Performed	16 844	8 751	25 595
Planned-performed rate	100.0	70.1	87.3

Source: Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.

Prepared by: NFC-FRI Zvolen.

Table 6.2.3–2 Trends in planned and performed cleaning (ha)

Cleaning	Year				
	1990	2000	2005	2006	2007
State subjects	33 994	34 668	30 743	29 894	29 334
Performed	34 143	34 936	29 079	28 383	25 595
Planned-performed rate	100.4	100.8	94.6	94.9	87.3

Source: Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.

Prepared by: NFC-FRI Zvolen.

6.2.4 Thinning

Similarly to previous years, thinning volumes performed in 2007 were lower (down by 14 728 hectares) than planned. In state forests, thinning operations failed to cover 6 158 hectares. The situation was even worse in the non-state sector with 8 570 hectares of



Figure 15 Neglecting tending measures pays back in premature disintegration of even-aged stands (National Nature Reserve Sivec).

unrealised thinning. This trend is becoming a long-term problem (Table 6.2.4–1) and is chiefly attributed to the postponement of planned intermediate felling due to removal operations in mature and premature forest stands. As for intermediate felling, actual volumes have long-term topped the planned volumes (Table 6.2.4–2.). If left unchanged, the trend can have a long-term detrimental impact on the development of available forest resources.

Table 6.2.4–1 Planned and performed thinning

Thinning		State subjects	Non-state subjects	Total
Planned	ha	32 117	25 116	57 233
Performed		25 959	16 553	42 512
Planned-performed rate	%	80.8	65.9	74.3
Planned	m ³	750 538	533 163	1 283 701
Performed		1 120 074	812 784	1 932 858
Planned-performed rate	%	149.2	152.4	150.6

Source: Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.

Prepared by: NFC-FRI Zvolen.

Table 6.2.4–2 Trends in planned and performed thinning

Thinning		Year				
		1990	2000	2005	2006	2007
Planned	ha	63 397	61 111	58 318	57 850	57 233
Performed		37 143	53 938	46 070	46 566	42 512
Planned-performed rate	%	58.6	88.2	79.0	80.5	74.3
Planned	m ³	1 190 418	1 220 469	1 284 554	1 284 915	1 283 701
Performed		1 896 279	1 926 010	2 163 218	2 163 621	1 932 858
Planned-performed rate	%	159.3	157.8	168.4	168.4	150.6

Source: Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.

Prepared by: NFC-FRI Zvolen.

6.3 Silvicultural systems

Since 1990, the area of forests managed by clear-cutting has significantly been reduced in favour of more natural shelterwood, selective and purpose-cut systems. Implementation of these systems benefiting from natural regeneration is one of the main concepts behind close-to-nature forest management. Its main objective is to create forests with site appropriate species composition and differentiated vertical structure allowing for optimum delivery of multiple (productive and non-productive) forest services and benefits.

Figure 16 The small - scale form of the shelterwood system most resembles natural processes typical for natural forests.



Table 6.3–1 Silvicultural systems and their forms

System	Forms	1990		2000		2006		2007	
		Felling area	Σ stand	Felling area	Σ stand	Felling area	Σ stand	Felling area	Σ stand
		%							
Clearcut	Small-scale	55.5	52.1	26.9	28.0	24.2	24.8	22.2	23.5
	Large-scale	9.2	7.9	2.2	2.4	9.8	6.3	8.0	5.3
	Transformation	0.9	1.2	0.7	0.6	0.5	0.4	0.5	0.4
	Transformation	2.3	2.1	0.3	0.4	0.9	0.7	0.8	0.6
	Shelterwood-clearcut combination	16.6	15.6	—	—	—	—	—	—
	Total	84.5	78.9	30.1	31.4	35.4	32.2	31.5	29.8
Shelterwood	Small-scale	7.1	6.1	49.2	41.3	43.4	39.0	45.8	41.4
	Large-scale	0.8	0.7	8.0	8.1	8.2	7.3	10.2	8.8
	Overstorey removal cut	6.2	8.8	10.9	11.9	10.1	11.5	9.7	11.1
	Total	14.1	15.6	68.1	61.3	61.7	57.8	65.7	61.3
Selection and purpose cut	Tree and group selection	1.4	5.5	1.8	7.3	2.9	10.0	2.8	8.9

Source: *Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.*

Prepared by: *NFC-FRI Zvolen.*

Legend: Σ stand – a number of stands with a prescribed silvicultural system.

The concept of close-to-nature management has readily been adopted by forest planners who nowadays give preference to shelterwood, selective or purpose cut systems also in commercial and special-purpose forests. These systems are currently being prescribed for around two thirds of regenerated forests in the aforementioned categories. In the category of protection forests, this rate tops 80 per cent for the total felling area and 90 per cent for the number of forest stands

Table 6.3–2 Silvicultural systems by forest category

System	Forest category					
	Commercial		Protection		Special-purpose	
	Felling area	Σ stand	Felling area	Σ stand	Felling area	Σ stand
Clearcut	32.4	32.6	17.3	6.0	28.5	27.4
Shelterwood	67.4	66.9	13.0	8.6	64.8	57.9
Selection and purpose	0.2	0.5	69.7	85.4	6.7	14.7

Source: *Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.*

Prepared by: *NFC-FRI Zvolen.*

6.4 Felling operations

6.4.1 Timber felling

The total volume of timber felled in 2007 reached 8 367.1 thousand m³ which represented 9.9 thousand m³ increase compared to 2006. The volume of incidental felling formed 56.2 per cent of the total felling volume; in conifer forests, this volume was up to almost 80 per cent.

Table 6.4.1–1 Felling volume

	Volume 1 000 m ³	Year				
		1990	2000	2005	2006	2007
Conifer	Total	2 777.0	3 245.0	6 927.4	5 150.0	5 344.2
	of which incidental	1 838.0	2 012.0	6 152.7	3 831.0	4 271.8
	% of incidental felling	66.2	62.0	88.8	74.4	79.9
Broad-leaf	Total	2 499.0	2 973.0	3 263.1	3 207.2	3 022.9
	of which incidental	766.0	1 010.0	380.3	435.0	429.0
	% of incidental felling	30.7	34.0	11.7	13.6	14.2
Total	Total	5 276.0	6 218.0	10 190.5	8 357.2	8 367.1
	of which incidental	2 604.0	3 021.0	6 533.0	4 266.0	4 700.8
	% of incidental felling	49.3	48.6	64.1	51.0	56.2

Source: Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.

Prepared by: NFC-FRI Zvolen.

In state forests, the volume of felled timber amounted to 4 660 thousand m³ (56 per cent of the total felling) of which 2 826 thousand m³ was conifer (softwood) and 1 834 thousand m³ broad-leaf (hardwood) timber. In non-state forests, the respective volumes were 3 706 thousand m³ (44 per cent), 2 518 thousand m³ and 1 188 thousand m³.



Figure 17 Felling, log scaling and timber haulage are realized using modern technology.

Table 6.4.1–2 Felling volume by type and tenure

Tenure	Species	Felling									
		Incidental		Regeneration		Intermediate			Total		
		Performed		Incidental		Performed	Incidental		Performed	Incidental	
		1 000 m³ of timber with d.u.b > 7 cm			%	1 000 m³ of timber with d.u.b > 7 cm		%		1 000 m³ of timber with d.u.b > 7 cm	
State subjects	C	31,0	2 149,0	1 766,3	82,2	646,1	490,9	76,0	2 826,1	2 257,1	79,9
	B	9,5	1 351,0	172,8	12,8	474,0	70,7	14,9	1 834,4	243,5	13,3
	Σ	40,5	3 500,0	1 939,1	55,4	1 120,1	561,5	50,1	4 660,5	2 500,6	53,7
Non-state subjects	C	6,6	2 007,8	1 600,4	79,7	503,6	414,3	82,3	2 518,0	2 014,6	80,0
	L	2,2	877,2	117,9	13,4	309,2	67,6	21,9	1 188,5	185,5	15,6
	Σ	8,8	2 885,0	1 718,3	59,6	812,8	481,8	59,3	3 706,5	2 200,1	59,4
Total	C	37,6	4 156,8	3 366,6	81,0	1 149,8	905,1	78,7	5 344,2	4 271,8	79,9
	B	11,7	2 228,1	290,7	13,0	783,1	138,2	17,7	3 022,9	429,0	14,2
	Σ	49,3	6 384,9	3 657,4	57,3	1 932,9	1 043,3	54,0	8 367,1	4 700,8	56,2

Source: Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.

Prepared by: NFC-FRI Zvolen.

Notes: C – conifer, B – broad-leaf.

6.4.2 Actual felling and available commercial growing stock

The current age structure of Slovak forests and its foreseen development suggest a gradual increase in the volume of mature felling. The prediction is based on the currently abnormal per cent of premature forests (both in terms of area and growing stock volume) coming to rotation in next few decades (Figures 4.5–1 and 4.5–2). In next 30 to 40 years, the volume of total felling is projected to grow; in the same period, the volume of intermediate felling is expected to fall.

The sound volume of annual felling known as *annual allowable cut* represents objective felling potential based on actual condition of forest stands and generally binding forestry and nature conservation regulations. Annual allowable cut represents one of the main indicators of management planning and is obligatorily entered in FMPs.

Table 6.4.2–1 Development of annual allowable cut, actual and incidental felling and total current increment (TCI)

Indicator		1990	1995	2000	2003	2005	2006	2007
		1 000 m ³ / %						
Annual allowable cut		5 160	4 930	5 325	6 197	6 821	7 041	7 228
Actual felling volume		5 276	5 323	6 184	6 652	10 190	8 357	8 367
Of which incidental	1 000 m ³	2 604	2 986	3 021	2 677	6 533	4 266	4 701
	%	49.3	56.1	48.6	40.2	64.1	51.0	56.2
Volume exceeding allowable cut	1 000 m ³	+ 116	+ 393	+ 859	+ 455	+ 3 369	+ 1 316	+ 1 139
	%	+ 2.2	+ 8.0	+ 16.1	+ 7.3	+ 49.4	+ 18.7	+ 15.8
Total current increment		*9 739	*10 350	11 204	11 452	11 584	11 671	11 665
Felling volume out of TCI		54.2	51.4	55.5	58.1	88.0	71.6	71.7

Source: Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.

Prepared by: NFC-FRI Zvolen.

Note: * data interpolated from TCI figures available for 1980, 1993 and 2000.

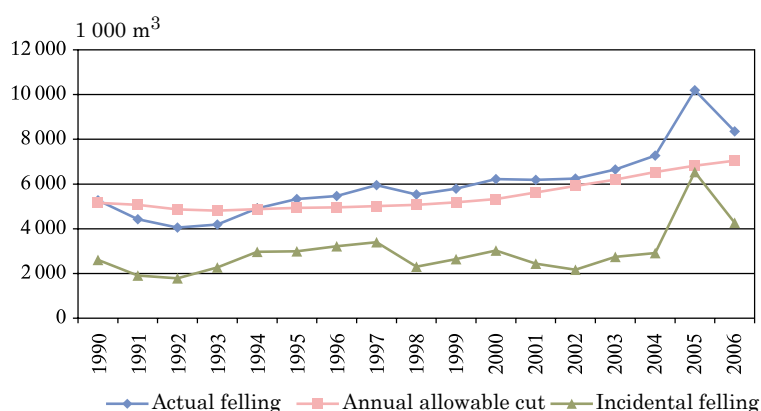


Figure 6.4.2–1 Felling trends.

Source: Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.

Prepared by: NFC-FRI Zvolen.

Prescribed volumes of intermediate and regeneration felling are often affected by felling urgencies. Since 1990, annual volumes of incidental felling have constituted a staggering 40 to 65 per cent of the total felling incurred in respective years.

Most critical is the situation in conifer forests. Spruce stands in particular have been badly hit by recent large-scale disturbances. Due to a high rate of incidental felling in these forests, the volumes of total annual felling prescribed by FMPs are now routinely topped. Since 2000, these volumes were on average 16.7 per cent higher than planned; in the last three years (2005–2007) this rate rose to a staggering 27.8 per cent.

6.4.3 Timber transportation

In 2007, the volume of skidded timber amounted to 8.03 million m³. The volume of timber skidded by state subjects' own machinery represented only 5 per cent of the total volume; in non-state forests, the volume was estimated at 7 per cent.

Table 6.4.3–1 Skidding operations

Subjects		Year (1 000 m ³)				
		1990	2000	2005	2006	2007
State	Under MA SR	4 728	3 509	5 889	4 289	4 377
	Other ministries	469	345	397	358	379
	Total	5 197	3 854	6 286	4 647	4 756
Non-state		0	Data missing	3 019	3 362	3 274
Total		5 197	3 854	9 305	8 009	8 030

Source: *Compendium of Slovak Forestry Statistics, NFC-IFRI, 2008.*

Prepared by: NFC-FRI Zvolen.



Figure 18 Majority of timber haulage are performed by commercial enterprises.

Table 6.4.3–2 Timber haulage

Subjects		Year (1 000 m ³)				
		1990	2000	2005	2006	2007
State	Under MA SR	4 266	3 167	6 278	3 763	3 961
	Other ministries	469	345	490	314	261
	Total	4 735	3 512	6 768	4 077	4 222
Non-state		0	Data missing	2 519	2 805	2 522
Total		4 735	3 512	9 287	6 882	6 744

Source: Statistical records of the MA SR: Les S (MA SR) 5-01 and Les S (MA SR) 9-01; NFC Zvolen.

Prepared: NFC-FRI Zvolen.

6.4.4 Forest road network

The data available for 2007 put the average density of forest road network in Slovakia at 18.6 m per hectare. Compared to 2006, the total length of forest roads increased by 16 km of which 2 km was 1L roads and 14 km 3L and permanent skidding roads.



Figure 19 A well-designed network of good quality forest roads is imperative to close – to – nature forest management and forest fire control.

Table 6.4.4–1 Forest road network

Road type		2006		2007	
		Length (km)	Density (m.ha ⁻¹)	Length (km)	Density (m.ha ⁻¹)
Own roads	Main forest road - category 1L (paved surface)	6 354	3.2	6 356	3.2
	Main forest road - category 2L (patch-paved surface)	14 842	7.4	14 842	7.4
	Non-paved 3L category road + permanent skidding road (TPC)	15 894	7.9	15 908	8.0
	Total	37 090	18.5	37 106	18.6
Other 1L roads		3 212	1.6	3 212	1.6
Total		40 302	20.1	40 318	20.2

Source: NFC survey.

Prepared: NFC-FRI Zvolen.

Legend: 1L – main forest road with paved surface for a year-round use; 2L – main forest road with non-paved surface with macadam sections for a seasonal use; 3L – non-paved forest road with main forest road parameters allowing timber haulage in favourable geological and climatic conditions; TPC – permanent non-paved skidding road with maximum longitudinal gradient of 20%.

6.5 Forest protection

The Government was on its session on 21 November 2007 provided the Report on Forest Health, a detailed account of major issues and challenges facing forestry sector in the coming years. The document paid special attention to largely publicised spruce decline and its socio-economic and ecological impact on particular sectors of national economy. It projected the impact of spruce dieback be most felt in rural regions unless proposed revitalisation measures were timely and efficiently implemented.

The Report was approved and the Government agreed to release 355 million SKK in 2008 in an effort to hamper further decline of these forests. In 2009 (2010), additional 500 (700) million SKK should be made available for the cause. The Minister of Agriculture was decided to oversee allocation of approved funding and implementation of proposed measures. Furthermore, Ministers of Agriculture and the Environment were instructed to:

- establish a special procedure for timely decisions arising from the implementation of Act on Nature and Landscape Protection;
- amend the law with emphasis on further enhancement of resilience and ecological stability of forests;
- manage removal of timber damaged by natural disturbances;
- issue joint regulation on the implementation of measures based on § 28 Sec. 3 of the Act No 326/2005 Coll. on forests in the wording of pursuant regulations

6.5.1 Forest Protection Service

The Forest Protection Service (FPS) is a body appointed to conduct state inspection in the area of forest protection (§ 29 of Act No 326/2005 Coll on forests). FPS tasks cover all aspects of forest protection and among others include also inspections on the implementation of forest protection measures, their efficiency, and forest health. Law amendments enforced in 2007 re-phrased the § 29, Sec. 2, letter e) as follows: FPS is authorised to assess revitalisation projects in pollution damaged forests. Other provisions of the cited paragraph remained unchanged.

In 2007, FPS employed 12 inspectors covering forest protection issues in particular regions. Data acquired from inspection activities were aggregated to produce national and regional reports on forest health and incidence of particular disturbances. FPS also compiled disturbance projections and issued pest warnings.

At the same time, it carried out duties related to plant treatment specified in Act No 193/2005 Coll on plant treatment, provided advisory and educational services, supplied data for sectoral information system, and assessed revitalisation projects. Its executive power focused on a wide range of forest protection related correcting measures.

6.5.2 Preventive measures

In young forests, preventive weed control measures were implemented on the total area of 36 945 hectares. At the same time, measures on game damage control covered 28 111



Figure 20 The official ban on timely removal of calamitous timber in protected areas resulted in an unprecedented dieback of spruce across its entire distribution range.

hectares. These measures included the installation of 277 km of fence to protect 346 hectares of young plantations and 9 km fence to prevent cattle grazing. Brush cutting and cleaning were completed on 10 789 hectares.

One of the most important preventive measures implemented in connection with bark beetle and wood borer outbreaks was the removal of timber from wind and snow affected areas. Timely removal of damaged timber is seen as vital if we want to prevent bark beetle and subsequent secondary pests from spreading.

Effectiveness of bark beetle controlling measures is also affected by red tape in governmental environment agencies issuing decisions on removal of calamitous timber in protected areas, road construction, terrestrial and aerial insecticide application, installation of pheromone traps, etc. Formal approvals (exceptions, if applicable) issued in compliance with Act No 543/2002 Coll on nature and landscape protection were often granted too late or not granted at all. Such delays inflict extensive damage to disturbance timber as well as standing, originally undamaged forest stands attacked by bark beetle.

6.5.3 Disturbance measures

In 2007, special attention was paid to the protection and controlling measures on bark beetle on spruce (Table 6.5.3–1). Implemented measures included installation of 14 501 trap trees, 69 254 pheromone traps and chemical treatment of some 557 395 m³ of timber. Installed traps showed the following efficiency expressed through a volume of attracted beetle: low – 18 per cent, moderate – 36 per cent, high – 45 per cent. As for trap trees, comparable statistics read: low – 13 per cent, moderate – 26 per cent, high – 61 per cent. Compared to 2006, the number of trap trees and traps substantially increased.



Figure 21 Pheromone traps help to reduce bark beetle populations.

Also the intensity of beetle attacks was much greater than in 2006. Majority of traps (89 per cent) and trap trees (91 per cent) were set to control outbreaks of European spruce bark beetle. Projections for 2008 are rather on the down side making it necessary to intensify protection measures against this notorious spruce pest.

Table 6.5.3–1 Bark beetle and wood borer measures on spruce

Species	Trap trees (pcs)			Pheromone traps (pcs)			Chemically treated (m ³)
	Low	Moderate	High	Low	Moderate	High	
European spruce bark beetle	2 019	4 779	6 078	7 963	16 032	38 679	508 661
Six-toothed spruce bark beetle	618	461	516	1 008	1 832	3 346	47 734
Striped ambrosia beetle	—	—	—	101	41	175	1 000
Other bark beetle sp.	—	30	—	50	27	—	—
Total	2 637	5 270	6 594	9 122	17 932	42 200	557 395

Source: NFC – FRI Zvolen (Form L 116).

Controlling and protection measures against fungi pathogens were mostly directed at forest nurseries since fungi plagued planting stock can suffer long-term ill effects which might in the long run compromise production capacity of subsequent stands. In 2007, 313.6 hectares of nursery production plots were treated by fungicides and 225.6 hectares by herbicides. Overview of other pesticides is provided in Table 6.5.3–2.

Table 6.5.3–2 Nursery area treated by pesticides (ha)

Pesticide type	Insecticide	Fungicide	Herbicide	Rodenticide
Area in ha	24.9	313.6	225.6	75.4

Source: NFC – FRI Zvolen (Form L 116).

6.5.4 Fire control

As in previous years, forest fire control was handled by the Air Fire Service (AFC) established in 2001. The company, responsibilities of which are regulated by MA SR and MI SR Regulation No 1344/40/2003-700 of 18 February 2003 on air actions related to forest fire monitoring and suppression, handles a range of forest fire issues. In 2007, MI SR (National Fire and Rescue Brigade Headquarters), MA SR (Forestry Department) and ME SR (Nature and Landscape Protection Department) issued a cross-sectoral regulation on coordinated implementation of fire control measures in forest areas affected by calamitous disturbances.



Figure 22 Aerial monitoring constitutes an important part of forest fire control.

Measures associated with forest fire control were last year coordinated by NFC. At present, forests are air monitored if the fire risk index issued by the Slovak Hydrometeorological Institute in Bratislava exceeds level 3. Authorised officers of the State Forests of the Slovak Republic, s.e. and the State Forests TANAP might order AFC to monitor forests also in cases of lower index if season, local weather conditions, vegetation development, visitor numbers, performed forestry operations or other circumstances give a serious reason for concern. In 2007, air monitoring covered 214 days between 3 April 2007 and 27 October 2007. Of that period, 145 days were airborne; the remaining 69 days were not serviced due to bad weather conditions. In total, 177 flight missions with over 775 flight hours were put in last year resulting in the identification of 931 controlled and 113 uncontrolled forest fire epicentres. The highest number of uncontrolled fires was recorded in April.

As for terrestrial fire control, this is the responsibility of particular forest owners and tenurers. They are under obligation to report any identified source of forest fire to the Fire and Rescue Brigade (FRB) and implement appropriate fire suppression measures pending their arrival. In 2007, a pilot project on stationary camera system was drafted to improve effectiveness of forest fire monitoring. The system should be tested in 2008 using 2 cameras installed by NFC-FRI and FE Kriváň.

6.6 Certification of sustainable forestry

6.6.1 PEFC certification

To date, an estimated 1 166 928 hectares of forests have been certified under the PEFC scheme (Programme for the Endorsement of Forest Certification schemes) in Slovakia. The process of certification is led by the State Forests of the Slovak Republic, s.e., which administer the scheme for forest managing bodies in whole Slovakia.

Table 6.6.1–1 Structure of PEFC certified forests

Subjects	Forest area (ha)		Certified forests (%)		No of managing bodies
	Tenure	PEFC certified	Tenure	Tenure type	
State	1 072 765	1 054 580	98.3	90.4	5
Private	139 824	13 154	9.4	1.1	14
Community	502 677	31 041	6.2	2.7	33
Church	40 810	8 462	20.7	0.7	1
Municipal	171 639	59 691	34.8	5.1	16
Agro-cooperatives	5 227	—	—	—	—
Total	1 932 942	1 166 928	60.4	100.0	69

Source: Slovak Forest Certification Association, 2007.

The Chain of Custody Certification (CoC) is based on the monitoring of certified timber origin throughout the entire chain from felling to end users of wood and paper based products. The list of CoC certificate holders is provided in the table below.

Table 6.6.1–2 CoC certificate holders

Subject	Location	Business nature*)
Vis Export-Import Ltd.	Zvolen	Timber merchant
Drevoindustria Mihálik, Ltd.	Čadca	Timber merchant
Wood Trade Company, Ltd.	Limbach	Processor
Iron Art, Ltd.	Hontianske Tesáre	Processor
Slovwood Ružomberok, s. c.	Ružomberok	Timber merchant
Spektrum, Ltd.	Hliník nad Hronom	Processor
Mondi SCP, s. c.	Ružomberok	Processor

Source: Slovak Forest Certification Association, 2007.

At present, it is estimated that there are approximately 4 million m³ of timber sourced from PEFC certified forests offered on the Slovak timber market.

6.6.2 FSC certification

To the end of 2007, there were 162 240 hectares of FSC certified forests. In total, 6 certificates of sustainable forest management and 18 certificates of CoC were issued to the reported date. Current certificate holders include state, municipal, church and community subjects. The year saw the development of the 3rd version of national FSC forest management standard later tested in the certification of Municipal Forests Bratislava.

6.7 Technical normalization in forestry

Based on the plan of technical normalization for 2007, the Technical Committee (TC) No 6 – Forestry oversaw the following agenda:

- Completion of STN 48 0030 – Multi-operation technologies in forestry. The task was jointly coordinated by the Department of Forest Exploitation and Mechanisation of TU Zvolen and NFC Zvolen.
- Review of STN 73 6108 – Forest road network. The task was coordinated by the Department of Forest Constructions and Ameliorations of TU Zvolen and was restricted to baseline data acquisition only due to limited funding.
- Development of STN 48 2410 – Silviculture. Reforestation and treatment of plantations and thickets. The task was coordinated by NFC Zvolen. Restricted normalization budget limited task development to its initial stages.
- Based on the requirements of the Slovak Institute of Technical Normalization Bratislava (SITN), TC 6 completed a range of other tasks, most importantly author corrections of the following ready-to-publish standards:
 - STN 48 0055 – Qualitative grading of conifer roundwood
 - STN 48 0056 – Qualitative grading of broad-leaf roundwood
 - STN EN 1309-2 – Round and sawn timber. Method of measurement. Part 2: Round timber. Requirements for measurement and volume calculation rules.

Other jobs included annotations and language reviews of developed standards and preparation of a draft version of the *Strategic Statement of TC for 2008* released for publication upon the TC Chairman and SITN approval. In 2007, SITN published 3 new STN with immediate effect: STN 48 0055, STN 48 0056, and STN EN 1309-2.



7. TIMBER TRADE

Timber sale constitutes the single most important source of revenue in forestry on which both conservation of forest functions and maintenance of employment are vitally dependent. It is estimated that 79 per cent of total sectoral earnings and revenue came last year from this single source.

7.1 Domestic timber supply

In 2007, forestry subjects supplied domestic timber market with 7 847 thousand m³ of timber (this figure included also their own consumption). The volume supplied was the largest on record and was partially contributed to the removal of November 2004 windthrow remnants. From the major part, the volume was the consequence of abundant growing stock in higher age classes and incidental felling following 2005–2007 disturbances.



Figure 23 Timber is a natural resource and its sales are thus subject to tight control measures.

Table 7.1–1 Log grade structure of raw timber supply

Grade	2006 (m ³)				2007 (m ³)				Year (%)	
	Domestic	Export	Own consumption	Total	Domestic	Export	Own consumption	Total	2006	2007
Conifer timber										
Veneer logs I class	255	52	—	307	445	77	3	525	0,01	0,01
Veneer logs II class	8 278	619	44	8 941	10 416	1 122	15	11 553	0,19	0,23
Saw logs	2 805 753	45 739	71 720	2 922 762	3 016 635	34 673	84 290	3 135 597	61,08	62,40
Poles	558	—	—	558	—	—	—	—	0,01	0,00
Mechanical wood pulp, abrasive wood	—	—	—	—	4 697	—	1	4 698	—	0,09
Mining timber	12 166	2 352	1	14 519	8 284	963	8 691	17 938	0,30	0,36
Thin poles	12 042	737	293	13 072	10 007	—	283	10 291	0,27	0,20
Pulpwood	875 116	139 540	2 824	1 017 480	935 112	184 530	14 275	1 133 918	21,26	22,56
Energy wood	52 958	16 316	3	69 277	71 393	—	5 748	77 141	1,45	1,54
Fuelwood	135 983	44	6 435	142 462	118 910	84	11 364	130 358	2,98	2,59
Stumpage	307 231	768	873	308 872	139 577	—	368	139 946	6,45	2,78
Raw trunks	276 834	2 296	8 047	287 177	357 431	1 404	4 340	363 176	6,00	7,23
Total	4 487 174	208 463	89 790	4 785 427	4 672 908	222 853	129 379	5 025 140	100	100

Table 7. 1–1 – contd.

Grade	2006 (m ³)				2007 (m ³)				Year (%)	
	Domestic	Export	Own consumption	Total	Domestic	Export	Own consumption	Total	2006	2007
Broad-leaf timber										
Veneer logs I class	3 106	2 339	—	5 445	3 576	2 372	—	5 948	0,18	0,19
Veneer logs II class	23 758	10 658	6	34 422	24 998	10 878	—	35 876	1,12	1,15
Saw logs	1 002 968	97 505	29 409	1 129 882	1 238 746	42 600	11 884	1 293 230	36,65	41,63
Mining timber	4 803	213	—	5 016	3 087	—	34	3 121	0,16	0,10
Poles	465	—	174	639	—	—	180	180	0,02	0,01
Pulpwood	1 473 442	30 870	1 355	1 505 667	1 514 739	4 462	1 523	1 520 724	48,84	48,96
Energy wood	66 255	17 606	—	83 861	48 339	—	2 452	50 791	2,72	1,64
Fuelwood	147 912	7 799	8 902	164 613	123 143	1 515	6 686	131 344	5,34	4,23
Stumpage	109 747	—	9 411	119 158	32 772	—	569	33 341	3,86	1,07
Raw trunks	33 374	—	1 005	34 379	30 434	53	1 304	31 791	1,12	1,02
Total	2 865 830	166 990	50 262	3 083 082	3 019 835	61 880	24 632	3 106 347	100	100
ΣConifer + broad-leaf	7 353 004	375 453	140 052	7 868 509	7 692 743	284 733	154 011	8 131 487	—	—
Conifer sawn wood (lumber)	10 165	—	951	11 116	30 733	1 278	1 813	33 824	—	—
Broad-leaf sawn wood (lumber)	11 788	2 495	11	14 294	4 538	1 841	244	6 623	—	—
Chipwood	119 213	33 922	3	153 138	122 775	15 454	199	138 428		

Source: Quarterly record on the timber supply in the forest sector Les D (MA SR) 2-04, Slovak customs statistics. Prepared by: NFC-FRI Zvolen.

Note: The export volume includes only timber delivered directly by forest owners (tenurers). Differences between the volume of supplied timber and actual timber sales are caused by the adjustment of sawn timber volume not included in the sale volume. Sawn timber is adjusted to fit log grade quality classes I – IV using the 0.65 coefficient for conifers and 0.70 for broad-leaves. The volume of sawn timber delivered to domestic market is added to the volume of log grades sold on the market. The volume of sawn timber for export is added to the volume of export log grades. Delivery volumes also include sawn timber for private consumption.

Generated log grades were the best since 1990. Whilst conifer saw logs constituted 62.4 per cent of the total volume, the same grade of broad-leaf timber accounted for 41.6 per cent of the supply. Despite recent improvements in the quality of supplied timber, supplies of most valuable veneer logs used for veneer production are still limited. This fact is caused by a limited demand for these grades on a domestic market and insufficient marketing of these products abroad.

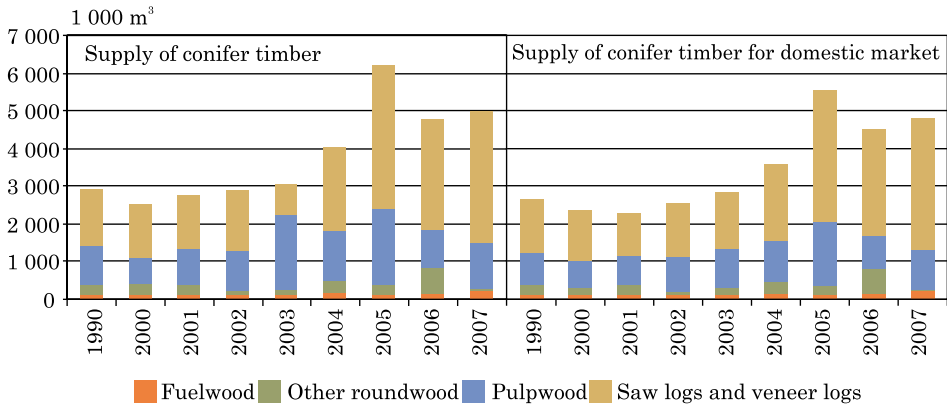


Figure 7.1–1 Supply of conifer timber.

Source: Quarterly record on the timber supply in the forest sector Les D (MA SR) 2-04, Slovak customs statistics.
Prepared by : NFC-FRI Zvolen.

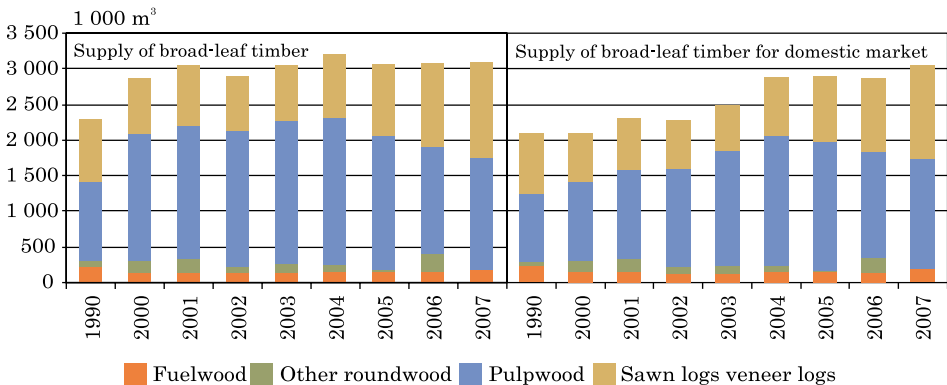


Figure 7.1–2 Supply of broad-leaf timber.

Source: Quarterly record on the timber supply in the forest sector Les D (MA SR) 2-04, Slovak customs statistics.
Prepared by : NFC-FRI Zvolen.

7.2 Timber export and import

Official customs figures put the volume of exported timber to 1 533 thousand m³ in 2007. Forest owners together with forestry subjects sold abroad an estimated 285 thousand m³ of timber of which conifer represented 223 and broad-leaf 62 thousand m³. The remaining volume, i.e. 1 248 thousand m³ was exported by other subjects, commercial enterprises in particular. Compared to 2006, forestry subjects exports dropped by 90 thousand m³. Commercial non-forestry entities, on the other hand, increased their exports by 390 thousand m³. The situation in which 19 per cent of the total timber volume is exported without added value is highly undesirable and generates loss for all involved including timber processors, forestry subjects as well as public.

Table 7.2–1 Export of raw timber grades

Grade	2006		2007	
	1 000 m ³	%	1 000 m ³	%
Conifer saw logs and veneer logs	285	23,1	544	35.5
Conifer pulpwood and other industrial roundwood	391	31,7	379	24.7
Broad-leaf saw logs and veneer logss	218	17,7	122	8.0
Broad-leaf pulpwood and other industrial roundwood	324	26,3	412	26.9
Fuelwood	15	1,2	76	4.9
Total	1 233	100	1 533	100

Source: Customs Yearbook.

Prepared by: NFC-FRI Zvolen.

In 2000, export figures took a sharp downturn. The trend changed in 2005 when export volumes rose to 1 815 thousand m³ as a result of calamitous timber removals. In 2007, the volume of exported timber included 1 024 thousand m³ of softwood and 221 thousand m³ of hardwood lumber. In the same period, forestry subjects sold abroad only 1 000 m³ of softwood and 2 000 m³ of hardwood lumber.

Figures illustrating imports of raw timber grades in 2006 and 2007 are given in Table 7.2–2 below.

Table 7.2–2 Import of raw timber grades

Grade	2006		2007	
	1 000 m ³	%	1 000 m ³	2006
Conifer saw logs and veneer logs	3	0.9	15	3.6
Conifer pulpwood and other industrial roundwood	+	+	46	11.2
Broad-leaf saw logs and veneer logss	51	14.6	74	18.0
Broad-leaf pulpwood and other industrial roundwood	286	81.7	265	64.3
Fuelwood	10	2.8	12	2.8
Total	350	100	412	100

Source: Customs Yearbook.

Prepared by: NFC-FRI Zvolen.

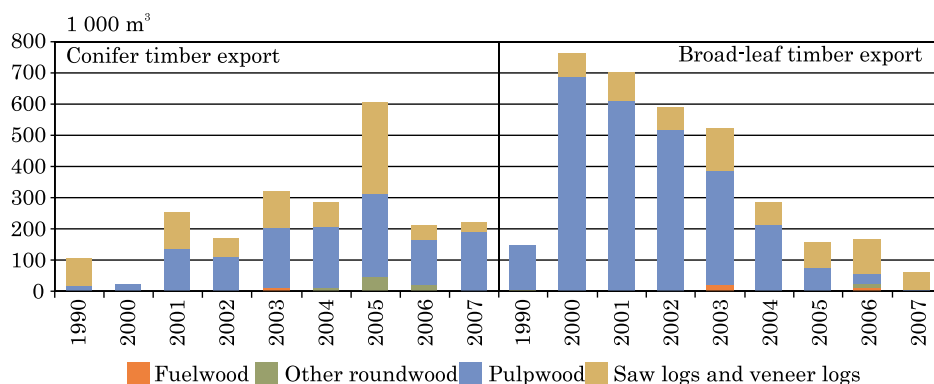


Figure 7.2–1 Export of conifer & broad-leaf timber by forestry subjects.

Source: Quarterly record on the timber supply in the forest sector Les D (MA SR), ME SR statistics, Statistical Office of SR.

Prepared by : NFC-FRI Zvolen.

7.3 Timber consumption

In recent years, national forest policy has shifted from exporting large volumes of raw timber to rather home processing it to increase added value of wood-based products. This approach supports sectoral employment and higher earnings, long-term below national average. The implementation of policy objectives has readily translated into a gradual growth of consumption of basic roundwood grades per capita (Table 7.3–1).

Table 7.3–1 Production and consumption of timber per capita

Grade	1990	2000	2006	2007
	m ³ per capita			
Roundwood – production	0.865	1.082	1.463	1.506
Roundwood – consumption	0.837	0.805	1.299	1.298
Industrial roundwood – production	0.800	0.943	1.405	1.428
Industrial roundwood – consumption	0.771	0.751	1.242	1.322
Pulpwood – production	0.343	0.488	0.469	0.521
Pulpwood – consumption	0.310	0.360	0.344	0.432

Source: Quarterly record on timber supply in forest sector Les D (MA SR) 2-04, ME statistics, Statistical Office of SR.

Prepared by: NFC-FRI Zvolen.

7.4 Timber prices

The volume of timber sold in Slovakia interannually increased by almost 5 per cent. The increase was achieved through improved sales of both conifer (4 per cent up) and broad-leaf (5.8 per cent up) timber. Exports of log grades realized by forestry subjects were 25 per cent down on 2006 figures. This drop was associated with a staggering 62 per cent decrease in the volume of exported hardwood grades compared to the softwood grades 4.6 per cent increase. (Table 7.4–1).

Table 7.4–1 Sale and average prices of log grades in 2007

No.	Grade	Sale (m³)		
		Domestic	Export	Total
Conifer timber				
1	Veneer logs I class	448	77	525
2	Veneer logs II class	10 431	1 122	11 553
3	Saw logs	3 059 863	36 208	3 096 071
4	Mechanical wood pulp, abrasive wood	4 697	—	4 697
5	Mining timber	8 284	963	9 247
6	Thin poles	10 131	—	10 131
7	Pulpwood	941 972	184 816	1 126 788
8	Energy wood	71 393	—	71 393
9	Fuelwood	125 861	84	125 945
10	Σ 1 – 9	4 233 080	223 270	4 456 350
11	Conifer stumpage	139 577	—	139 577
12	Conifer raw trunks	361 625	1 550	363 175
13	Σ Conifer	4 734 282	224 820	4 959 102

Table 7.4–1 – contd.

Broad-leaf timber				
14	Veneer logs I class	3 576	2 372	5 948
15	Veneer logs II class	24 998	10 878	35 876
16	Saw logs	1 243 733	44 991	1 288 724
17	Mining timber	3 087	—	3 087
18	Thin poles	—	—	—
19	Pulpwood and ungraded timber	1 515 375	4 558	1 519 933
20	Energy wood	48 339	—	48 339
21	Fuelwood	123 143	1 515	124 658
22	Σ 14 – 21	2 962 251	64 314	3 026 565
23	Broad-leaf stumpage	32 772	—	32 772
24	Broad-leaf raw trunk	31 593	198	31 791
25	Σ Broad-leaf	3 026 616	64 512	3 091 128
26	Σ Conifer + broad-leaf	7 760 898	289 332	8 050 230

Source: State statistical survey Les (MA SR) 2-04.

Prepared by: NFC-FRI Zvolen.

Table 7.4–1 – contd.

No.	Grade	Average price (SKK/ m³)		
		Domestic	Export	Total
Conifer timber				
1	Veneer logs I class	3 478	3 974	3 551
2	Veneer logs II class	3 218	3 321	3 228
3	Saw logs	1 830	1 560	1 826
4	Mechanical wood pulp, abrasive wood	1 443	—	1 443
5	Mining timber	1 494	1 384	1 483
6	Thin poles	798	—	798
7	Pulpwood	949	1 102	974
8	Energy wood	332	—	1 223
9	Fuelwood	451	1 268	452
10	Σ 1 – 9	1 567	1 190	1 548
11	Conifer stumpage	701	—	701
12	Conifer raw trunks	1 409	1 419	1 410
13	Σ Conifer	1 530	1 191	1 514
Broad-leaf timber				
14	Veneer logs I class	10 582	10 407	10 512
15	Veneer logs II class	4 986	6 006	5 295
16	Saw logs	1 818	2 464	1 840
17	Mining timber	1 610	—	1 610
18	Thin poles	—	—	—
19	Pulpwood and ungraded timber	1 229	1 607	1 230
20	Energy wood	514	—	1 528
21	Fuelwood	840	1 716	850
22	Σ 14 – 21	1 492	3 278	1 530
23	Broad-leaf stumpage	381	—	381
24	Broad-leaf raw trunk	1 323	1 425	1 323
25	Σ Broad-leaf	1 478	3 272	1 516
26	Σ Conifer + broad-leaf	1 510	1 655	1 515

Table 7.4–1 – *contd.*

No.	Grade	Total revenue (SKK)		
		Domestic	Export	Total
Conifer timber				
1	Veneer logs I class	1 558 081	306 017	1 864 098
2	Veneer logs II class	33 562 722	3 725 749	37 288 471
3	Saw logs	5 598 140 221	56 485 320	5 654 625 541
4	Mechanical wood pulp, abrasive wood	6 780 117	—	6 780 117
5	Mining timber	12 377 388	1 332 655	13 710 043
6	Thin poles	8 087 711	—	8 087 711
7	Pulpwood	893 775 974	203 656 611	1 097 432 585
8	Energy wood	23 672 235	—	23 672 235
9	Fuelwood	56 788 374	106 530	56 894 904
10	Σ 1 – 9	6 634 742 823	265 612 882	6 900 355 705
11	Conifer stumpage	97 846 758	—	97 846 758
12	Conifer raw trunks	509 706 343	2 199 859	511 906 202
13	Σ Conifer	7 242 295 924	267 812 741	7 510 108 665
Broad-leaf timber				
14	Veneer logs I class	37 842 245	24 685 265	62 527 510
15	Veneer logs II class	124 633 664	65 336 007	189 969 671
16	Saw logs	2 260 828 272	110 862 234	2 371 690 506
17	Mining timber	4 969 848	—	4 969 848
18	Thin poles	—	—	—
19	Pulpwood and ungraded timber	1 862 788 725	7 324 184	1 870 112 910
20	Chipwood	24 843 769	0	24 843 769
21	Fuelwood	103 402 591	2 600 132	106 002 723
22	Σ 14 – 21	4 419 309 115	210 807 822	4 630 116 937
23	Broad-leaf stumpage	12 476 534	0	12 476 534
24	Broad-leaf raw trunk	41 786 212	282 150	42 068 362
25	Σ Broad-leaf	4 473 571 860	211 089 972	4 684 661 833
26	Σ Conifer + broad-leaf	11 715 867 785	478 902 713	12 194 770 498

Source: State statistical survey Les (MA SR) 2-04.

Prepared by: NFC-FRI Zvolen.

In 2007, the average realization of timber rose by 7.5 per cent compared to 2006. This rise was primarily associated with growing timber demands on regional markets. Average realization rose by 6 per cent for softwood and 10 per cent for hardwood grades. The realization in state sector subjects was 2 per cent above the average realization in non-state subjects (Table 7.4–2).

Table 7.4–2 Average timber prices 2006/2007 (SKK/m³)

No.	Sortiment	Domestic			Export			Σ Domestic + Export		
		2006	2007	2007/ 2006	2006	2007	2007/ 2006	2006	2007	2007/ 2006
Conifer timber										
1	Veneer logs I class	3 771	3 478	0.92	3 675	3 974	1.08	3 754	3 551	0.95
2	Veneer logs II class	3 135	3 218	1.03	3 191	3 321	1.04	3 139	3 228	1.03
3	Saw logs	1 741	1 830	1.05	1 607	1 560	0.97	1 739	1 826	1.05
4	Poles	2 040	1 443	0.71	—	—	—	2 040	1 443	0.71

Table 7.4–2 – contd.

No.	Sortiment	Domestic			Export			Σ Domestic + Export		
		2006	2007	2007/ 2006	2006	2007	2007/ 2006	2006	2007	2007/ 2006
Conifer timber										
5	Mining timber	1 301	1 494	1.15	1 187	1 384	1.17	1 283	1 483	1.16
6	Thin poles	789	798	1.01	1 012	—	—	802	798	1.00
7	Pulpwood	875	949	1.08	899	1 102	1.23	878	974	1.11
8	Chipwood	1 223	332	0.27	1 223	—	—	1 223	1 223	1.00
9	Fuelwood	444	451	1.02	388	1 268	3.27	444	452	1.02
10	Σ 1 – 9	1 497	1 567	1.05	1 109	1 190	1.07	1 477	1 548	1.05
11	Conifer stumpage	701	701	1.00	551	—	—	701	701	1.00
12	Conifer raw trunks	1 437	1 409	0.98	1 679	1 419	0.85	1 439	1 410	0.98
13	Σ Conifer	1 439	1 530	1.06	1 113	1 191	1.07	1 425	1 514	1.06
Broad-leaf timber										
14	Veneer logs I class	10 044	10 582	1.05	10 204	10 407	1.02	10 113	10 512	1.04
15	Veneer logs II class	5 056	4 986	0.99	5 751	6 006	1.04	5 271	5 295	1.00
16	Saw logs	1 763	1 818	1.03	1 979	2 464	1.24	1 783	1 840	1.03
17	Mining timber	1 218	1 610	1.32	1 177	—	—	1 217	1 610	1.32
18	Thin poles	710	—	—	—	—	—	710	—	—
19	Pulpwood	1 093	1 229	1.12	1 269	1 607	1.27	1 097	1 230	1.12
20	Chipwood	1 528	514	0.34	1 528	—	—	1 528	1 528	1.00
21	Fuelwood	843	840	1.00	1 267	1 716	1.35	865	850	0.98
22	Σ 14 – 21	1 381	1 492	1.08	2 119	3 278	1.55	1 425	1 530	1.07
23	Broad-leaf stumpage	325	381	1.17	—	—	—	325	381	1.17
24	Broad-leaf raw trunks	1 325	1 323	1.00	—	1 425	—	1 325	1 323	1.00
25	Σ Broad-leaf	1 340	1 478	1.10	2 119	3 272	1.54	1 384	1 516	1.10
26	Σ Conifer + broad-leaf	1 401	1 510	1.08	1 558	1 655	1.06	1 409	1 515	1.08

Source: State statistical report Les (MA SR) 2-04.

Prepared by: NFC-FRI Zvolen.

7.5 Timber price factors

The assessment of trends in timber market prices is based on the analysis and evaluation of market components and conditions impacting the realization of particular timber grades. To complete the assessment, impact of neighbouring and global markets must be duly considered. There is a number of major factors impacting timber prices development, most important of which are the following: economic development, construction industry demands, demographic trends, and felling volume limitations.

In addition to objective economic factors, there are also a number of other factors impacting timber realization and market prices including the following:

- fluctuations in domestic demand for particular log grades;
- volume of timber sale realized by domestic producers;
- fluctuations in sale volumes and timber prices in neighbouring countries;
- fluctuations in the volume of timber sold and demanded by leading timber producers and consumers (USA, China, Canada, Russia, EU);

- increased volumes of stumpage sale;
- non-competitive position of small timber retailers with respect to major timber merchants;
- volume of calamitous timber available across Europe;
- fluctuating exchange rates between the Slovak crown and the euro (US dollar);
- development and implementation of governmental policies in areas significantly affecting situation on timber markets (climate change, renewable energy, etc.).



8. FORESTRY ECONOMICS

8.1 Macro-economic conditions

The growth in major macroeconomic indicators observed in previous years continued to further intensify with gross domestic product (GDP) reaching an estimated 1 852 billion SKK. Its interannual rise indicated by fixed prices reached 10.4 per cent, which was 1.9 per cent up on a year earlier. The growth was significantly encouraged by improved employment and productivity figures. The inflation rate reached 2.8 per cent and was 1.7 percentage points below the 2006 level. The actual growth of the whole national economy was more than twice the EU-25 average, and the highest among the EU-10 countries. The accelerated rate of GDP growth was closely associated with gross added value (GAV) in most economic sectors (industrial production, other production, selected non-production sectors) and improved tax retrieval from unsubsidised products. Agriculture and fisheries were the only sectors experiencing slump in the added value figures (> 20 per cent down) last year. Foreign export figures rose by 16 per cent, but dropped by 5 percentage points when compared to 2006. The domestic consumption driven growth dropped by 1.7 percentage points to 2.4 per cent with consumption reaching 13.8 per cent. The deficit in foreign trade balance dropped by staggering 90.5 percentage points to 8.7 billion SKK compared to 91.6 billion SKK a year earlier. The central budget deficit meanwhile dropped by 25.9 percentage points to 23.5 billion SKK, i.e. 1.27 per cent of GDP (Table 8.1–1).

Table 8.1–1 Basic national and sectoral macro-economic indicators

Indicator	Unit	Year				Estimate for 2008
		2004	2005	2006	2007	
GDP in current prices	billion SKK	1 325	1 440	1 636	1 852	2 100
GDP rise in pegged prices of 1995	%	5.5	6.1	8.3	10.4	11.0
Investments in current prices	million SKK	349 000	376 736	432 084	503 565	585 000
Employees	1 000 persons	2 170	2 216	2 301	2 357	2 400
Average monthly salary	SKK	15 825	17 274	18 761	20 146	21 630
Inflation rate	%	7.5	2.7	4.5	2.8	3.0
Unemployment rate	%	18.1	16.2	13.3	11.0	10.0
Foreign trade balance	billion SKK	-47.0	-76.0	-91.6	-8.7	-10.0
State budget balance		-70.3	-33.89	-31.7	-23.5	-20.0
Discount rate	%	6.0	3.2	3.7	4.25	4.5
Interest rate	%	4.9 / 5.5	1.62 / 6.56	2.12 / 6.2	2.19 / 7.84	2.25 / 8.0
Exchange rate (central)	SKK/USD	34.0	31.0	29.7	24.7	20.0
Exchange rate (central)	SKK/EUR	39.9	38.6	37.2	33.8	30.0
Growth in average nominal salary	%	10.2	9.2	8.6	7.2	7.0
Growth in average real salary	%	2.5	6.5	4.1	4.3	5.0

Source: NFC-FRI Zvolen, Statistical Office of SR (SO SR).

Prepared by: NFC-FRI Zvolen.

Positive development of major economic indicators increased demand for skilled labour with the employment figures interannually rising by 2.4 per cent (1.4 percentage point). The unemployment for the same period decreased by 17.4 percentage point. The official

unemployment rate reached 11 per cent which was the lowest since 1996. Sectoral unemployment fell in all sectors except for education. The average nominal monthly salary interannually grew by 7.2 per cent. Lower inflation rates contributed to improved average real earnings which increased by 1 percentage point to 4.4 per cent.

The gross capital grew for a third consecutive year; the interannual rise of 16.6 per cent (503.6 billion SKK in current prices) compared well with 14.5 per cent rise a year earlier. The growth was chiefly driven by newly acquired fixed assets and decrease in used long term assets.

Sectoral contribution to national economic growth interannually slightly fell all this despite improved average timber realization (8 per cent up) and comparable felling and timber sales volumes. National and sectoral economic indicators did not experience equal growth in 2007. On the one hand, national GDP rose by 13.2 per cent, on the other, sectoral contribution fell by 0.06 per cent to 0.46 per cent. Further improvement and stabilisation of the indicator can only be driven by general recognition of multiple forest benefits and services delivered to other industries of national economy and, indeed, public. This should be accompanied by the inclusion of their calculated monetary value into the GVA and GDP. Although general figures for timber realization interannually fell by 4 per cent, figures for total average realization grew in the same term by 8 per cent (6 and 10 per cent for conifer and broad-leaf grades).

8.2 Sectoral and national statistics

In 2007, sectoral GDP was based on 2006 felling and timber sale volumes combined with an interannual increase in average realization of conifer and broad-leaf timber by 6 and 10 per cent, respectively. The volume of sold timber rose only marginally by 0.26 million m³. Sectoral GDP expressed in current prices was up 0.18 per cent over the year. As a result, sectoral contribution to national GDP fell by 0.06 per cent to 0.46 per cent. The mid-term 2025 outlook suggests that available volumes of marketable timber are most likely to fluctuate between 8 000 and 9 000 thousand m³ a year. Thus the downward trend in sectoral GDP contribution is projected to continue unless large-scale incidental felling occurs.

Increased investments into forest property and production observed from 2005 onwards in 2007 discontinued when investments were down 1.1 per cent over the year. Decreased volume of investments was most felt in the category of construction and machinery. On the other hand, immaterial investments rose by a staggering 242 per cent.

Sectoral employment was down 0.03 per cent over the year compared to the whole national economy. The total workforce stabilised at around 12 thousand. If the volume of performed forestry operations were to be taken into account, the number of employees has moderately increased.



Figure 24 The joint contribution of forestry and timber industry to GDP is estimated at 3 per cent.

The private sector employed last year in various occupations an estimated 11.3 thousand employees. The nominal sectoral monthly earnings were up 7.1 per cent over the year (4.3 per cent up in real terms). Nominal and real earnings growth last year slowed down to pre-2005 figures and was down 2.9 per cent over the year. Average sectoral monthly earnings were down by 1 691 SKK- i.e. 10.6 per cent (1 529 SKK down a year earlier) compared to average earnings for all industries and sectors of the national economy.

Table 8.2–1 Trends in selected economic indicators

Indicator	Year							
	1990		2005		2006		2007	
GDP in current prices (billion SKK, %)	278.5	100	1 440	100	1 636	100	1 852	100
Forest sector alone	2.7	0.97	8.4	0.59	8.5	0.52	8.5	0.46
Investments (million SKK, %)	69 741	100	376 736	100	432 084	100	503 565	100
Forest sector alone	553	0.79	932	0.25	1 174	0.27	1 161	0.23
Workforce (1 000, %)	2 459	100	2 216	100	2 301	100	2 357	100
Forest sector alone	36	1.47	13 ^{y)}	0.59	12 ^{y)}	0.52	12 ^{y)}	0.51
Average monthly earnings (SKK, %)	3 278	100	17 274	100	18 761	100	20 146	100
Forest sector alone	3 419	104.3	15 543	89.98	17 232	91.85	18 455	91.61

Source: NFC-FRI Zvolen, Statistical Office of SR (SO SR).

Prepared by: NFC-FRI Zvolen.

Note: Additional 12 thousand in 2005, 13 thousand in 2006 and 11.3 thousand in 2007 were employed by non-state forestry subjects and suppliers and are listed in the category "employee" or "self-employed."

The state budget extracted last year an estimated 1.7 billion SKK (1 682 million SKK) worth of tax from forestry. In addition, social and other payments contributed by legal entities and natural persons to various funds amounted to additional one billion SKK. Majority of total sectoral earnings and revenue (78.8 per cent) came last year from timber sales. The actual volume of harvested timber was up 0.12 per cent over the year; in the same period, the volume of sold timber was up 3.28 per cent and included also selling out stockpiles from previous years. The total timber sale revenue was up 10.6 per cent over the year chiefly due to improved timber realization (8 per cent up). Improved timber sales (3.28 per cent up) and timber realization (8 per cent up) combined with other earnings and revenue generated the total profit of 1 061 million SKK. The figure also included state subsidies for forestry operations performed in public interest.

Table 8.2–2 Trends in selected economic indicators referring to state budget

Indicator	Actual figures (million SKK)				Outlook for 2008
	1990	2005	2006	2007	
Earnings and revenue	4 531	13 779	13 816	15 409	15 489
Costs	4 326	13 061	12 664	14 348	14 305
Economic result	205	718	1 152	1 061	1 184
State subsidies for forestry operations	1 007	25	122	10	82
Earnings and revenue rate (%)	Profit	4.52	5.21	8.34	6.88
	State subsidies	22.22	0.18	0.86	0.06

Source: NFC – FRI Zvolen, MA SR.

Prepared by: NFC-FRI Zvolen.

8.3 Sectoral earnings and revenue

Sectoral earnings and revenue were up 11.5 per cent over the year reaching 15 409 million SKK. Earnings and revenue in state subjects were up 11.3 per cent compared to 11.9 per cent for non-state subjects. The difference in economic profitability was chiefly associated with more substantial timber sales managed by non-state subjects (up 5 per cent on 2005 figures compared to 2 per cent in state subjects). Comparatively small differences in average timber realization did not allow for full compensation of lower timber sales on the side of state subjects.

Table 8.3–1 Sectoral earnings and revenue in current prices (million SKK)

Forest tenure	1990	1995	2000	2005	2006	2007
State forests	4 531	5 118	6 504	9 708	8 889	9 895
Non-state forests	—	2 376	3 178	4 071	4 927	5 514
Total	4 531	7 494	9 682	13 779	13 816	15 409

Source: Green Reports, special questionnaire from forest owners and tenurers, state statistical reports Les (MA SR) 5-01, Les (MA SR) 7-01, Les (MA SR) 1-04, Les (MA SR) 2-04, Les (MA SR) 6-01, Uč POD 1-01, Uč POD 2-01.

Prepared by: NFC-FRI Zvolen.

8.3.1 Timber sale returns

The volume of timber sold in 2007 was comparable with 2006 despite the fact that almost the entire volume of calamitous windthrow from 2004 had already been removed. The last year's increase in the volume of felling operations was primarily associated with commencing regeneration of abundant mature forests and high volumes of incidental felling in stands damaged by wind and bark beetle. The stands are situated on sites affected by a post-2004 windthrow removal ban and sites of large-scale decline of spruce forests in Kysuce and Orava. In total, 8 050 thousand m³ of timber including lumber (estimated in roundwood units) was sold last year – 3.3 per cent up compared to 2006. The volume of timber sales represented 96.2 per cent of felling volume realised that year. The remaining volume was used for own production or remained stocked. Total timber earnings were up 11.1 per cent over the year (8.1 per cent in state and 15.3 per cent in non-state forests); the increase was contributed to improved timber realization (80 per cent) and higher timber sales (20 per cent).

Table 8.3.1–1 Sectoral timber earnings in current prices (million SKK)

Forest tenure	1990	1995	2000	2005	2006	2007
State forests	2 604	3 540	4 621	7 635	6 502	7 031
Non-state forests	—	2 074	2 483	3 720	4 478	5 164
Total	2 604	5 614	7 104	11 355	10 980	12 195

Source: Green Reports, special questionnaire from forest owners and tenurers, state statistical reports Les (MA SR) 5-01, Les (MA SR) 7-01, Les (MA SR) 1-04, Les (MA SR) 2-04, Les (MA SR) 6-01, Uč POD 1-01, Uč POD 2-01.

Prepared by: NFC-FRI Zvolen.

8.3.2 Other earnings and revenue

Other earnings and revenue were up 18.4 per cent over the year. The growth was significantly higher in state forests (20.6 per cent) than in non-state forests (2.9 per cent) – see annexed Tables 15–1, 15–3 and 15–5. Traditionally, this category featured earnings from the sale of non-wood forest products including planting material, forest tree seeds, venison, etc. Additionally, earnings came also from sideline production round timber appreciation in a form of sawn timber sold on markets, hunting, tourism, forestry services, engineering, and other production. The category also included revenue from the lease and sale of forest properties and revenue from financial capital and securities. Partial overview of other earnings and revenue generated by state subjects is given in Table 8.3.3–1.

Table 8.3.2–1 Non-wood forest products and sideline production in state subjects 2007

Indicator		Unit	Production	Earnings (1 000 SKK)
Non-wood forest products	Christmas trees	10 ³ pcs	6.20	872
	Conifer foliage	1 000 kg	0.994	280
Sideline production of goods and services	Sawn timber in sideline wood production	Conifer	68 414	33 261
		Broad-leaf	3 669	24 735
	Tourism services (e.g. chalet recreation, agro-tourism)	m ³	—	7 497
	Engineering production (machinery, equipment)		19	5 220
	Engineering services (repair, maintenance)		—	3 471
Total			—	75 336

Source: State statistical reports Les D (MA SR) 2-04, SL MA SR (special survey conducted in state forestry subjects).

Prepared by: NFC-FRI Zvolen.



Figure 25 Sales of Christmas trees and decorative foliage constitute an important part of other sectoral earnings.



Figure 26 Low quality timber from incidental felling fetches lower prices at timber markets.

8.4 Public and EU funding

Public support is provided separately for state and non-state subjects responsible for practical aspects of forest management and forestry which is a broader term used also for state forestry administration and other public institutions such as the National Forest Centre, the Svätý Anton Museum, and the Forestry and Wood-processing Industry Museum. In 2007, the total volume of public (SR) and structural funding (EU) allocated for forestry reached 630 million SKK, of which 356.9 million SKK was the allocation made for forest managing subjects.

Table 8.4–1 Public forestry subsidies (million SKK)

Source	Current expenditure	Capital outlay (investments)	Total
Forest sector			
Budgetary chapter of MA SR			
08V 01 – Structural Funding for Forest Sector (SOP and RDP)	—	155.2	155.2
08V 02 – Revival and Development of Forest Sector	131.8	—	131.8
Other sources	62.9	7.0	69.9
Σ Forest sector	194.7	162.2	356.9
Other (MA SR – ŠR)			
NFC	136.8	—	136.8
Regional Forest Offices and state forestry administration (MA SR)	114.9	3.4	118.3
Svätý Anton Museum + Forestry and Wood-processing Industry Museum	8.0	10.0	18.0
Σ Other	259.7	13.4	273.1
Σ Forestry	454.4	175.6	630.0

Source: SL MA SR, APA MA SR.

Prepared by: NFC-FRI Zvolen.

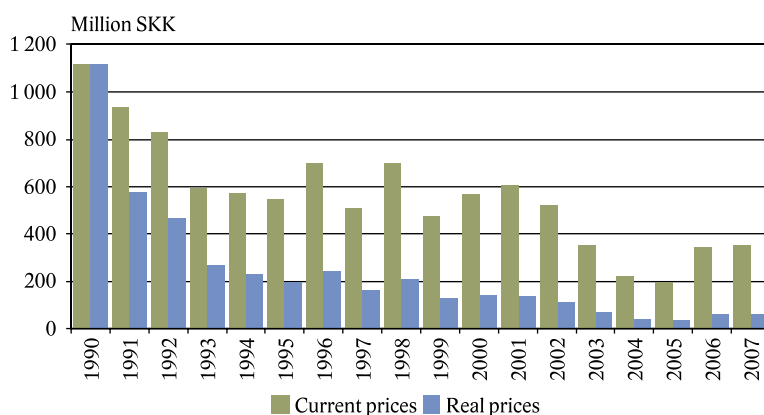


Figure 8.4–1 State funding for services in public interest 1990–2007 (million SKK).

Source: SL MA SR, APA MA SR.

Prepared by: NFC-FRI Zvolen.

In 2007, MA SR provided funding under the following programmes: 08V – *Sustainable Forestry* (sub-programmes 08V01 – *Structural Funding for Forest Sector*, 08V02 – *Revival and Development of Forest Sector*, and 08V03 – *Research and Expert Assistance for Sustainable Forestry*); 090 – *Policy Formulation, Regulation and Implementation* (sub-programme 090-01 – *Programme Funding*); and 092 – *Rural Development* (sub-programme 092-03 – *Landscape Development*).

Under the sub-programme 08V01 – *Structural Funding for Forest Sector*, 155.2 million SKK was granted for SOP and RDP projects (116.6 million SKK from structural funds and 38.6 million SKK from the state budget).

Under the sub-programme 08V02 – *Revival and Development of Forest Sector*, the following areas were primarily supported: large-scale forest protection; national park management; innovations in forest management & planning; FMP design; forest fire monitoring; specialised state forestry administration. In total, 301 million SKK were allocated for the aforementioned causes last year (forest managing subjects – 131.8 million SKK, state administration – 118.3 million SKK, NFC – 50.9 million SKK).

The sub-programme 08V03 – *Research and Expert Assistance for Sustainable Forestry* provided support for research on sustainable forestry and professional advisory services worth 75.5 million SKK.

Under the programme 090 – *Policy Formulation, Regulation and Implementation*, 6.4 million SKK was allocated to the “Education” measure. The Svätý Anton Museum was awarded 18 million SKK from the *Rural Development* programme.

A number of subjects including MFE Pliešovce, the University Forest Enterprise (TU Zvolen) and forestry colleges managed to acquire funding also from other sources.

Table 8.4–2 Public funding (million SKK)

Use	State sector	Non-state sector	Total
Forestry operations	10.0	0	10.0
Investments	11.5	150.7	162.2
Other activities	152.1	32.6	184.7
Total	173.6	183.3	356.9

Source: SL MA SR, APA MA SR.

Prepared by: NFC-FRI Zvolen.

Since the EU accession in 2004, sectoral development has also been substantially supported from the Structural Funds. In the 2004–2006 programming period, the funding was provided through two main programmes: SOP Agriculture and Rural Development (SOP ARD) and the Rural Development Plan (RDP). The latter was compiled in concurrence with SOP ARD. Sectoral activities implemented under SOP ARD and RDP are co-financed from the European Agricultural Guidance and Guarantee Fund (EAGGF).

In the 2007–2013 programming period, forestry subjects shall be eligible for funding also from the European Agricultural Fund for Rural Development (EAFRD). Allocated resources shall be administered through the following strands of the National Rural Development Programme for 2007–2013: OS 1 – *Enhancement of Agricultural and Forest Sector Competitiveness*, and OS 2 – *Enhancement of the Environment and Landscape*.

In recent past, public funding available for sectoral activities experienced a severe slump. The situation finally improved two years ago when the funding, given in current prices, reached 32 per cent of the volume available in 1990. If estimated in pegged prices of 1990,

it amounted to nothing but 5.5 per cent. The aforementioned shortages might partially be mitigated using financial resources available from RDP. As in many other industries, limited funding has meanwhile compromised the implementation of modern, environmentally friendly technologies. In forestry, it also affected compensations associated with multiple ecological and social services provided by forests. In monetary terms, majority of these services are provided free although provision of them often increases regular management costs. These costs have traditionally been covered from timber sale proceeds.

8.5 Sectoral costs

The total cost of production, trading and other economic activities was up 13.3 per cent over the year. In the non-state sector, the total cost went up by 16.2 per cent compared to 11.9 per cent in the state sector (Annexes 15–1, 15–3, 15–5, Tables 8.5.1, 8.5.2). If split by operation, silviculture costs rose 11.5 per cent and felling costs 13.3 per cent above the corresponding 2006 costs. The costs grew faster in state subjects (almost 10 per cent in silviculture and 7.3 per cent in felling). If inflation rates continue to run in the set course there is very little hope for slashing these costs in the immediate future. The comparison between the volume of felling and silvicultural operations and their respective costs shows that rising costs in non-state forests emulate rising volumes of operations better than costs in state forests. More significant growth of total costs is in non-state subjects partly absorbed by unregistered labour input of forest owners and tenurers self-managing their properties.

Table 8.5–1 Sectoral costs in current prices

Indicator	1990	1995	2000	2005	2006	2007
Total	4 326	7 419	9 497	13 061	12 664	14 348
Material costs including depreciation	1 976	3 226	3 990	5 139	5 616	6 760
Depreciation	596	815	813	834	839	976
Personnel costs	2 056	2 304	3 891	4 175	3 660	3 900
of which labour costs	1 490	1 651	2 789	2 985	2 649	2 834

Prepared by: NFC-FRI Zvolen

Table 8.5–2 Sectoral costs in pegged prices 1995

Indicator	1990	1995	2000	2005	2006	2007
Total production costs	11 775	7 419	6 400	6 629	6 152	6 780
Material costs including depreciation	5 379	3 226	2 689	2 608	2 728	3 194
Depreciation	1 622	815	548	423	408	461
Personnel costs	5 596	2 304	2 622	2 119	1 777	1 843
of which labour costs	4 056	1 651	1 880	1 515	1 286	1 343

Source: PFI 2007, Green Reports, questionnaire from forest owners and tenurers, state statistical reports Les V (MA SR) 5-01, Les F (MA SR) 7-01, Les V (MA SR) 1-04, Les D (MA SR) 2-04, Les P (MA SR) 6-01, Uč POD 1-01, Uč POD 2-01.

Prepared by: NFC-FRI Zvolen.

8.5.1 Material costs including depreciation

Interannual growth of material costs (including depreciation) was chiefly related to increased fuel and energy costs. The costs grew 9.3 per cent in 2006, but 20.4 per cent a year later. Depreciation alone rose by 16.3 per cent whilst adjusted material costs rose at the same time by 21.1 per cent. These costs are sensitive to developments on oil and energy world markets and are thus predicted to further grow. Extreme oil and energy price hikes are partially offset by the strengthening of Slovak crown against major world currencies (USD, EUR).

8.5.2 Personnel costs

In 2007, underestimation of personnel costs continued to further persist. Most underrated categories included labour costs and costs related to the appraisal of natural production factor. Intensifying pressure on upward revisions of labour costs following the joining of the monetary union could shorten the period of approximation of domestic costs to the average EU costs, originally estimated to 30 years, by 25–30 per cent depending on the rate of economic growth. Labour costs in Slovak forest sector for the time being remain one of the most important factors of intensifying productivity and forest production on both the European and global scales. Overall personnel costs in the sector rose 6.6 per cent over the year. The state sector costs growth stood at 5.7 per cent compared with 8.0 per cent for the non-state sector (Tables in Annexes 15–1, 15–3 and 15–5). In the former mentioned, the costs were affected by reduced volumes of the majority of forest operations chiefly contributed to the general hike in real earnings. Meanwhile, in the latter mentioned the employee numbers declined by 1.2 per cent compared to 2006. The sectoral growth of labour productivity, average nominal wage (7.1 per cent), and real wage (4.3 per cent) was last year primarily driven by workforce layoffs and increased operation volumes. In addition to personnel and labour costs, in the category of non-state forest owners self-managing their properties the sum of net earnings or net business profit is considered important. The sum is entered into the Aggregated Forestry Economic Account (AFEA).

8.5.3 Production costs

The overall review of management standards in particular state and non-state subjects is based on the assessment of quality of natural production factor (Table 8.5.3–1) and a set of production indicators (Table 8.5.3–2).

Presented indicators of natural production factor confirm only a subtle difference in the quality of managed commercial forests and their ecosystems. The Table also shows that indicators related to the commercial forests area, conifer species and growing stock per hectare were in 2007 more favourable in non-state forests. In return, the average yield class in conifer and broad-leaf forests and conifer growing stock per hectare were marginally better in state forests. The development of other indicators such as age structure, stocking, forest damage and terrain grade was very similar.

Table 8.5.3–1 Natural production factor in state and non-state forests 2007

Indicator	Unit	State subjects	Non-state subjects	Total
Functional forest category				
– commercial (C)	1 000	715 / 67	595 / 69	1 310 / 68
– protection (P)	ha / %	178 / 17	151 / 18	328 / 17
– special purpose (SP)		174 / 16	109 / 13	283 / 15
Species composition in C forests				
– conifer	%	31.7	41.1	36.0
– broad-leaf		68.3	58.9	64.0
Average yield class in C forests				
– conifer	m	30.7	29.8	30.3
– broad-leaf		25.6	25.1	25.4
Growing stock in C forests per ha				
– conifer	m ³	287	286	286
– broad-leaf		207	207	207
Total		232	240	236

Source: Compendium of Slovak Forestry Statistics, NFC-IFRI 2008.

Prepared by: NFC-FRI Zvolen.

Table 8.5.3–2 Average costs of selected silvicultural and felling operations (SKK)

Operation	Unit	State subjects		Non-state subjects		Total	
		2006	2007	2006	2007	2006	2007
Total regeneration	SKK/ha	42 906	56 166	32 129	35 085	38 153	46 636
Artificial regeneration	SKK/ha	51 563	61 553	37 804	51 635	45 495	57 072
Natural regeneration	SKK/ha	5 520	5 714	4 388	3 437	5 020	4 683
Tending of forest plantations	SKK/ha	8 157	11 073	4 767	6 170	6 662	9 521
Protection of young forests	SKK/ha	4 055	4 600	4 406	5 107	4 210	4 825
Cleaning	SKK/ha	4 913	5 255	4 261	3 944	4 625	7 807
Forest protection	SKK/ha of forest	136	149	41	44	94	118
Silviculture	SKK/ha of forest	915	1 297	698	985	819	1 159
	SKK/ha of regen. area	109 194	257 265	103 640	142 036	106 745	205 171
	SKK/ha of felling	216	284	171	238	196	264
Felling	SKK/m ³	128	153	146	255	136	198
Skidding	SKK/m ³	265	320	175	235	225	283
Log scaling	SKK/m ³	122	217	49	58	90	149
Timber hauling	SKK/m ³	145	201	102	78	126	148
Construction and repair of unpaved forest roads and maintenance of forest roads and depots	SKK/m ³ of felling	113	148	62	120	91	140
Felling	SKK/m ³	1 157	1 159	474	794	856	989
	SKK/ha of forest	3 042	4 789	1 930	3 289	2 552	4 125
Σ Silviculture + felling	SKK/m ³ of felling	1 373	1 454	645	1 110	1 052	1 267
	SKK/ha of forest	3 957	6 086	2 628	4 274	3 371	5 284

Source: Record L-144, Sectoral statistical records of MA SR Les F (MA SR) 7-01, Les P (MA SR) 1-06, Les D (MA SR) 2-04, Les V (MA SR) 5-01, Les V (MA SR) 1-04 Uč Pod 1-01, Uč Pod 2-01, Analytical standards of state forest enterprises, Green Reports, Compendium of Slovak Forestry Statistics, NFC-IFRI 2008.

Prepared by: NFC-FRI Zvolen.

In 2007, state forests reported moderate to significant growth of unit costs for all silvicultural operations. The growth was associated with a decline in the volume of operations except for forest protection and a rise in real earnings. The situation in non-state forests was largely similar except for natural regeneration and cleaning unit costs of which slightly increased (Table 8.5.3–2). Overall sectoral statistics showed a slight decline of unit costs only in the category of natural regeneration; other costs interannually increased.

Total unit costs of felling operations realized in state forests interannually rose between 0.2 (operations per m³ of felled timber) and 77.8 per cent (log scaling per m³). In non-state forests, comparable costs of selected and aggregated indicators rose between 18.3 and 93.5 per cent with the exception of timber haulage. Unit costs for the entire sector increased between 17.5 and 61.6 per cent depending on a particular operation (Table 8.5.3–2).

The approximation of total unit costs of state and non-state forests in 2007 largely failed. Variations in the development of particular unit costs were also associated with casual differences in natural and economic conditions of forest production.

8.6 Exploitation of production factors and economic result

8.6.1 Value of production factors

The value of natural production factors (forest plots and stands), expressed in their general value (market price), interannually changed. The change was brought on by a number of factors including the recategorisation of forest area associated with reprivatisation and tenure and adjustments in the computing of initial value into general value introduced by MASR Regulation No 492/2004 Coll. Computing results increased the forest value by 10.3 per cent. At the same time, the general value of forest plots slipped by 55.6 per cent whilst the same value of forest stands grew by 38.5 per cent (Table 8.6.1–1). The value of residual capital declined by 3.3 per cent over the year. The decline was particularly apparent in the category of state forests. Total labour costs were up 6.5 per cent on average, more in non-state (8 per cent) than state forests (5.6 per cent).

Table 8.6.1–1 Value of natural production factor, stock and labour

Production factor and stock	Sector (million SKK)		Total (million SKK)	Average (1 000 SKK per ha)
	State	Non-state		
Forest plots	21 894	15 437	37 331	18.60
Forest stands	154 479	119 149	273 628	136.37
Total	176 391	134 586	310 977	154.98
MIA in residuary value	8 458	1 074	9 532	4.75
of which buildings and constructions	7 161	550	7 711	3.84
Machinery and equipment	1 297	524	1 821	0.91
Labour costs (personnel costs)	2 409	1 491	3 900	1.82

Source: Compendium of Slovak Forestry Statistics, NFC-IFRI 2008, Summary Uč POD 2-01, Les V.

Prepared by: NFC-FRI Zvolen.

8.6.2 Rate of production factor exploitation

The yearly comparison of the exploitation rate of major production factors is described by the selected intensity indicators. Table 8.6.2–1 clearly indicates accelerated exploitation of natural resources, capital and labour ranging from 6.9 to 20.3 per cent (earnings and revenue, material costs including depreciation, personal earnings) with a concurrent 8.9 per cent rise in labour productivity computed from earnings and revenue. Moreover, statistics also suggest the decline in forest operation subsidies expressed by 0.082 index.

Table 8.6.2–1 Exploitation of production factors in nominal values of current year (SKK/ha)

Indicator				Growth index 2007/2006
	2005	2006	2007	
Earnings and revenue	6 869	6 884	7 678	1.1153
of which subsidies for forestry operations	12.46	60.82	4.98	0.0819
Production costs	6 511	6 313	7 149	1.1324
Material costs including depreciation	2 562	2 800	3 368	1.2028
Depreciation	416	418	486	1.1627
Labour costs	1 488	1 321	1412	1.0689

Source: Sectoral statistical record Les F (MA SR) 7-01, Summary Úč POD 2-01, Analytical standards of state forest enterprises, NFC-FRI Zvolen (special questionnaire from forest owners and tenurers), Les (MA SR) 5-01.

8.6.3 Sectoral economic performance

The overview of key sectoral economic and financial indicators for 1990, 2005–2007, outlook for 2008–2009 is provided separately for all main categories, namely the state forests under the auspices of MA SR, state forests managed by other sectors, and non-state forests (Annex 15 and Figures 8.6.3–1, 8.6.3–2 and 8.6.3–3). The results provide for the following conclusions:

- Post 1990 changes of inputs, outputs, forest production structure and sectoral management system were vital to facilitate sectoral transformation to market economy conditions. One of the main short-term objectives of Slovak forestry is to reach sustainable competitiveness in the segment of market products, public-beneficial services and know-how. Sectoral economic and social interests should be achieved in line with the principles of ecological and economic sustainability and effectiveness.
- Silvicultural operations mirrored growing trends in the exploitation of natural resources. Recent figures showed a decline in costs of most expensive silvicultural treatments. Future efforts shall focus on a sustainable supply of FRM to secure conservation and enhancement of national forest resource.
- It is believed that taking advantage of the natural production factor in establishment and management of forests can improve silviculture results as well as results in forest protection, biodiversity conservation, and environment protection.

Trends in sectoral earnings and revenue expressed in current prices have recently been mostly positive; the same is true for economic results achieved in particular years except for 2003 when the figures went into the red. In the same term, sectoral subsidies expressed in nominal values (excluding inflation) have continued to decline with the sharpest slip experienced in 2004 (Figure 8.6.3–1).

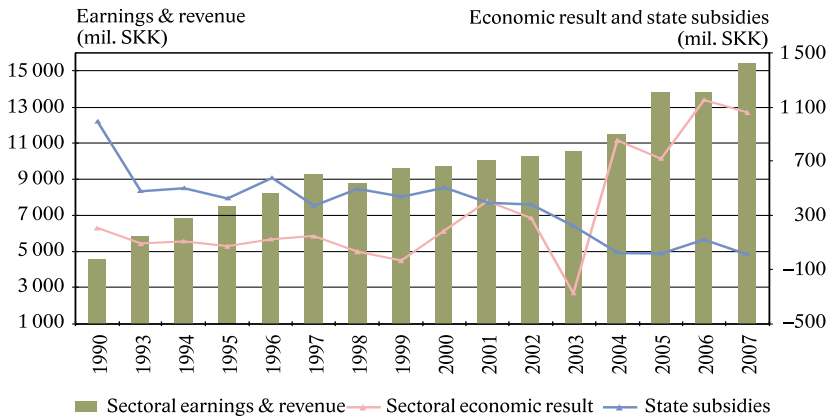


Figure 8.6.3–1 Trends in sectoral earnings & revenue, economic result and state subsidies.
Prepared by: NFC-FRI Zvolen.

Earnings & revenue achieved by state subjects (given in current prices) have shown a steady rise marked by significant jumps up in years following large-scale windthrow (1997, 2005). On the other hand, economic results given in current prices declined well until 2004. In state forests, quality and effectiveness of management are fundamentally driven by the largest forest tenurer – the State Forests of the Slovak Republic. As for a nominal value of subsidies allocated for the state sector (excluding inflation), this has in last few years been in a permanent decline (Figure 8.6.3–2).

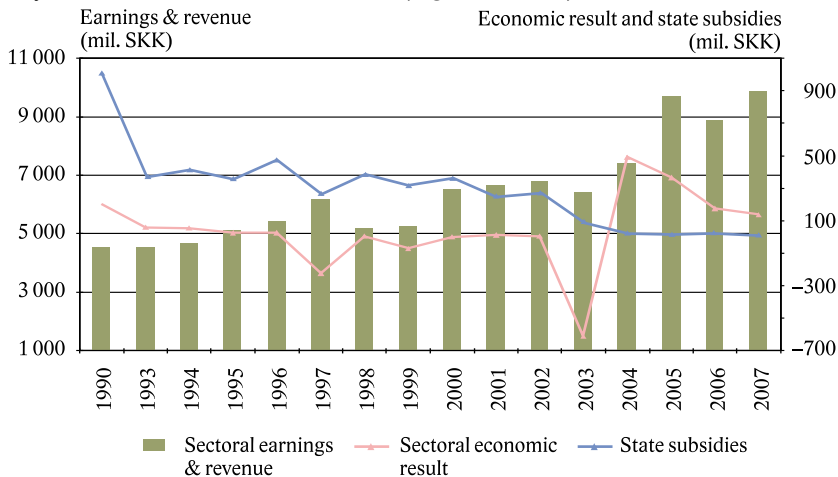


Figure 8.6.3–2 Trends in earnings & revenue, economic result and state subsidies in state forests.
Prepared by: NFC-FRI Zvolen.

In the category of non-state forests, all major economic indicators (earnings & revenue, economic result, etc.) have shown signs of gradual improvement. Limited yet regular state subsidies were available only till 2004. Later, they became irregular and further limited. From 2003 onwards, the economic result of non-state subjects also includes labour costs of forest owners and tenurers and their family members (Figure 8.6.3–3).

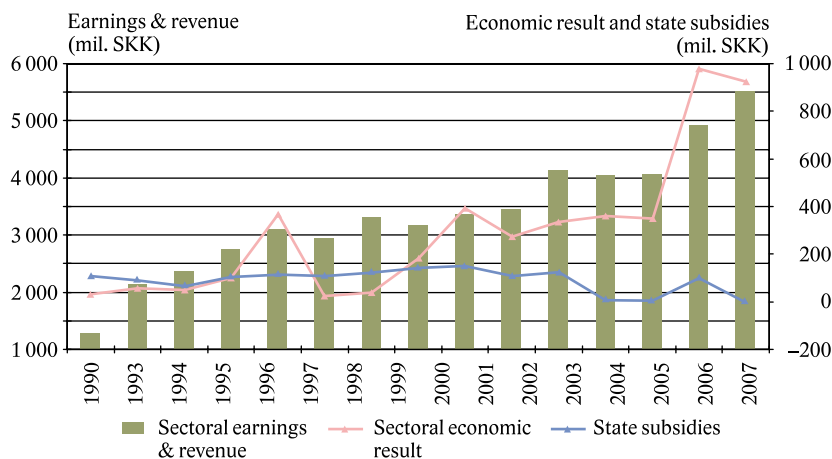


Figure 8.6.3–3 Trends in earnings & revenue, economic result and state subsidies in non-state forests.
Prepared by: NFC-FRI Zvolen.

2007 earnings & revenue were mainly driven by the increase in timber realization associated with a temporary revival of European timber markets and weakening asymmetry of increased domestic supplies of low quality timber from disturbance felling. Meanwhile, the volume of overdue accounts from 2006 slightly decreased. The unit labour productivity computed from earnings and revenue and stripped off state subsidies experienced further interannual growth.

8.6.4 Economic result

Economic aspects of forest management can best be assessed using the economic result of forest production or, alternatively, the whole range of production activities. The economic result of forest production is estimated as a difference between the receipts from timber sale, other forest production, and forestry services and the cost of silvicultural, felling and other forest operations. The economic result referring to sectoral production also consists of receipts from non-forest goods, products and services including corresponding costs. The economic result achieved in 2007 amounted to 1 061 million SKK.

8.6.4.1 Economic result of state subjects

The economic result (hereinafter only ER) of state subjects was significantly compromised by the aftermath of 2004 calamitous windthrow and subsequent bark beetle outbreaks in spruce forests (2006, 2007). These disturbances resulted in slumped earnings from timber sales and increased costs of felling and silvicultural operations, the main ER contributors. Given the nature of forest production (combination of growth and operation processes), the indicator is employable only for forest production under standard conditions – i.e. when the volume of silvicultural operations is appropriate for the felling volume realized in that particular year. This precondition was largely denied by the effects of wind and bark beetle disturbances when silvicultural measures to be normally associated with

the 2005 felling were postponed to 2006 and 2007 due to pending calamity removal. In state subjects, ER is significantly impacted by much more complex provision of public-beneficial forest services compared to non-state entities (e.g. watercourse management). On top of that, state subjects access fewer funding possibilities from various EU schemes and have a responsibility for over 100 thousand hectares of forests of unknown owners in which the cost of felling and silvicultural operations is met from their own budgets. In 2007, the aforementioned responsibility generated a total deficit of some 206 million SKK.

Table 8.6.4.1–1 Unitary economic result of state subjects (SKK)

Subject	Unit	Forest production			Total production		
		Years					
		2005	2006	2007	2005	2006	2007
State	SKK/ha of forest	1 489	644	251	313	156	123
	SKK/m ³ of felling	268	152	60	56	37	29

Source: NFC-FRI Zvolen, State statistical records Les (MA SR) 7-0 1 and Les (MA SR) 4-01.

Prepared by: NFC-FRI Zvolen.

8.6.4.2 Economic result of non-state subjects

Socio-economic data for non-state subjects are partly acquired from basic statistical records (L 144) and partly from specific records gathered through the network of reporting units (NRU) covering 1 200 subjects. NRU was established in 1997 (Les MA SR 5-01). Out of that number, only 600–700 subjects are able to provide credible yearly data since smaller subjects do not annually perform a whole range of forest production operations. Distribution of particular non-state ownership categories in NRU roughly corresponds with their representation in basic records (community forests – 55 per cent; municipal – 37 per cent; church – 4 per cent; private – 4 per cent). The total area of forest from which data are annually available is around 40 per cent of the total area of non-state forests.

Calamitous windthrow from 2004 and subsequent devastating bark beetle outbreak impacted ER of non-state subjects to a much lesser degree than ER of state subjects. The impact was less felt chiefly because of lower presence of these forests in major risk areas.

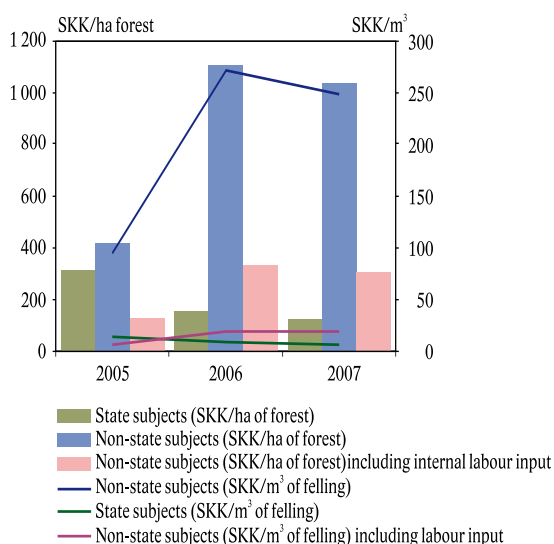


Figure 8.6.4.2–1 Comparison of unitary ER in state and non-state subjects (SKK) with and without labour costs for the latter.

In fact, no major deviation from standard production conditions due to aforementioned disturbances has been observed in these forests. Formally, ER of state and non-state subjects should be equally relevant. Nevertheless, differences exist in the definition of this indicator – production costs of non-state subjects (private and community forests in particular) do not include unpaid labour input of their owners, users and family members. This fact combined with better access to EU funding significantly improve ER achieved by of non-state entities.

Table 8.6.4.2–1 Unitary economic result of non-state subjects (SKK) with and without labour costs

Subject	Unit	Forest production			Total production		
		Year					
		2005	2006	2007	2005	2006	2007
Non-state	SKK/ha of forest	668	1 095	1 542	422	1 105	1 035
	SKK/m ³ of felling	151	269	371	95	272	249
	SKK/ha of forest*	200	329	463	127	332	311
	SKK/m ³ of felling*	45	81	111	29	82	75

Source: NFC-FRI Zvolen, State statistical records Les (MA SR) 7-0 1 and Les (MA SR) 4-01.

Prepared by: NFC-FRI Zvolen.

*Note: *ER including unpaid labour input.*

8.7 Economic tools

8.7.1 Prices of key production factors

The official evaluation of a particular forest property, which uses both the natural production factor and generated products, is currently based on the method of regulated and market prices. The method of regulated prices is applied in compliance with MJ SR Regulation No 492/2004 Coll on estimate of general value of forest property and Act No 326/2005 Coll on forests defining the value of particular non-production forest functions. The regulated value (official market value) of a particular property and its contribution to public forest benefits is primarily applied with respect to state administration (taxes, fees, compulsory payments, etc.). At the same time, it also provides an informative level of market price reflecting formal offer and demand mechanisms on property markets and in the process of estimation of forest property damage.

8.7.2 Taxes

The largest volume of contributed tax (62.4 per cent) was last year formed by the value-added tax (VAT). The income tax (gross profit) of legal entities and natural persons including individual income tax fell by 15.1 per cent compared to 2006. The decline was more felt in the category of state subjects (34.2 per cent) due to the improved estimate of this tax from the Aggregated Forestry Economic Account (AFEAE). In non-state subjects, the tax was up 15.5 per cent. The available income tax records still lack accurate data on the amount of sectoral tax paid by entrepreneurs and their employees.

Table 8.7.2–1 Overview of taxes contributed to state and municipal budgets (million SKK)

Tax		Year						
		1998	2000	2003	2004	2005	2006	2007
VAT (paid-returned rate)	SF	580	551	596	582	636	637	729
	NF	350	340	360	350	360	360	321
	Total	930	891	956	932	996	997	1 050
Property tax	SF	80	73	74	76	98	115	130
	NF	30	26	27	28	30	28	43
	Total	110	99	101	104	128	143	173
Road tax	SF	25	32	29	47	28	28	23
	NF	10	8	7	7	8	8	9
	Total	35	40	36	54	36	36	32
Income tax*	SF	133	149	258	329	257	310	204
	NF	45	38	174	166	171	193	223
	Total	178	187	432	495	428	503	427
Total	SF	818	805	957	1 034	1 019	1 090	1 086
	NF	435	412	568	552	569	589	596
	Total	1 253	1 217	1 525	1 585	1 588	1 679	1 682

Source: NFC-FRI Zvolen (Special questionnaire from forest owners and tenurers).

Note: * derived from the paid salaries and gross profit; SF – state forests, NF – non-state forests.

The overall interannual increase of property tax represented 21 per cent. The tax primarily grew in non-state forests (53.6 per cent) compared to 10 per cent rise in state forests. The growth was associated with improved computing of forest property tax using data from records and statistics on prescribed and paid property taxes. The tax formed 8.5 per cent of the total volume of claimed taxes. The road tax was down 11 per cent over the year, particularly in the segment of state forests.

From the total amount of taxes paid towards state and municipal budgets, state subjects paid in 64.9 per cent compared with 35.4 per cent contributed by non-state entities.

8.7.3 Credits

Sectoral business enterprises, state managed in particular, exploit this source of funding very carefully. The liability of state forests long-term varies between 2–4 per cent. In non-state forests, liability used to be initially much higher than long-term sustainable, but recently it stabilised at around 2 per cent. Forest subjects use credits to cover short-term resource deficits, overdue timber payments and purchases of crucial items of intermediate consumption. Credits are presently more exploited by non-state subjects who mainly use them for machinery purchase and road construction. For the latter, they can claim financial contributions from public and EU funds.

Table 8.7.3–1 indicates a mild increase of credit interest rates over the year. This fact is associated with changes in the security of credits provided by major commercial banks. In 2006, the security index represented 1.22 of a granted credit; a year later, the index fell to 1.04 of the credit.

Table 8.7.3–1 indicates a mild increase of credit interest rates over the year. This fact is associated with changes in the security of credits provided by major commercial banks. In 2006, the security index represented 1.22 of a granted credit; a year later, the index fell to 1.04 of the credit.

Table 8.7.3–1 *Exploitation of credits in state and non-state sectors (million SKK)*

Credit	Sector						Total		
	State			Non-state ^{*)}					
	2005	2006	2007	2005	2006	2007	2005	2006	2007
Credits from previous years (overdue)	36	35	129	20	25	40	56	60	169
Bank credits accepted in a particular year	56	60	40	60	50	50	116	110	90
Total	92	95	169	80	75	90	172	170	259
Level of proprietary guarantee	29	28	70	150	180	200	179	208	270
Interest rate	7.0	6.9	6.0	7.0	6.5	6.2	7.0	6.7	6.0

Source: NFC-FRI Zvolen (Special questionnaire from forest owners and users).

Note: ^{*)} qualified estimate.

8.7.4 Levy for forest property exclusion

The purpose of this levy is to protect and enhance sustainability of forest ecosystems and natural resources at a landscape level to ensure fulfilment of their multiple functions. The obligation imposed by § 9 of the standing forest law grants compensation payments for the loss of non-production forest functions. The official value of non-production functions has been derived for the average rotation period established for a particular FSTMU and is given in thousands of SKK per ha of forest. Rates for particular benefits of non-production forest functions are listed in the Annex 1 of the Forest Act.

The levy is regulated by state administration on forests and is based on an expert appraisal. This tool represents one of the tools of protection against permanent or temporary exclusion of forest properties, particularly with respect to development plans. The sum paid last year for the exclusion of forest land from forest production (90 million SKK) confirms ever growing demand for development land in the region.

8.7.5 Fines and sanctions for the violation of enforced regulations

Violation of particular provisions of the Forest Act might be penalised. On average, there are around 350 state and non-state subjects a year charged for various offences. In 2007, the amount of fines reached 2.5 million SKK, but only an estimated 30 per cent (750 thousand SKK) were actually settled.

8.7.6 Compensations for forest property damage

These compensations are regulated by both the general regulations and Forest Act. At present, forests are most affected by anthropogenic activities (air pollution, etc.) and ongoing climate change. The situation nonetheless improved in last ten years when the volume of major pollutants has significantly decreased. The improvement has chiefly been associated with a gradual replacement of old industrial technologies for more advanced, environmentally friendly alternatives, soaring energy prices, and the implementation of industrial innovations. Despite a substantial decrease in the volume of pollutants, these still annually contribute to an estimated 500 million SKK worth of forest damage. It is estimated that every year there is around 100 million SKK of emissions damage to state and non-state forests quantified in various expert assessments. The process of damage recovery is nevertheless very slow and each year only around 20 per cent of calculated damage is successfully claimed. One of the solutions is to use a specific percentage of air pollution fees on the implementation of forest remedial measures. Another alternative is to delegate responsibility for the implementation of remedial measures on damage responsible persons and entities.

8.7.7 Compensations for restriction of ownership rights

The compensation for management restrictions imposed by the Act No 543/2002 Coll on nature and landscape protection represents an estimated 620 – 750 million SKK per year. This amount has been ascertained using an average value of restrictions compensation negotiated between FRI Zvolen and SNC SR in 2003 to assist the approval of the national list of NATURA 2000 sites. According to the quantification provided by FRI Zvolen in 2001 and based on the then valid governmental order and the ME SR data, the volume of compensations was estimated at around 920 million SKK per year. Due to a severe lack of financial resources and a complicated procedure of claiming the compensation these have been complicated to obtain.

The situation should improve with the foreseen adjustment of the Act on Nature and

Landscape Protection and the creation of new compensation schemes. Except for financial compensations, forest land purchase, forest leasing, and intentional refund of state – ordered environmental services, and the combination of the aforementioned are at present being considered as possible alternatives.



Figure 27 Deadwood left in forests to enhance biological diversity generates loss of revenue.

8.8 Investments

8.8.1 Operations and supplies for commercial development

The volume of operations and supplies for commercial development equalled in 2007 the sum of 1 161 million SKK, down 13 million SKK from the previous year. Most investments went into construction (42.6 per cent) and machinery and equipment (34.6 per cent). Other investments represented the remaining 22.8 per cent of the total volume invested.

Table 8.8.1–1 Volume of investments (million SKK)

Investment category	Forest sector		State subjects under MA SR		Other state subjects		Non-state subjects	
	2006	2007	2006	2007	2006	2007	2006	2007
Construction	520	495	346	391	465	469	55	26
Machinery & equipment	577	402	453	261	502	316	75	86
Other	77	264	4	117	57	178	20	86
Total	1 174	1 161	803	769	1 024	963	150	198

Source: Statistical record Les (MA SR) 8-01.

Prepared by: NFC-FRI Zvolen.

In the category of other state subjects, the total volume of investments declined by 61 million SKK (more than 6 per cent) over the year. In the category of non-state subjects, investments interannually rose by 48 million SKK (32 per cent) to current 198 million SKK.

Table 8.8.1–2 Construction investments in state subjects under MA SR

Type (million SKK)						
Forest roads	Timber depots	Torrent regulation	Buildings, objects and construction sites	Nursery operations	Other development activities	Total
187	53	6	16	6	123	391

Source: Statistical record Les (MA SR) 8-01.

Prepared by: NFC-FRI Zvolen.

8.8.2 Machinery and equipment investments

Sectoral investments into machinery and equipment reached last year the sum of 402 million SKK, down 175 million SKK from the previous year. Meanwhile, non-state subjects reported an increase of 11 million SKK to total 86 million SKK. The structure of machinery & equipment investments in state subjects under MA SR, total value of which reached 261 million SKK last year, is given in Table 8.8.2–1.

Figure 28 Investments were in 2007 directed primarily to log scaling, passenger and technological transport.



Table 8.8.2–1 Machinery & equipment investments in state subjects under MA SR

Machinery & equipment for:						Passenger& technological transport	IT	Software	Total
Felling	Skidding	Timber haulage	Log scaling	Chipwood	Silviculture & nurseries				
12	17	35	102	1	5	63	22	4	261

Source: Reports on results of economic performance analysis in state forest enterprises under MA SR for 2007.
Prepared by: NFC-FRI Zvolen.

8.9 Economic Accounts for Forestry

The Economic Accounts for Forestry (EAF) measures, describes and analyses the formation of sectoral pension using a set of four accounts: production; pension; profit; and capital. EAF provides information on the origin of goods, their use, economic processes and associations within the industry in a particular accounting period.

Table 8.9–1 Aggregated indicators of EAF 2007

Indicator		Unit	State sector	Non-state sector	Total
Production account					
1	Utilisable production (timber felling)	1 000 m³	4 661	3 706	8 367
2	Log grades		4 603	3 447	8 050
3	Average timber realization	SKK/m³	1 528	1 498	1 515
4	Value of log grades	million SKK	7 031	5 164	12 195
5	Value of other forest production		2 718	316	3 034
6	Σ 4+ 5		9 749	5 480	15 229
7	Intermediate consumption		5 427	2 100	7 527
8	Gross added value		4 322	3 380	7 702
9	Fixed capital consumption		606	370	976
10	Net added value		3 716	3 010	6 726
Generation of income account					
11	Compensation of employees	million SKK	2 409	1 491	3 900
12	Other taxes fon production		1 060	420	1 480
13	Other production subsidies		162	33	195
14	Operating surplus		409	1 132	1 541
Entrepreneuvial income account					
15	Rents payable	million SKK	96	40	136
16	Interests payable		9	7	16
17	Interests receivable		0	10	10
18	Entrepreneuvial income		304	1 095	1 399

Source: Compendium of Slovak Forestry Statistics (SFMP), PFI 2007, Balance sheet Uč POD 3-02, Quarterly report POD 2-01, Les V 4-01.

Prepared by: NFC-FRI Zvolen.

A new sectoral system of the Integrated Environmental and Economic Account for Forests (IEEAF) was introduced last year to provide more complex, high quality data on forest production. Among other elements, the system also considers factors associated

with forest damage and the improvement of natural production factor. In addition, forest production is enhanced by the value of increment not felled in a particular year. After the increment inclusion, net profit 2007 rose from 1 399 million to approximately 3 billion SKK.

Table 8.9–2 EAF indicators at basic prices (current transaction accounts)

Indicator		Unit	Year								Index 2007/ 2006
			2000	2001	2002	2003	2004	2005	2006	2007	
Production account											
1	Utilisable production (timber felling)	1 000 m³	6 218	6 185	6 260	6 652	7 268	10 190	8 357	8 367	1.001
2	Log grades		5 791	5 720	5 607	6 257	7 198	9 287	7 794	8 050	1.033
3	Average timber realization	SKK/m³	1 227	1 341	1 375	1 335	1 315	1 223	1 409	1 515	1.075
4	Value of log grades	million SKK	7 104	7 567	7 748	8 355	9 468	11 355	10 980	12 195	1.111
5	Value of other forest production		1 996	2 072	2 039	1 878	1 851	2 399	*2 453	3 034	1.237
6	Σ 4+ 5		9 100	9 639	9 787	10 233	11 319	13 754	13 433	15 229	1.134
7	Intermediate consumption		3 989	4 210	4 471	4 747	4 669	6 328	5 921	7 527	1.271
8	Gross added value		5 111	5 429	5 316	5 486	6 650	7 426	7 512	7 702	1.025
9	Fixed capital consumption		813	764	791	842	820	834	839	976	1.163
10	Net added value		4 298	4 665	4 525	4 644	5 830	6 592	6 673	6 726	1.008
Generation of income account											
11	Compensation of employes	million SKK	3 891	4 034	4 078	3 831	3 678	4 175	3 660	3 900	1.066
12	Other taxes on production		182	187	182	432	1 589	1 588	*1 679	1 480	0.881
13	Other production subsidies		507	517	440	322	165	153	262	195	0.744
14	Operating surplus		732	961	705	703	728	982	1 596	1 541	0.966
Entrepreneurial income account											
15	Rents payablet	million SKK	126	124	120	136	115	191	202	136	0.673
16	Interest payable		71	29	18	47	14	8	9	16	1.778
17	Interest reccivable		20	14	7	12	13	17	19	10	0.526
18	Entrepreneuvial income		555	822	574	532	612	800	1 404	1 399	0.996

Source: Compendium of Slovak Forestry Statistics (SFMP), PFI 2007, Balance sheet Uč POD 3-02, Quarterly report POD 2-01, Les V 4-01.

Prepared by: NFC-FRI Zvolen.

* Volume of other taxes was adjusted using data provided additionally.

If given at basic prices, all main indicators of production account, generation of income account and entrepreneurial income account (total production value, gross added value, net added value, net operating surplus and net entrepreneurial income) have

since 2000 been improving. The only deviation from the trend was observed in 2001 (Table 8.9–2). Significant growth of net operating surplus from independent activities and net entrepreneurial income was in 2007 associated with increased volumes of other production subsidies and decreased rates of yearly employee bonuses.

8.10 Socio-economic statistics and employment

8.10.1 Acquisition of socio-economic data

In Slovakia, employment development is monitored compliant with EU regulations (Council Regulation (EC) No 577/98 on the organization of a labour force sample survey in the Community). The methodology fully corresponds with the recommendations of the International Labour Organization (ILO) and allows for classification according to the Sectoral Classification of Economic Activities (SCEA). The absolute number of full-time employees in the state sector is calculated from the data provided by a special survey questionnaire issued by MA SR. The data are correct to 31 December of a particular year. Statistics on sick leave, occupational diseases and work-related injuries are compiled by a number of different institutions (National Labour Inspectorate, National Health Information Center, and Public Health Authority). The available data are mostly insufficient. This is particularly true for a non-state sector for which they are either absent or impossible to separate from the bulk of other data.

Data on average earnings are collected only for the enterprises with 20+ employees (for subjects performing financial mediation and all non-business subjects regardless of the number of their employees). In addition, data is also gathered for the enterprises with < 20 employees if their annual production turnover exceeds 100 million SKK. The data do not thus cover small enterprises with fewer than 19 employees and private businesses not registered in the Commercial Register (including their employees).

8.10.2 Labour and job motivation

Statistical figures for 2007 suggest a stable trend in labour employed in Forestry, timber felling and associated services (SCEA 02). The figure of some 23 thousand is added by more than 29 thousand employees of timber industry (SCEA 20 – Wood-processing) and approximately 7 thousand employees of paper and pulp industry (SCEA 21 – Pulp and paper-making industry).

Table 8.10.2–1 Workforce by education (%)

Type	2006			2007		
	Total	Female	Male	Total	Female	Male
Basic	9.2	17.1	6.6	12.9	20.5	9.9
High school	78.7	68.6	82.1	79.2	66.7	84.2
University	12.1	14.3	11.3	7.8	12.8	5.9

Source: SO SR.

Prepared by: NFC-FRI Zvolen.

With respect to gender, the sector is still much dominated by male workforce. Last year, the dominance was even more profound as 3:1 male-female-employment-rate from 2006 increased to a less favourable 4:1. In state subjects, the 2007 rate was 83.3 to 16.7 per cent in favour of male employees. The downward trend in full-time staff observed in recent years further continued. The category most in decline are forest workers.

The official Register of Organizations (Statistical Office) comprised 13 210 subjects active in the SCEA 02 sector to 31 December 2007. This was up 986 subjects on the previous year. More than 9 800 of these subjects were the self-employed tradesmen.

Changes in the education structure of sectoral workforce were primarily associated with decline in university educated staff and a marginal increase of both the high school graduates and basic education workers.

As for the age structure of sectoral workforce, recent trends have shown a drop in the category of pre-retirement staff. Compared to 2006, almost 1 500 employees (7.5 percentage point) fewer were reported from the most numerous category of 40–49 years old. The number of female employees also declined. Current shortage of female workforce is most felt in younger age groups (30 and below).

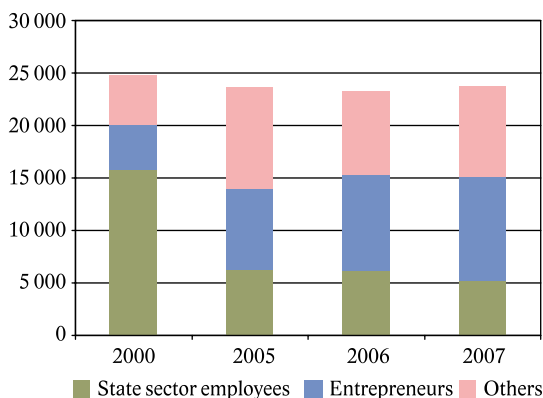
The average monthly earnings in the sector rose from 17 232 to 18 455 SKK (1 223 SKK) – i.e. 7.1 per cent up over the year. Average sectoral monthly earnings represented 91.9 per cent of average national earnings.

Figure 8.10.2–1 Forest sector employees.

Source: SO SR.

Prepared by: NFC-FRI Zvolen.

Note: "Others" category includes employees of non-state forestry subjects and supplier companies.



8.10.3 Sickness and occupational injuries

The forest sector traditionally belongs to industries with a high rate of occupational injuries and diseases. Groups most at risk include felling, skidding and hauling crews. In 2006, the Public Health Office of SR registered 1 572 forest sector employees (38 women) working in risk occupations.

Table 8.10.3–1 Overview of sectoral workforce exposed to health risk factors

Risk	Excess vibrations	Excess noise	Chemical substances	Long-term excess and unilateral load
Male	928	1 476	35	38
Female	3	21	14	—

Source: Public Health Office of SR.

Prepared by: NFC-FRI Zvolen.



Figure 29 Majority of most serious occupational injuries are related to felling operations.

A number of newly reported occupational diseases gone up last year. With respect to the above described occupational risks, the most common health hazards included Lyme disease and working with high vibrations equipment.

Table 8.10.3–2 Occupational diseases and other work-related health problems

Year	Indicator	Total	Vibration disease	Noise impaired hearing	Lyme disease	Other				
						Total	Of which (code)			
			Code 28	Code 38	Code A692		24	26	29	47
2000	a	63	37	4	0	22	2	15	5	0
	b	18.0	19.6	28.0	0	13.5	3.0	14.1	15.8	0
2006	a	36	16	3	10	7	0	0	6	1
	b	18.7	16.8	20.7	17.8	23.3	0	0	24.5	16.0
2007	a	42	26	0	13	3	0	0	3	0
	b	19.0	19.2	0	16.2	25	0	0	25	0

Source: National health information center.

Prepared by: NFC-FRI Zvolen.

Legend: a – No of cases, b – average No of hazard subjected years.

24 – Infectious diseases and parasitary diseases except for tropical infectious diseases, parasitary diseases and diseases transmittable from animals to humans.

26 – Diseases transmittable from animals to humans directly or through carriers.

29 – Diseases from long-term excess unilateral extremity load affecting bones, joints, tendons, and nerves.

Table 8.10.3–3 Overview of sectoral occupational injuries

Year	Employment category	Injuries in total	Fatal		Serious		Other	
			Male	Female	Male	Female	Male	Female
2000	Employees	612	2	0	3	1	534	72
	Tradesmen	2	1	0	0	0	1	0
2006	Employees	137	8	0	16	0	95	18
2007	Employees	121	4	0	29	2	70	16

Source: National Labour Inspectorate, special questionnaire of MA SR, 2008.

Prepared by: NFC-FRI Zvolen.

The number of occupational injuries registered last year reflected the trend of gradual reduction of full-time workforce employed by state forest enterprises. The number of injuries was 16 cases down on last year. It is rather difficult to obtain genuine figures in this area since statistics of the National Labour Inspectorate (NLI) are largely incomplete because of missing data on self-employed tradesmen. Statistics incompleteness results from the changes imposed by Act No 124/2006 Coll in the wording of Act No 309/2007 Coll.

Fatal injuries and injuries requesting longer than 42 days of sick leave are primarily a result of insufficient personal abilities and skill for assigned jobs and usage of dangerous working practices and methods.



9. ORGANIZATIONAL AND INSTITUTIONAL STRUCTURE

9.1 State administration on forestry and game management

The state administration on forestry and game management (SAFGM) is represented by the Ministry of Agriculture (the central body of SAFGM), 8 regional forest offices (RFO), and 40 district forest offices (DFO).

In 2007, SAFGM responsibilities were attended by the Forestry Department of MA SR which has 2 units – the Forest Policy and Resource Management Unit and the Forestry and Game Management Unit.

Executive power of SAFGM is based on a number of generally binding regulations most important of which are:

- Act No 326/2005 Coll on forests in the wording of the pursuant regulations;
- Act No 217/2004 Coll on forest reproductive material and on amendment of some acts in the wording of the pursuant regulations;
- Act No 181/1995 Coll. on land associations in the wording of the pursuant regulations;
- Act No 23/1962 Coll on hunting in the wording of the pursuant regulations.

In addition to SAFGM duties defined by § 58 of the Forest Act, the Forestry Department was responsible for a wide range of other tasks under its jurisdiction including:

- drafting generally binding regulations related to forest management and hunting;
- developing predictions, strategies and conceptions of sectoral development;
- cooperating on defining tools and mechanisms promoting sustainable management of forests and hunting grounds;
- cooperating with other ministerial departments on specific assignments;
- cooperating on the compilation of the Green Report and Hunting Yearbook 2007, task monitoring, and DFO / RFO guidance;
- fulfilling tasks ensuring protection of state owned forest land;
- fulfilling tasks related to coordination, supervision and management of state subjects under its jurisdiction;
- contributing to the Aggregated Forest Economic Account (AFEA);
- organising consulting services for the non-state forest sector;
- fulfilling assigned duties on defence and protection of state interests;
- administering controlling duties defined by Act No 502/2001 Coll.;
- providing information services defined by Act No 211/2000 Coll.

SAFGM duties related to rights, legally protected interests or obligations of natural persons and legal entities are regulated by procedures defined by Act No 71/1967 Coll on administrative procedure in the wording of pursuant regulations (Administrative Code) unless stated otherwise. Tables 15.1–11, 15.1–12 and 15.1–13 refer to these procedures as “Administrative Code procedures” or “decisions.”

The term “other procedures” refers to procedures in which SAFGM bodies are not decision-makers, but rather act in line with generally binding regulations.

In 2007, the Forestry Department dealt with 2 598 official enquiries regulated by the following legislation:

- Act No 326/2005 Coll on forests in the wording of the pursuant regulations – 42 enquires;

- Act No 217/2004 Coll on forest reproductive material and on amendment of some acts in the wording of the pursuant regulations – 13 enquires;
- Act No 23/1962 Coll on hunting in the wording of the pursuant regulations – 46 enquires.

As for the RFO agenda, the majority of cases dealt with are related to procedural decision-making on hunting based on the Administrative Code provisions (Table 15.1–4). Of other tasks, most frequented are those related to professional assistance with all aspects of forest management and tasks stemming from generally binding regulations executing the Forest Act.

At DFOs, the largest volume of work is related to the execution of state authority in the area of hunting (Tables 15.1–15 to 15.1–18).

Rocedures based on Act No 326/2005 Coll on forests in the wording of the pursuant regulations	Payments, fines, penalties	
	Awarded sum	Paid sum
	in 1 000 SKK	
Compensations for a loss of non-production forest functions (§ 9, Letter b)	79 084.3049	78 612.9756
Penalty levy (§ 9, Section 10)	13 609.912	8 327.955
Decision on payments refund (§ 9, Section 11)	1 354.411	20.411
Decision on fragmentation of forest property (§ 11)	363.879	363.879
Total	94 412.5069	87 325.2206

Execution of state power in forests also includes imposing fines, handling penalty procedures for the violation of Forest Act provisions and corresponding executive regulations, and procedures related to new entries into the Register of Land Associations. The aforementioned areas of work belong to the most complicated agenda of state administration on forestry.

In addition to data given in Table 15.1–13, DFO handled 2 372 entries into the Forest Property Record submitted by managing subjects and certified forest managers (§ 4, Section 1 of the Forest Act), 566 entries into the Timber Mark Register and registers of other authorised timber marking methods (§ 23, Section 4 of Forest Act), and 29 entries into the Register of Forest Reproductive Material Sources (§11, Section 5 of the Act on Forest Reproductive Material).

9.2 Ownership and management of forests

A current structure of ownership and management rights is given in Table 9.2–1. The Table is based on the Register of Forest Owners and Managers. State subjects use 55.5 per cent of national forests, but own only 41.4 per cent of forest land.

Tables 9.2–1 and 9.2–2 clearly show that the process of forest ownership rights restitution is still open and thus more changes are due. The largest area of unresolved forests is in private hands. Majority of these forests are of a very limited size, of individual or shared ownership, and impossible to identify in the field. In addition, there is a group of forest owners who still have not applied for their ownership rights.

Table 9.2–1 Forests by ownership and tenure 2007

Category	Ownership category						
	State	Municipal	Private	Community	Church	Agricultural co-ops	Unknown
	Forest crop land (ha / %)						
Ownership	799 067	189 875	275 164	493 261	62 313	4 195	109 067
	41.4	9.8	14.3	25.5	3.2	0.2	5.6
Tenure	1 072 765	171 639	139 824	502 677	40 810	5 227	—
	55.5	8.9	7.2	26.0	2.1	0.3	—

Source: *Compendium of Slovak Forestry Statistics*.

Prepared by: NFC-FRI Zvolen.

The area of forests used by private owners has increased since 2003 from 5.9 to 7.2 per cent. Meanwhile, the area of forests used by state subjects has fallen since 2002 by 6.8 per cent (from 62.3 to 55.5 per cent). State entities also manage 14.1 per cent of forests pending restoration of ownership rights, forests of unknown owners and leased forests.

Table 9.2–2 Forests by ownership and use

Subjects		2002	2003	2004	2005	2006	2007
		Forest crop land (%)					
State	Ownership	42.8	42.2	42.1	41.8	41.1	41.4
	Use	62.3	61.5	59.4	58.5	56.1	55.5
Non-state	Ownership	49.9	49.3	52.5	52.3	53.4	53.0
	Use	37.7	38.5	40.6	41.5	43.9	44.5
– Municipal	Ownership	9.7	9.7	9.9	9.7	9.8	9.8
	Use	8.7	8.7	8.7	8.7	8.9	8.9
– Private	Ownership	12.9	12.0	14.6	14.2	15.0	14.3
	Use	6.1	5.9	6.2	6.3	7.2	7.2
– Community	Ownership	24.0	24.3	24.4	24.9	25.3	25.5
	Use	20.6	21.6	23.0	23.8	25.5	26.0
– Church	Ownership	3.2	3.2	3.4	3.4	3.1	3.2
	Use	2.1	2.1	2.5	2.5	2.0	2.1
– Agricultural cooperatives	Ownership	0.1	0.1	0.2	0.1	0.2	0.2
	Use	0.2	0.2	0.2	0.2	0.3	0.3
Unknown ownership		7.3	8.5	5.4	5.9	5.5	5.6

Source: *Compendium of Slovak Forestry Statistics*.

Prepared by: NFC-FRI Zvolen.

9.3 Subjects managing and commercially exploiting forests

9.3.1 State forests

Forests owned by state are managed by state bodies, namely the Forests of the Slovak Republic, s.e., Forest-Agricultural Estate Ulič, s.e. (FAE), and the State Forests TANAP (SF TANAP). All these bodies are under jurisdiction of the Ministry of Agriculture. The Military Forests and Estates, s. e., Pliešovce (MFE SR) is a statutory unit of the Ministry of Defence. Atop the state forests, state bodies also manage unreclaimed forests and forests

leased from non-state subjects. For training purposes, the Forests of the Slovak Republic, s.e., leased 913 hectares of forest to the Forestry College (FC) Banská Štiavnica, 381 hectares to Forestry College Prešov, and 9 090 hectares to Technical University Zvolen. Forestry College Liptovský Hrádok has a standing training contract with the Forests of the Slovak Republic, s.e. and thus does not lease state forests.

Table 9.3.1–1 Key indicators of forests managed by state subjects

Indicator	Subject					Total
	Forests of the Slovak Republic, s.e.	SF TANAP	FAE Ulič, s.e.	MFE SR, s.e.	FC, TU	
Forest crop land (ha)	932 956	38 855	20 789	68 081	12 085	1 072 765
Growing stock (1 000 m ³)	217 345	6 084	4 132	14 765	3 225	245 551
Area of mature stands (ha)	165 225	3 570	2 345	14 762	2 806	188 708
Growing stock of mature stands (1 000 m ³)	65 559	1 316	875	5 017	1 345	74 112
Total current increment (1 000 m ³)	5 628	136	126	464	79	6 433
TCI per ha (m ³)	6.03	3.51	6.07	6.89	6.53	6.00

Source: *Compendium of Slovak Forestry Statistics*.

Prepared by: NFC-FRI Zvolen.

9.3.2 Non-state forests

Non-state forests include private, community, church, agricultural co-op and municipal forests. Most common legal and corporate forms represented in non-state sector include land associations with/without corporate entity status, Ltd companies, shared companies, natural persons with/without business licence, and special units (commercial, semi-budgetary) of municipal offices.

Table 9.3.2–1 Key indicators of non-state forests

Indicator	Ownership category					Total
	Private	Community	Church	AG ^{a)}	Municipal	
Forest crop land (ha)	139 824	502 677	40 810	5 227	171 639	860 177
Growing stock (1 000 m ³)	34 588	112 161	9 823	1 104	42 637	200 313
Area of mature stands (ha)	29 029	85 722	7 276	1 258	32 755	156 040
Growing stock of mature stands (1 000 m ³)	11 560	32 531	2 756	409	13 869	61 125
Total current increment (1 000 m ³)	903	2 998	240	31	1 058	5 230
TCI per ha (m ³)	6.46	5.97	5.89	5.89	6.17	6.08

Source: *Compendium of Slovak Forestry Statistics*.

Prepared by: NFC-FRI Zvolen.

Note: AC – agricultural cooperatives.

9.3.3 Commercial sector

The volume of operations realised by commercial units in 2007 is given in the following table:

Table 9.3.3–1 Operations realized by commercial units in forestry subjects

Subject	Artificial regeneration		Forest protection		Cleaning		Felling		Skidding		Timber haulage	
	ha	%	ha	%	ha	%	1 000 m ³	%	tis. m ³	%	1 000 m ³	%
Forests of the Slovak Republic, s.e.	4 262	100	33 140	100	15 492	99	4 073	95	4 042	96	2 217	60
SF TANAP	362	99	2 425	74	586	97	183	100	123	100	138	73
FAE Ulič, s. e.	0	0	0	0	591	65	30	51	28	47	2	3
State subjects under MA SR	4 624	99	35 565	97	16 669	97	4 286	94	4 193	96	2 357	60
MFE SR, s. e.	467	89	2 075	89	1435	89	316	92	294	92	175	86
FC, TU	20	49	174	41	173	62	30	51	35	60	2	3
Other state subjects	487	86	2 249	82	1608	85	346	86	329	87	177	68
Σ State subjects	5 111	98	37 814	96	18 277	96	4 632	94	4 522	95	2 534	60
Non-state subjects	2 200	54	9 444	33	6 859	78	3 413	92	3 039	93	1 784	71
Total	7 311	78	47 258	69	25 136	91	8 045	93	7 561	94	4 318	64

Source: NFC-FRI Zvolen (questionnaire for forest owners and tenurers).

Table 9.3.3–2 Operations realized by commercial units in the Forests of SR, s. e.

Year	Artificial regeneration		Forest protection		Cleaning		Felling		Skidding		Timber haulage	
	ha	%	ha	%	ha	%	1 000 m ³	%	1 000 m ³	%	1 000 m ³	%
2000	571	11	706	2	5 978	31	1 381	42	1 454	45	207	6
2004	3 714	85	28 729	87	15 835	89	3 234	87	3 224	89	742	21
2005	3 954	57	29 916	93	16 073	96	4 224	95	4 187	97	2 729	69
2006	4 126	100	31 512	98	15 677	99	3 767	96	3 680	96	2 148	63
2007	4 262	100	33 140	100	15 492	99	4 073	95	4 042	96	2 217	60

Source: NFC-FRI Zvolen (questionnaire for forest owners and tenurers).

9.4 Professional forestry bodies

9.4.1 National Forest Centre

The National Forest Centre (NFC) in Zvolen is a semi-budgetary entity established by MA SR. NFC in 2007 continued to respond successfully to challenges and realised its planned target goals, namely the following:

- Development of sectoral strategic and conceptual documents (Green Report, long-term sectoral development strategies, National Forest Programme, national parks zonation, etc.).
- Complex support for MA SR (Forest Protection Service, Seed Inspection, forest health monitoring, National Forest Inventory, public procurement of FMPs, etc.).



Figure 30 Building of the National Forest Centre.

- Development of legislative norms including acts and regulations on forests and hunting.
- Sectoral research on both the national and international level (sectoral research, projects managed by the Agency for Research and Development Support, 6th FP projects, international projects funded by global programmes and regional initiatives).
- Coordination of further education for forestry professionals with particular emphasis on continual life-long education of all categories of officers and workers including top managers.
- Methodological assistance and technical support for regional and district forest offices.
- Review and publishing of the national thematic map set with forestry and water management layers.
- Administration of sectoral information system, gathering and processing of forest data for bodies of state forestry administration, development of integrated web platform Forestportal.
- Elaboration of forest management plans.
- Compilation of studies, analyses, assessments, and supplementary documents for MA SR, forest owners (users), other agencies and sectors of the national economy, foreign clients, etc.

Table 9.4.1–1 NFC employee structure

Category		Employees to 31 December 2007
Employees in total		325
A.	Researchers	79
B.	Technicians and other staff	27
C.	Support staff	4
Research and development staff in total		110
D.	Administrative staff – university degree	113
E.	Administrative staff – high school degree	69
F.	Workers	33

Source: NFC 2008.

9.4.2 Other state funded forestry entities

Museum in St Antone

Since 1 January 2006, the museum also manages the Forestry and Wood Technology Museum in Zvolen. Last year, it continued to hold traditional events such as the 9th national competition *Wood Etudes – Wooden Interior Accessories* and the 6th *Green Objective* competition for young documentary photographers. The museum is also very active in organising forest-related events and activities for children. In 2007, it organised 11 talks for children about hunting and nature protection in which 622 of them participated. In addition, the 6th *Hypericum* competition, aimed to improve knowledge of schoolchildren



Figure 31 St. Hubert Days in Svätý Anton are organised in joint cooperation of the Ministry of Agriculture and the Slovak Hunting Union.

on animal and plant species, was held for 3-member school teams; another popular event – the 6th year of walk known as *Poltár Twig*, was held last year in cooperation with the Poltar town and FE Kriváň. Forestry and hunting related events and exhibitions included the following:

- *The Coburgs in Slovakia* exhibition as a part of a larger *Hunting and Relax* exhibition held at the Bratislava Incheba event centre.
- *Regional Exhibition of Hunting Trophies* held in cooperation with the regional organisation of the Slovak Hunting Union (SHU) in Žiar nad Hronom.
- *Hunting in Photography*
- *Unique Trophies of Šariš*
- *Unusual Trophies*
- *Hunting Year in Paintings of Jozef Lackovič* as a part of a *Forestry and Hunting* exhibition held in Košice.

Another annual event – *St Hubert Days*, which is a national hunting festival of international dimension, was as traditionally held in cooperation with MA SR and the Slovak Hunting Union. It was accompanied by a number of associating events such as the 11th *European Championship in Deer Calling*.

9.5 Interest groups and associations

9.5.1 Slovak Forestry Chamber

The Slovak Forestry Chamber (SFC) is a nationwide body of 235 members which:

- promotes and defends lawful professional, social and economic interests of its members,
- cooperates with non-governmental organisations in forestry and the environment area,
- cooperates with the Forests of the Slovak Republic, s.e. and associations of non-state forest owners in drafting national forest policy, sectoral development plans, and generally binding regulations and their executive orders.

In 2007, SFC among other activities also provided comments to the Forest Act amendment and Act on Forest Reproductive Material. It also co-organised an excursion to SF TANAP and issued statement on the ongoing public anti-forester campaign in TANAP related to the post-windthrow management of the area. The SFC Board also addressed the Slovak Prime Minister and the Parliament with a call from the foresters protest in front of the Government Office on 16 May 2007, which it helped to organise.

9.5.2 Associations of non-state forest owners

There were four associations of non-state forest owners (ANFO) active in Slovakia last year. Members of these associations in between them own 584 920 hectares of forests; additional 275 257 hectares of forest (32 per cent) are in hands of unorganised non-state forest owners. The Council of the Non-state Forest Owner Associations (CNFOA), an informal umbrella body of non-state forest owners representing the interests of the Slovak

Association of Municipal Forests, the Slovak Union of Republic Associations of Non-state Forest Owners, the Slovak Union of Diocese Forests and the Union of Owners of Private, Community and Municipal Forests of Banská Bystrica Region, was established on 1 January 2006. The CNFOA mission is to coordinate efforts in promoting rightful interests of non-state forest owners. Among other activities, CNFOA last year commented on the Forest Act amendment, the nature and landscape protection bill, the hunting bill and the nfp draft. CNFOA also joined the protest meeting held in front of the Government Office on 16 May 2007.

9.5.3 Association of Forest Sector Employers

The Association of Forest Sector Employers (AFSE) was in 2007 joined by the Municipal Forests (MF) Bratislava, MF Jelšava, MF Brezno and MF Mníšek nad Hnilcom to put the number of member municipal forest employers to 15. The total number of its members thus increased to 25. Association members met ad-hoc if needed and strived to promote interests of employers in negotiations with the Trade Unions and in submitted labour law claims.

9.5.4 Slovak Hunting Union

The Slovak Hunting Union (SHU) unified last year more than 56 thousand hunters in organised in 1340 hunting associations jointly managing 3 028 734 hectares of forest. The Union belonged in 2007 to one of the largest interest groups in Slovakia. It is a member of numerous international organisations such as CIC, FACE, FCI and IAF.

One of the main priorities of SHU is to improve knowledge of its members and non-hunting public and to promote moral and ethical principles of hunting including its traditions. The Union supported mission of hunting is to enhance ecological services and benefits of forests – i.e. to ensure sustainable management of game species and their gene pool without compromising natural diversity of species. In addition, SHU cooperates with the State Veterinary and Food Authority on prevention and mitigation of wildlife diseases, assists with conservation of protected animals and their habitats, and cooperates with state administration on hunting.

In 2007, the Union held its 9th Assembly and actively participated in drafting legal norms related to hunting. SHU and its district/regional associations focused their attention on issues of hunting and the environment, hunting sport, legislation, economics, inspection, hunting education and cynology.

SHU also organized various cultural events associated with the Month of Hunting, trophy exhibitions, and other events of regional and national importance.

9.5.5 Council for Economic and Social Understanding in the Forest Sector

The Council is formed by three representatives from each of the following: MA SR, the Association of Forest Sector Employers and the Trade Unions of Timber, Forest and Water Industries. In 2007, the Council participated in negotiations on the amendment of the Social Insurance Act and commented on the 2008 State Budget Act.

9.5.6 Slovak Forest Certification Association

The Slovak Forest Certification Association (SFCA) was established as an independent voluntary professional association of legal entities with interests in forest sector. Its prime objective is to promote sustainable forest management practices, concept of wood as a renewable source of energy, consumption of wood-based products, nature conservation and sustainable societal development. At present, SFCA has 16 members divided by their interests into 3 main chambers: the Chamber of Forest Owners; the Wood-processing Industry Chamber; and the Chamber of Other Interest Groups.

SFCA is also a member of the PEFC Council (Programme for the Endorsement of Forest Certification schemes) which is an independent, non-profit, non-governmental organisation promoting sustainably managed forests through independent third party certification.

9.6 Forestry Information System and forestry statistics

Forestry Information System (FIS) is a multi-spectral information system managing a number of subsystems including production, socio-economic, ecological-environmental and research subsystems. Its most important component is the Forest Sector Information System.

9.6.1 Forest Sector Information System

The Forest Sector Information System (FSIS) was developed to provide a fully-fledged information base for the sector. FSIS is rooted in legislation and is based on binding information standards and defined data flows. It provides up-to-date integrated data on forest condition and standard of forest management. One of its inherent components is also the Thematic State Map Set on Forests (TSMSF) which when combined with textual and numeric data provides for a wide range of data localisation and geospatial analyses. FSIS and TSMSF are administered by the National Forest Centre – Institute for Forest Resources and Information Zvolen. The system is hierarchical and integrates a number of specialised subsystems including subsystems on forest conditions, Forest Record, forest ownership and tenure, sectoral statistics, timber markets, GIS, etc. Data used by particular subsystems are processed and stored in the Data Bank. FSIS outputs

are provided alternatively in printed, file and network digital format (Internet – www.forestportal.sk).

9.6.2 Other information systems under the Forestry Information System (FIS)

There is a number of other IS in forestry differing in character and size. Their list includes the following: State Forestry Administration IS, State Forest Sector IS, Non-state Forest Sector IS, Forest Research IS, and Forest Tree Species Gene Pool IS, IS of state agencies outside MA SR, and Forest Sector Emergency IS.



10. RESEARCH, EDUCATION, CONSULTING AND PUBLIC RELATIONS

10.1 Forest research

Scientific and research projects commissioned under MA SR were in 2007 managed by the National Forest Centre – Forest Research Institute Zvolen (NFC-FRI Zvolen) in joint cooperation with its network of research stations in Liptovský Hrádok, Gabčíkovo, Banská Štiavnica, Košice and the Research Station and Museum (RSM) of SF TANAP. Research projects on forest-related issues were also conducted at the Faculty of Forestry (FF) of TU Zvolen and the Institute of Forest Ecology of the Slovak Academy of Sciences (IFE SAS) in Zvolen. These research and education establishments however do not belong into MA SR jurisdiction.

Scientific and research activities were mainly funded through various sectoral research projects, grants of the Agency for Research and Development Support (APVV), projects of the Scientific and Grant Agency (VEGA) of the Ministry of Education of SR and SAS, projects of scientific and technical collaboration, and applied research of the Ministry of Education of SR. A number of educational activities was also funded through projects of the Cultural and Educational Grant Agency (KEGA). Lastly, there was a group of activities supported from various developmental schemes of the aforementioned ministry.

Research projects primarily addressed newly arising sectoral issues, particularly those associated with global climate change, role of forests in cultural landscape, post-windthrow development in the Tatra Mts., and forest biomass use.

Table 10.1–1 Scientific & research projects

Organization	RP	APVV	VEGA	KEGA	Other
NFC-FRI Zvolen	4	14	—	—	21
RSM TANAP	—	1	—	—	2
FFTU Zvolene	—	5	22	3	8
IFE SAS Zvolen	—	5	9	—	—

Source: Special questionnaire of MA SR, 2008

Prepared by: NFC-FRI Zvolen

Note: RP – governmental and sectoral research projects

Table 10.1–2 Publications by research institution

Institution	No of published materials*				Other publications
	Book publications (scientific monography type)	Other book publications	Current scientific journals, patents and discoveries	Other reviewed publications	
NFC-FRI Zvolen	5	24	4	76	173
RSM TANAP	–	–	1	2	12
FFTU Zvolene	9	26	19	289	89
IFE SAS Zvolen	1	9	19	80	92

Source: MA SR questionnaire, 2008

Prepared by: NFC-FRI Zvolen

Note: *Publications based on the categorisation established by Ministry of Education Regulation No 13/2005-R of 31 August 2005 laying down rules for bibliographic registration and categorisation of publication activities and responses.



Figure 32 Research projects focus on global climate change and its impact on forest ecosystems – climatic extremes are also responsible for seasonal water deficit in mountain streams.

Scientific knowledge and research results are further disseminated by particular institutions and their staff in national and international periodicals and journals. In 2007, the following scientific periodicals were published: *Forestry Journal* and *Folia venatoria* (NFC-FRI), *Folia oecologica* and *Tichodroma* (IFE SAS), and *Acta Facultatis Forestalis* (FF TU).

In addition, over 20 conferences, symposia, seminars and workshops were held to present newest research achievements of which many were attended by foreign scientists and researchers (for more details see please Chapter 11).

10.2 Forestry education

Graduate and undergraduate courses and programmes in forestry subjects were offered at the Faculty of Forestry of TU Zvolen. In addition, there were three specialised forestry colleges (Banská Štiavnica, Liptovský Hrádok, Prešov) and four forestry apprenticeship schools (Banská Štiavnica, Bijacovce, Modra Harmónia, Tvrdošín) who provided a range of college courses and apprentice qualifications. In the academic year 2006/2007, a total of 128 forest engineers completed various graduate courses; in addition, 17 students completed last year their PhD courses. Forestry colleges and forestry apprenticeship schools last year jointly produced 558 qualified graduates. Forestry colleges were attended by 766 students of which 192 were 2007 graduates. Forestry apprenticeship schools were

attended by 796 students of which 366 completed their training in 2007.

Further education of forest sector workforce was last year centrally managed by the National Forest Centre – Institute for Forest Consulting and Education (NFC-IFCE Zvolen). It organised and managed a number of accredited educational seminars and trainings attended by more than 2 000 employees from various state and non-state forestry bodies.

The Centre for Further Education (CFE), which is formally attached to TU Zvolen, continued to run its Third Age University project and also held 17 courses focused on the implementation of newest research results into general forestry practice.



Figure 33 Graduates of the Faculty of Forestry of the Technical University in Zvolen find jobs in sectoral agencies and organizations.

Table 10.2–1 Courses available at FFTU Zvolen in 2006/2007

1st degree – Bachelor			2nd degree – Engineer			3rd degree– PhD		
Course	Form		Course	Form		Course	Form	
	Day	Distance		Day	Distance		Day	Distance
	Students / Graduates			Students / Graduates			Students / Graduates	
Forestry	290/0	84/0	Forestry	216/75	91/19	Forest planning	7/1	11/1
Applied zoology and game management	91/0	45/0	Forest ecology	34/12		Forest phytology	8/1	6/2
						Silviculture	8	7/1
			Applied zoology and game management	41/8		Mechanization of forest and agricultural production	7/4	6/2
			Management and economics of forest enterprises	44/14		Game management	6	4
			Geoinformation and mapping technologies in forestry			Hydro amelioration	4	4
						Plant protection	1	7
						Sectoral and diversified economics		12/2
						Ecology	1/2	5/1
Total	381/0	129/0	Total	335/109	91/19	Total	42/8	62/9

Source: MA SR questionnaire, 2008

Prepared by: NFC-FRI Zvolen

The Centre for Further Education (CFE) last year organised 60 different events for 1 131 participants. The areas covered included the following:

- integrated felling-hauling technologies;
- silviculture of broad-leaf forests;
- implementation of selection systems;
- development of forestry projects;
- agri-environmental measures in agriculture;
- legal and economic aspects of forestry business;
- financial and organisational stabilisation of forest enterprises;
- biomass as alternative source of energy;
- diversification of economic activities in rural regions.

The Third Age University is currently attended 23 students studying in 10 different courses. To date, the university produced 27 graduates in 3 different courses.

Table 10.2–2 Educational activities managed by NFC-IFCE Zvolen

Programme/course	No	No of participants
Specialised accredited courses for administrative staff	44	1 315
Verification of professional aptitude under the forestry operations programme	6	141
Language courses	24	37
Specialised management courses	32	164
Courses for college staff	3	84
Basic courses and trainings for forest workers	43	284
Public relations events	14	
Total	166	2 025

Source: NFC-IFCE Zvolen, 2007

Prepared by: NFC-FRI Zvolen

10.3 Advisory and consulting services

The Agricultural Advisory System (AAS) was established following the provisions of the *Strategy for the Sectoral Advisory System from 2007 onwards* developed in compliance with Council Regulation (EC) No 1782/2003 establishing common rules for direct support schemes under the common agricultural policy and establishing certain support schemes for farmers. This regulations directs the Member States to set up an integrated advisory system for farmers. Last year saw initial phases of its institutional development during which the scope of its services and statutes were defined. On top of that, educational projects for future advisors were accredited. NFC was commissioned to manage its forest sector strand. As a part of its opening activities,

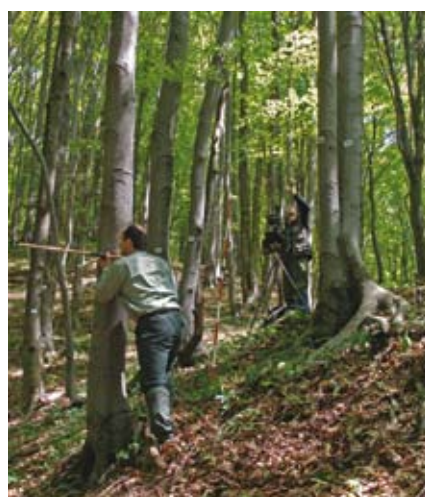


Figure 34 The National Forest Centre also provides advisory services.

NFC-IFCE Zvolen certified 15 natural persons and 2 legal entities as advisors for sectoral issues.

In 2007, advisory services were provided by NFC, IFE SAS Zvolen, FF TU Zvolen, bodies of state administration on forests, SF TANAP and also through editorials of the *Les/Slovenské Lesokruhy* magazine.

NFC last year provided advisory and assistance services in a number of areas including silviculture, forest protection, biomass use, EU mechanisms, and FMP elaboration. In non-state forest sector, 50 hours of consulting were provided for various subjects. FF TU Zvolen provided advisory services through its scientific boards and through the *Acta Facultatis Forestalis* magazine. IFE SAS Zvolen issued 41 expert statements and assessments related to environmental issues. SF TANAP organised 1 seminar on public footpaths and set up an information network on visitor facilities and services.

Bodies of state administration on forests, District Forest Offices in particular, provided direct support through various meetings with forest managing subjects and certified forest managers in areas under their jurisdictions. In addition, their staff routinely participated in general assemblies of various land associations.

The bimonthly magazine *Les / Slovenské Lesokruhy*, published jointly with MA SR, was in 2006 distributed in 5 000 circulation (6 issues). Special magazine supplements provided forestry public with free-of-charge copies of regulations enforced in forestry sector (including executive regulations).

10.4 Public relations

The key event of the newly developed *Sectoral Communications Strategy* was the opening year of the national *Forestry Days*. The event was organised in close cooperation of almost all most important sectoral subjects including the Forests of the Slovak Republic, s.e., Military Forests and Estates of the Slovak Republic, s.e. Pliešovce (MFE SR), SF TANAP, TU Zvolen, forestry colleges, St Anton Museum and its associate Forestry and Wood Technology Museum, Slovak Forestry Chamber, and a number of non-state forestry subjects represented by their national union.

In the course of the event, the Forests of the Slovak Republic, s.e. in cooperation with the Ministry of Education established more than 1 000 microarboreta at schools nationwide. The initiative fell into the framework of the *Trees of Knowledge Project*. The total number of planted trees exceeded 5 000. The project directly linked to the United Nations Environment Programme (UNEP) campaign appealing to European bodies to support planting of one billion trees in 2007. In addition to microarboreta establishment, other events associated with the 2007 *Forestry Days* took place.

The main objective of public relations activities, based on a wide range of different communication tools and methods, is to enhance public understanding of major forestry issues, promote forestry education and build up positive image of forestry among general public. There is a number of tools to imply in achieving this objective, one of which is using Internet tools (see please NFC website www.lesnapedagogika.sk).

In 2007, forest educators of both the state and non-state subjects organised a number of forest walks for nursery children, and basic/high school students. The walks aimed to improve their knowledge of forests and nature in general. Equally successful were



Figure 35 All major forestry subjects participated in organising 2008 Forestry Days.

regular visits to 150 children homes under the Forests of the Slovak Republic, s.e. project *Christmas Tree Just for You*. In addition, forest educators continued in visits to the basic school at the Children Hospital in Banská Bystrica.

Forestry institutions last year also ran a number of cooperative projects focused on environmental education such as the *Levice Hunting Days*, *Tree Day* in Open Air Forestry Museum in Vydrovo, *Forests to Children* near Počúvadlo Lake, and the *St Hubert Days*. SF TANAP organised a yearly educational competition known as *Travelling Owl*. This competition represents an annual highlight of their long-term work with 25 basic schools of the Tatra region.

Last year, the Forests of the Slovak Republic, s.e. through their *Special Forestry Sites* initiative designated 9 sites important for their historic, social and cultural links to forestry. The company also continued in their initiative of establishing a network *Forest Information Centres*. These centres, which are formally attached to respective FE and FD, have since their opening greatly improved visitor infrastructure in many areas of Slovakia. The initiative also includes publishing of regional maps depicting sites of special visitor interest.

A number of new forest nature trails were opened last year by various forestry subjects. These trails are very popular among public, children in particular. Except their informing, educating, and guiding values they also improve site aesthetics. SF TANAP focused their efforts on the reconstruction and improvement of path surfaces to make them wheelchair-friendly.

One of the best forms of presentation of diversity of forestry practice are various thematic exhibitions. Last year, SF TANAP organised the *Bark Beetle*, *Bears in TANAP*, and the *Tatra Fires* exhibitions.

As for international events, the DREVO – LES 2007 exhibition was held in the Nitra Agrokomplex Fair Centre on 23 – 26 October 2007. A number of important forestry entities including private forest owners took this opportunity to present in the LES 2007 pavilion

their most outstanding achievements. On 450 m² of the exhibition area they presented public with a brief yet complex insight into forestry. In addition, they promoted innovative approaches to wood processing, using forest waste for energy, seed management and silviculture. In the course of the events, main advocates of public involvement officially “christened” a new edition of *Green Calendar*.



11. INTERNATIONAL INITIATIVES

Last years' cooperation of Slovak forestry bodies with foreign partners was based on the established commitments, agreements and ongoing bilateral research and education projects as well arising opportunities (project calls, offers for project partnerships, etc). Prolific international dialogue is the best window for making Slovak forestry seen and heard, particularly with respect to global and Pan-European processes on forest policy, ongoing climate change, and other environmental concerns.

Ministry of Agriculture (MA SR)

In 2007, MA SR continued to participate in international processes on both the regional and global levels. International obligations and engagements were met in close cooperation between its Forestry and International Coordination Departments. The following list contains most important processes and events in which the Ministry in cooperation with NFC regularly participates:

- United Nations Forum on Forests (UNFF)
- Committee on Forestry (COFO)
- EU Council Working Group on Forests
- EC Standing Forestry Committee (SFC)
- Ministerial Conference on Protection of Forests in Europe (MCPFE)
- UNECE Timber Committee (TC UNECE)

National Forest Centre (NFC)

In 2007, NFC was a coordinating body of a number of international initiatives and events directly associated with its scientific, research, educational, consulting, developmental and planning activities, most important of which were the 5th Ministerial Conference on Protection of Forests in Europe held in Warsaw, TC UNECE Integrated Programme of Work, and EUROSTAT.

In the area of international research, NFC-FRI strived last year towards full integration of Slovakia into the structures of the European and global common research area to provide basis for future involvement in international scientific consortia.

Last year, NFC became a national focal point for the 7th EU Framework Programme thematic priorities *Environment and Energy*. As a result, close links with the Forest Technology Platform (FTP), Forest Based Industries (FBI) and research coordinating offices in Brussels (CZELO, POLSCA) were established.

In cooperation with Banská Bystrica regional authority, NFC participated in the initiative *Clusters Linked over Europe* (CLOE) with view of establishing a regional forestry-timber industry grouping promoting transfer of know-how and creating research-education-business partnerships.

NFC in 2007 successfully implemented a number of actions associated with the membership in the European Forestry Institute (EFI) and its project centres (CONFOREST, INNOFORCE), and in the IUFRO and COST working groups.

From a number of scientific events organised by NFC, the following were of the highest priority: 23rd ICP Forests plenary working session held under the *International Co-operative Programme on the Assessment and Monitoring of Air Pollution Effects on Forests*;



Figure 36 International activities organised by Slovak forestry bodies represent one of the best tools of enhancing worldwide credit of Slovak forestry.

international seminars the *Contemporary Issues of Forest Protection 2007*, *Contemporary Aspects of Forest Nursery, Seed Management and Artificial Forest Regeneration*, and *Contemporary Issues of Forestry Economics in Slovakia*; international meetings under the EQUAL project *Gender Mainstreaming Strategy for Employment in Mountain Rural Areas in Slovakia*; and finally the international CZELO workshop.

TU Zvolen organised last year the international conference *Bioclimatology and Natural Hazards* which focused on climate change impacts on forests. The conference was held in Zvolen (Poľana) on 17–20 September. Its participants formulated 7 key messages addressing open questions and demanding attention particularly in Eastern and Central Europe. They read as follows: Risk increase. Ecosystems have a memory. Species cannot go anywhere. Landscapes carry values. There are priorities. Eastern Central Europe (ECE) is relevant. The human potential is underestimated.

NFC in 2007 participated in projects of the 6th FP, INTERREG, projects of official developmental assistance (ODA), and activities held under MASCAREF and EUFGIS. Under development was the proposal for a project under the 7th FP.

NFC also took part in COST actions (E42, E43, E45, E51, E52) considered a very successful tool for promoting European scientific and technical cooperation and EU partnerships. There were also two Leonardo da Vinci projects addressing education issues – i.e. PAWS forest pedagogy project and a bilateral project with Finland dealing with informal education. In the area of international promotion of public involvement, NFC took part in the activities of EFC UN/FAO Forest Communicators Network. These activities were managed by the working group for intra- and cross-sectoral communication and public relations in forestry.

Technical University Zvolen

In 2007, the university celebrated the 200th anniversary of graduate forestry education in Slovakia and the 55th anniversary of forestry and wood science in Zvolen. Results achieved last year again confirmed the importance of integration into the European educational and research platform. In order to receive international credit, it is imperative for the university to acquire membership in acclaimed professional and academic organisations. At present, its current membership list includes IUFRO, EFI, PRO SILVA, IAWS, IAWA, and FPS.

The university is working towards maximising opportunities for student and lecturer mobility through Erasmus, Leonardo and CEEPUS programmes. In the academic year

2006/2007, 17 students from 6 different countries were hosted by the university through the Erasmus programme. At the same time, 11 university lecturers were hosted by foreign universities (only insufficient language skills prevent these numbers to be higher). The university through its Faculty of Forestry (FF) participated in actions held under the Innovations in Forestry (INNO-FOREST) programme. As for Leonardo da Vinci, the university participated last year in 2 programmes focused on the promotion of professional education ENTRACOP and Media Nature.

In addition, FF TU organised 2 international summer schools- i.e. the International Summer School DAAD (Spatial Modelling and Information Systems in Forestry and E-learning Aspects) and the international summer school organised under the Network of Excellence (NoE) instrument of the 6th FP EVOLTREE (Evolution of Trees as Drivers of Terrestrial Diversity).

In 2006/2007, 60 foreign students enrolled on courses offered by the university.

The majority of university run international projects were funded under the 6th FP and held by FF. The university was also very active in COST events.

One of the most important international events of 2007 held in Zvolen was the EFORWOOD-week Zvolen, an international scientific conference of the Integrated Project of the 6th FP. The conference was attended by 94 leading European scientists and science managers from prestigious forestry research and scientific bodies.

Institute of Forest Ecology SAS

In 2007, IFE SAS continued in activities associated with membership in international scientific organisations and unions such as IUFRO (International Union of Forest Research Organizations), the National Committee of MAB/UNESCO, EUROBATS (The Agreement on the Conservation of Populations of European Bats), ISHS (International Society for Horticultural Science), etc. In addition, the Institute was also represented on editor boards of 2 foreign magazines (*Folia zoologica*, *Sylvia*). Furthermore, it participated in one 6th FP project, several bilateral projects and a number of other projects funded or co-funded from foreign sources.

IFE SAS hosted last year 4 international scientific events and send 23 of its researchers abroad (9 countries). At the same time, the Institute was visited by 21 scientists from 4 different countries.

Forests of the Slovak Republic, s.e.

In March 2007, the European State Forest Association (EUSTAFOR), a forum for the European state forest organizations, held its General Assembly in Brussels. The assembly was attended by all its member organisations including the Forests of the Slovak Republic, s.e. At the assembly, the members agreed on the programme and tasks for the new planning period.

The organisation continued last year in cooperation with state forest enterprises of neighbouring countries. Meetings with Polish, Czech and Hungarian foresters were associated with development of joint projects, exchange of officers and organisation of bilateral working seminars.

Forestry colleges and apprenticeship schools

Majority of international activities were associated with the participation of schools in

international projects and initiatives such as INTERREG IIIA (Composting, Separation, Compost) with FAS Modra-Harmónia as one of the partners, and Leonardo da Vinci (student exchange) with FC Banská Štiavnica and Liptovský Hrádok as partners.

Forestry apprenticeship schools (FAS) also organised a number of their own events such as an international competition to test dexterity of young foresters, *Salamander Days*, the *25th Memorial of D. Višňovca*, *Banská Štiavnica Woodcarving Days* (all events organised by FAS Banská Štiavnica), Sawyer 2007 – the official *Timber Sawing Championship* of the Slovak and Czech Republics, *Forestry Schools Championship* (both events held by FAS Tvrdošín), and, lastly, the international meeting of MULFOR representatives (FC Banská Štiavnica).

SFTANAP

SF TANAP has a long established cooperation with the Polish Tatrzańskym parkom narodowym and the Czech Krkonoše National Park that primarily covers multiple aspects of forest management, nature conservation and public relations issues. Through its research station, SF TANAP have also been involved in cross-boundary research studies on the backwashes of the 2004 calamitous windthrow.



12. INDUSTRIES AND INITIATIVES ASSOCIATED WITH FORESTS AND THEIR FUNCTIONS

12.1 Nature and landscape protection

Forests represent the commonest and most diverse terrestrial ecosystem. Their landscape-ecological and environmental contributions are multiple and irreplaceable. Forests play a decisive role in the creation and conservation of the environment and maintenance of ecological balance.

Protected areas (PA) are usually designated in regions less impacted by anthropogenic and development activities. These “underdeveloped” areas

are very often covered by forests and majority of them are unsuitable for agriculture production. Average forest cover in protected areas is at 72.6 percent, much higher than equivalent for a forest land – arable land rate. Figure 12.1–1 shows the area of forest impacted by management restrictions defined by the Act on Nature and Landscape Protection.

The nature and scope of anthropogenic activities are in the majority of protected areas (except for Special Protection Areas – SPA) regulated by a particular level of protection defined by the Act on Nature and Landscape Protection. At present, areas with special nature conservation values fall into the 2nd–5th level of protection. The 1st level of protection with the lowest degree of management restrictions is applied for so-called *open countryside* situated outside protected areas. The range of management restrictions increases with every subsequent level of protection. A total ban on any kind of management intervention is applied only in the strictest 5th level of protection.

Restrictions imposed by the 2nd – 4th level of protection mainly include those associated with a limited use of pesticides and fertilisers, construction of forest roads and other structures, collection of forest berries and hunting activities. Nevertheless, the implementation of restrictive management might also compromise the interests of nature conservancy since a particular protection regime might not fully provide for the conservation of natural values for which a particular protected area has been designated. The current network of protected areas also features ecosystems in which full restoration of natural biodiversity is just hypothetical because of occurred changes. These include forest plantations, locust stands, etc. Moreover, protection of large tracts of land is resources demanding. Should this be added by compensations for management restrictions the budget allocated for nature conservation measures would be seriously topped. Therefore, the Ministry of the Environment has taken the decision to *review the current network of PAs* with the objective to exclude from the protection the least valuable areas. The review nevertheless shall not include the national network of Natura 2000 sites.

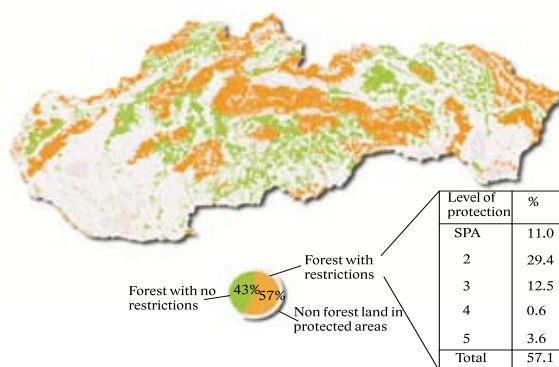


Figure 12.1–1 Forests under management restrictions

Source: MASR, 2007

Prepared by: NFC-FRI Zvolen

The ongoing process of *zonation* of protected areas has been marked by efforts of some conservation groups to disproportionately enlarge the area of intervention free A zone regardless of particular ecosystem conditions. Upon the completion, all National Parks (NP) and Protected Landscape Areas (PLA) shall be divided into management zones. Small-scale protected areas (SSPA) now situated within NP and PLA borders should be cancelled and attached to particular management zones.

Table 12.1–1 Protected areas by particular protection level and category

Protected area		Protection level (ha)					Total
		1	2	3	4	5	
Protected Landscape Area (PLA) ¹		—	354 450	—	—	—	354 450
National Park (NP) ¹		—	—	225 286	—	—	225 286
NP buffer zones		—	117 885	—	—	—	117 885
PLA ² and NP ³ zones, (area in ha reduced by SSPA area)	A	—	—	—	—	1 107	1 107
	B	—	—	—	3 921	—	3 921
	C	—	—	15 826	—	—	15 826
	D	—	28 667	—	—	—	28 667
Small-scale protected areas (SSPA)	(National) Nature Reserve ((N)NR)	—	—	—	5 427	67 270	72 697
	(National) Nature Monument ((N)NM)	—	—	—	1 022	342	1 364
	Protected Landscape Element (PLE)	—	—	—	3	—	3
	Protected Site (PS)	—	—	62	1 232	—	1 294
	SSPA buffer zones	—	—	327	1 028	—	1 355
Special Areas of Conservation (SAC) outside the national network of PA		—	67 748	—	—	—	67 748
Special Protection Areas (SPA) outside SCI and the national network of PA		212 044	—	—	—	—	212 044
Total		212 044	568 750	241 501	12 633	68 719	1 103 647

Source: MA SR, 2007.

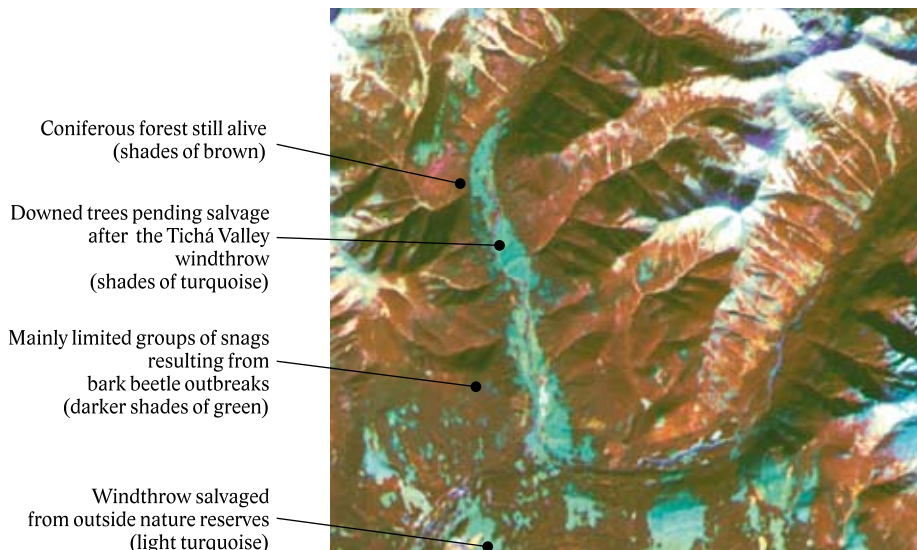
Prepared by: NFC-FRI Zvolen.

¹area after SSPA subtraction, ²zonation completed only in PLA Horná Orava, ³zonation completed only in NP PIENAP.

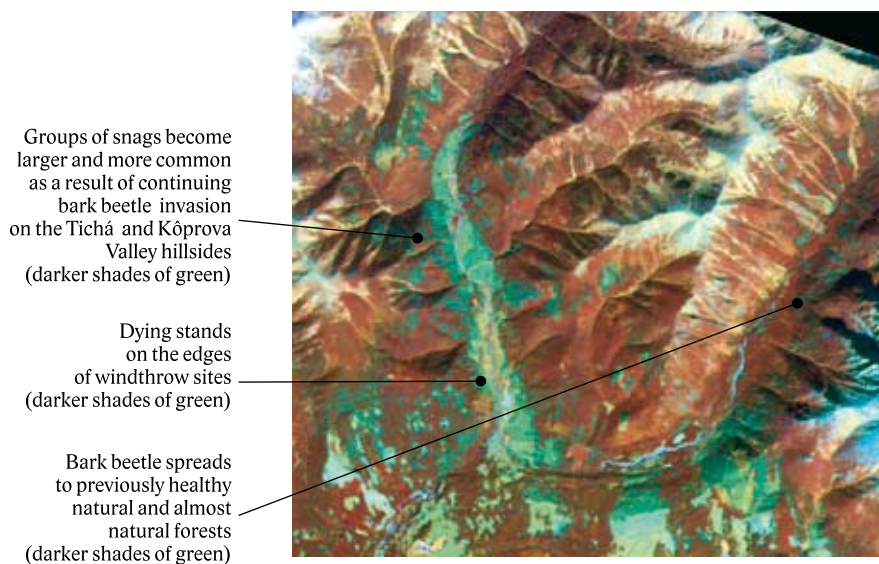
Intervention-free areas with the strictest level of protection should be designated only on sites on which a favourable ecosystem status is sustained without human intervention including disturbance events of a calamitous scale. The concept of those conservation groups promoting conservation of natural processes on protected sites is for forestry practice utterly unacceptable. They argue that allowing any area to develop without human intervention represents value on its own. On the top of promoting designation of intervention-free zones, they also



Figure 37 Bark beetle species preferably attack most valuable mature stands of protected areas significantly compromising their natural values.



23 September 2007



13 September 2008

Figure 12.1–2 Trends in bark beetle induced forest decline in the National Nature Reserves Tichá and Kôprová Valley in the period between 23 September 2007 and 13 September 2008.

Source: Spotimage satellite imagery [SPOT 4 (2007), SPOT 5 (2007), 10 m, IR-SWIR-R composition of bands] purchased by the Forests of the Slovak Republic, s. e.

Prepared by: NFC-FRI Zvolen.

hamper implementation of measures prescribed to control insect outbreaks in PAs. Such approach has resulted in many mountain forest reserves turning into epicentres of bark beetle outbreaks from which these spread further to adjacent forest stands. Another of hotly debated points of conflict last year was the protection status of buffer zones around PAs. These zones are currently under the 2nd–4th level of protection despite the fact that they do not meet the protection criteria for PAs. Their primary function is to protect PAs against potentially harmful impact of surrounding area and hamper spreading pests from PAs to adjacent grounds. Nevertheless, buffer zones (BZ) are among conservationists considered an unofficial extension of PAs with all their attributes applied. Buffer zones around NPs are under the same level of protection as PLA and their total area currently exceeds the half of the total PLA area. The Ministry of the Environment included reassessment of buffer zone areas in their review of PA network. It is thus expected their area to fall considerably in the near future.

Natura 2000 – Sites of Community Importance

The national list of proposed Sites of Community Importance (pSCIs) was adopted by Decree of the Slovak Government No 239/2004 from 17 March 2004 and its subsequent announcement in Order of the ME SR No 3/2004-5.1 from 14 June 2004. This official commitment started development of a national network of Natura 2000 sites, an integral part of a wider European network of these sites. The list contains 382 pSCIs on the total area of 573 690 hectares. On some 86 per cent, they overlap with the current national network of protected areas. Owing to this fact, their level of protection has for the time remained unchanged. The remaining 14 per cent situated on presently unprotected land have been placed under the interim 2nd level of protection.

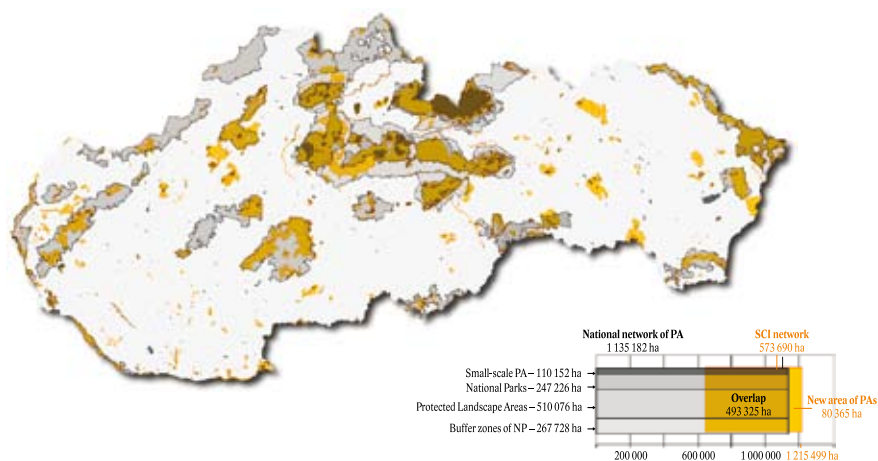


Figure 12.1–3 National network of protected areas and SCI network (Natura 2000).

Practical experience has shown that the Slovak protection classification is largely incompatible with the European legislation. One of the implications is that applied management restrictions often significantly exceed those prescribed for the 2nd level of protection. In many cases, conservationists take advantage of the controversial § 6, Sec.1 of the Act No 543/2002 Coll. on nature and landscape protection which obligates any possibly detrimental intervention carried out in the habitat of the European or national

importance to be approved by the local District Office for the Environment. Provisions of this paragraph are most often used in pSCIs, but they can be applied on the whole territory of Slovakia. Since the interpretation of terms “to damage habitat” and “to destroy habitat” is rather non-uniform, this paragraph can theoretically be applied to almost any forest management measure resulting in significant yet futile management restrictions.

The implementation of Habitats Directive has so far led to further restrictions in standard forest management practices not only in new PAs but also in the majority of old PAs under the 2nd – 4th level of protection. More or less unchanged remained only the 5th level of protection. Nevertheless, the issuance of permissions and exceptions has become more complicated (complaints submitted to EC are blocked for more than a year at times).

Natura 2000 – Special Protection Areas

Special Protection Areas (SPAs) represent another category of Natura 2000 sites. The national list of proposed Special Protection Areas (SPAs) was adopted by Decree of the Slovak Government No 636/2003 from 9 July 2003 and includes 38 areas. In subsequent years (2005, 2006) the Government approved additional five areas. In 2007, ME SR drafted regulations to all areas previously lacking them. Consultations on these regulations were launched at both the cross-sectoral and institutional level including deliberations of all regulations with non-governmental organizations and forest owners/users. Further 14 regulations came into force on 1 February 2008. The total area of proposed and designated SPAs currently amounts to 1 154 111 hectares of which 51.6 per cent overlap with the existing network of PAs. The area of already designated SPAs covers 357 667 hectares.

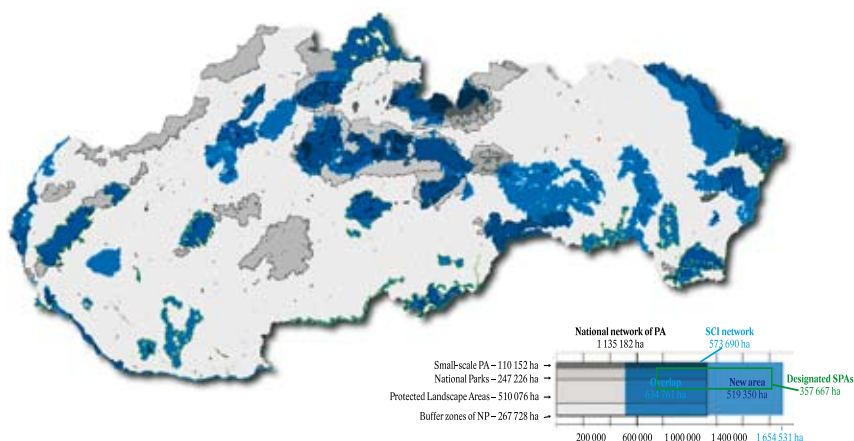


Figure 12.1–4 National network of protected areas and SPA network (Natura 2000).

12.2 Water management

One of the top priorities of forest management is to enhance fulfilment of water conservation functions and services provided by forests since these have a significant impact on both the water cycle and quality in any form of cultural landscapes. Forests are known to have an ability to reduce surface runoff and protect against soil erosion. This ability considerably



Figure 38 Forests significantly influence water quality and its cycle in landscapes.

improves infiltration of rainfall into groundwater aquifers, reduces risk of flooding and content of sediments in surface waters. These services can temporarily be limited in first few years of forest development (establishment of new generation of forest) or in cases of inappropriately designed forest road networks. Given the societal and economic dimension of these services it is highly desirable to ensure their sustainable development. In order to do this, forests need to be managed systematically. Timing and spatial arrangement is especially crucial in the regeneration stage. International research in areas devastated by large-scale bark beetle outbreaks has shown that snag stands suffer from impaired hydric functions. Conclusions of this research are especially worrying for further development of TANAP and other PA sites hit by calamitous outbreak. Although hydric services are generally provided by all forests, their importance considerably increases on extreme sites (e.g. steep slopes), in higher altitudes (headstreams), and around sources of drinking water. Water management companies thus often request these forests be included in the category of special-purpose forests designation of which is based on the forest planners' recommendation.

Despite the ever growing importance of hydric services for the society, the area of forests having hydric services as the primary function has slipped in recent years from 1.42 to 1.21 per cent of the total forest area. These services were high on the agenda of the 5th Ministerial Conference on the Protection of Forests in Europe held in Warsaw on 5–7 November 2007. One of its main documents – Warsaw Resolution 2: “*Forests and Water*” openly calls for sustainable development and enhancement of water-related forest services based on afforestation and reforestation of suitable lands; restoration of degraded forests, particularly in floodplains and upper watershed areas; improvement of

political instruments supporting these services; and enhancement of education services improving public awareness on the relationship between forests and water. The document also draws attention to the impact of climate change on forests-water relationship and recognises the importance of development of more effective mechanisms to support these services. Slovakia has recognised the importance of hydric functions and the need for their further sustainable development in her *nfp* (Priority 7 – Maintenance and Enhancement of Protection Functions of Forests under the Strategic Objective 3 – Enhancement of Quality of Life).

12.3 Technical amelioration and minor watercourses

Technical amelioration (TA) and torrent control (TC) in forests are according to the Act No 364/2004 Coll. on waters and on the amendment of the Act of the Slovak National Council No 372/1990 Coll on offences in the wording of the pursuant regulations (Water Act) and Act No 666/2004 Coll. on flooding control the responsibility of respective forestry bodies. Nevertheless, the current volume of financial resources budgeted for these activities is far too insufficient to support new investments and maintenance of old constructions slowly falling into disrepair. The Forests of the Slovak Republic, s. e. last year invested only 5.6 million SKK into torrent control measures while 53.7 million SKK was invested into repair and maintenance of TA and TC structures. At the same time, FAE Ulič invested into the latter mentioned only 0.6 million SKK.

State entities managed by MA SR last year oversaw 17 855 km of minor watercourses (MW); 12 km was meanwhile transferred to the Slovak Water Company. State entities administered by MD SR and specialised schools managed 655 km of minor watercourses; additional 37 km was transferred to the Slovak Water Company. Last year's spring and summer flooding cost forest sector the total of 13.4 million SKK in direct damage, of which 4.25 million SKK was on minor watercourses. In order to partially compensate for damaged and disturbed flood control barriers the Government Decree No 255/2008 awarded the Forests of the Slovak Republic, s. e. 2 175 thousand SKK to correct the damage. Further 200 thousand SKK was paid out to cover the cost of safety operations. The total cost of flooding caused damage is given in Table 12.3-1.

Table 12.3–1 Damage on watercourses managed by state entities (1 000 SKK)

	2000	2001	2002	2003	2004	2005	2006	2007	Total
Damage	30 850	5 165	55 448	0	11 006	9 760	31 265	4 250	147 744
Compensated	8 247	385	26 420	0	3 889	0	0	2 375*	41 316*
Difference	-22 603	-4 780	-29 028	0	-7 117	-9 760	-31 265	-1 875*	-106 428*

Source: Information on economic results of state forestry enterprises and organizations for 2007.

Prepared by: NFC-FRI Zvolen.

* adjusted using post-deadline data.

12.4 Wood-processing sector

Sectoral performance trends and key fiscal indicators are given in Tables below.

Table 12.4–1 Volume of timber processed by wood-processing sector (1 000 m³)

Industry	Actual volume			Projection for 2008	Outlook for 2009
	1990	2006	2007		
Timber industry	2 300	4 271	4 285	4 400	4 400
Pulp & paper-making industry	1 880	2 313	2 333	2 400	2 400
Σ Wood-processing sector	4 180	6 584	6 618	6 800	6 800

Source: ME SR, 2007.

Prepared by: NFC-FRI Zvolen.

Table 12.4–2 Selected sectoral fiscal indicators (million SKK)

Indicator	Industry	Actual figures				Projection for 2008	Outlook for 2009
		1990	2005	2006	2007 ^a		
Revenue	TI	9 138	19 940	22 200	24 209	25 000	25 000
	PPI	29 564	45 343	46 500	47 230	50 000	53 000
	Total	38 702	65 283	68 700	71 439	109 500	109 500
Costs	TI	9 455	19 166	21 800	23 284	24 000	24 000
	PPI	28 225	43 635	44 100	44 785	46 000	50 200
	Total	37 680	62 801	65 900	68 069	70 000	74 200
Gross economic result	TI	-317	774	400	925	1 000	1 000
	PPI	1 339	1 708	2 400	2 445	2 500	2 800
	Total	1 022	2 482	2 800	3 370	3 500	3 800

Source: ME SR, 2007.

^aProjection for 2007.

Prepared by: NFC-FRI Zvolen.

Notes: TI – timber industry, PPI – pulp & paper-making industry.

Table 12.4–3 Production and consumption of wood-based products (m³ and tonnes per capita)

Grade	1990	2000	2006	2007
Lumber production	0.269	0.191	0.453	0.515
Lumber consumption	0.260	0.290	0.245	0.334
Wood chipboard production	0.057	0.043	0.123	0.124
Particleboard production	0.057	0.046	0.123	0.124
Particleboard consumption	0.012	0.012	0.026	0.027
Fibreboard consumption	0.090	0.090	0.026	0.027
Pulp production (tonnes)	0.085	0.114	0.116	0.117
Pulp consumption (tonnes)	0.076	0.114	0.116	0.117
Paper and cardboard production (tonnes)	0.082	0.173	0.165	0.166
Paper and cardboard consumption (tonnes)	0.061	0.154	0.096	0.098

Source: ME SR, Statistical Office SR, NFC-FRI Zvolen.

Prepared by: NFC-FRI Zvolen.

Tables indicate a highly stable position of pulp & paper-making industry among other sectors of national economy. Development of this industry has been further fuelled by a long-term interest of foreign investors. Interannually increased volumes of processed low quality hardwoods helped to solve marketability of this grade and its export abroad.

12.5 Use of wood and other renewable resources for energy production

The use of wood for energy has become increasingly important. Although wood is the oldest source of energy it has only recently regained recognition. Ever rising prices of fossil fuels, increasing dependency on energy imports from insecure regions, and the effects of climate change are challenges that European society and politicians can not ignore. The EU is thus putting in place an ambitious energy policy covering the whole range of energy sources. One of the main priorities of the policy is to strive for improved use of renewables (solar, wind, biomass, geothermal, hydro-electric and tidal). At present, the EU 27 Member States cover only 13 per cent of their energy consumption from renewables, of which 7 per cent comes from biomass. In Slovakia, these rates are even more unfavourable – 5 and 2 per cent, respectively. In order to promote use of biomass seen by many as the most important renewables the Union adopted the Biomass Action Plan in 2005. The plan obliges its Member States to develop their own action plans based on biomass potential to promote its use in heating, electricity and transport. The plan also sets indicative renewable energy targets which include a 12 per cent overall share for renewable energy, a 21 per cent share in the electricity sector and a 5.75 per cent share for biofuels in 2010. In 2007, MA SR was commissioned to prepare the National Biomass Action Plan for 2008–2013. Soaring food consumption forces countries worldwide to optimise their use of arable land for food rather than biomass production. Wood biomass is thus seen as a welcome alternative to crop biomass.

Wood as an alternative source of energy has also returned to the attention of public. The public interest is gaining on momentum particularly in rural regions of Slovakia. Construction of larger size energy production facilities was in 2007 financed by investors and SOP managed by MI SR and ME SR. Three new facilities in the energy, industry and communal sectors were opened last year in Zvolen, Banská Bystrica and Revúca.

Table 12.5–1 Utilizable volumes of fuel dendromass (Biomass Action Plan)

Producer	Yearly volume (1 000 tonnes)	Energy equivalent PJ
Forest sector	2 432	28.6
Σ Wood processing facilities	1 835	22.0
Σ Communal sphere	300	3.6
Total	4 567	54.2

Source: NFC-FRI, 2008.

Prepared by: NFC-FRI Zvolen.

Note: The figures do not include wood sourced from agricultural land. Energy value of wood is given in moderately dry state in order to compare with crop biomass.

Forest sector has traditionally been the largest supplier of chipwood and firewood for industrial and home consumption. The Forests of the Slovak Republic, s.e., the largest producer of wood biomass in Slovakia, produced last year an estimated 150 thousand tonnes of chipwood of which approximately 20 thousand tonnes was exported abroad, mainly to Hungary. Smaller chipwood producers supplied additional 40 thousand tonnes of chipwood sourced from non-state forests and refuse from wood-processing industry.

Table 12.5–2 Yearly volumes of forest dendromass for energy production

Year	Chipwood		Fuelwood and other ¹⁾		Total	
	1 000 tonnes ²⁾	TJ	1 000 tonnes	TJ	1 000 tonnes	TJ
1990	2	19	368	3 496	370	3 515
2000	5	48	471	4 475	476	4 523
2005	120	1 140	640	6 080	760	7 220
2006	150	1 425	660	6 270	810	7 695
2007	190	1 805	670	6 365	860	8 170

Source: NFC-FRI, 2008.

Prepared by: NFC-FRI Zvolen.

Note: ¹⁾ fuelwood and waste wood, post-harvest debris and snags, ²⁾ chipwood and wood for chips production.

12.6 Hunting

In 2007, there were 1 826 hunting grounds of which 28 were independent hunting enclosures and 10 were pheasantries. In addition, 12 licensed hunting enclosures and 24 pheasantries were situated within the borders of existing hunting grounds. The average area of hunting grounds was 2 442 hectares which was 14 hectares more than in 2006, but 949 less than in 1990 (3 391 hectares).

The Forests of the Slovak Republic, s.e. in 2007 managed 136 self-operated hunting grounds with the total area of 511 995 hectares (11.5 per cent). Another 25 hunting grounds on 166 970 hectares (3.7 percent) were managed by other state subjects (MFE SR, s. e., Pliešovce, school forests, SF TANAP, FAE Ulič, s.e., others). Non-state subjects managed 72 self-operated hunting grounds with the total area of 198 309 hectares (4.4 per cent). Hunting associations (HA) managed 1 340 hunting grounds covering the area of 3 028 734 hectares (68 per cent). Furthermore, there were 253 hunting grounds with the area of 553 028 hectares (12.4 per cent) leased by non-members of the Slovak Hunting Union (SHU). As in previous years, the most substantial growth was recorded in the category of leased hunting grounds independent of SHU (up by 11 with the area of 38 430 hectares).

The largest hunting grounds were in the category of state subjects (6 679 hectares on average) and the Forests of the Slovak Republic, s.e. (3 765 hectares). These facilities are central for breeding of ungulates in all recognised hunting regions. The smallest average area was in the category of leased hunting grounds (2 103 hectares) and hunting associations (2 260 hectares). The total area of hunting area was 4 459 thousand hectares of which 2 334 thousand hectares was on agricultural land, 1 996 thousand hectares on forest land, 51 thousand hectares on waterbodies and 78 thousand hectares was on other land. Interannually, no major changes in hunting ground statistics were reported.

Main game species

Spring stock figures for ungulates excluding wild boar (correct to 31 March 2007) were higher than a year earlier. Observed growth in numbers of ungulate species is highly undesirable because of damage to forests and agricultural crops. Despite the improvement on the 2006 shooting records, the number of shot specimens was still significantly below the planned figures. In the category of small game species, spring stocks increased in rabbit and wild turkey populations, but declined in pheasant, hare and partridge.

Table 12.6.1–1 Ungulates and small game species

Species	No of specimens						
	Spring stock	Plán	Shooting	Trapping	Mortality	Total	Re-stocking
Red deer	41 287	16 870	13 961	41	1 183	15 185	52
Fallow deer	8 125	3 327	2 686	44	160	2 890	66
Mouflon	9 909	3 863	2 628	273	131	3 032	132
Roe deer	89 439	25 464	18 932	2	3 789	22 723	54
Wild boar	27 124	24 109	25 135	157	466	25 758	108
Pheasant	182 287	151 443	137 576	28	22 522	160 126	135 217
Hare	202 724	32 352	22 863	8 993	8 036	39 892	1 250
Rabbit	1 268	10	69	123	27	219	65
Partridge	13 285	0	0	0	535	535	52
Wild duck	0	0	16 468	0	360	16 828	6 321
Wild turkey	266	49	137	0	8	45	123

Source: Slovak Hunting Yearbook, 2007.

Prepared by: NFC-FRI Zvolen.

Populations of large predators increased over the year. At present, they are considered too large for available habitats. As for other rare game species, these also increased except for grouse and hazel grouse numbers of which over the year fell. Although shooting of rare game species is strictly regulated, planned shooting numbers are met only with great difficulties. Instead of 68 specimens of bear signed for shooting only 25 were shot. Long-term poor shooting figures have mainly been attributed to restrictions imposed by ME SR. In addition to 25 bears, 123 specimens of wolf and 7 alpine chamois were shot in the same period. Numbers of chamois were down by 20 specimens over the year (from 665 in 2006 to 645 in 2007).



Figure 39 Hunting is one of the contributing factors of landscape changes.

Table 12.6.1–2 Rare game species

Species	No of specimens			
	Spring stock	Approved shooting	Actual shooting	Mortality
Chamois	645	10	7	3
Bear	1 739	63	25	7
Wolf	1 322	129	123	3
Lynx	1 213	0	0	7
Wild cat	1 701	0	0	2
Otter	480	0	0	13
Grouse	1 471	0	0	1
Capercaillie	1 184	0	0	0
Hazel grouse	7 188	96	6	32
Marmot	1 063	0	0	0
Elk	1	0	0	0
Bison	37	0	0	2
Beaver	442	0	0	6

Source: Slovak Hunting Yearbook, 2007.

Prepared by: NFC-FRI Zvolen.

Economics

The total earnings generated from the hunting & game industry reached last year the sum of 247 152 thousand SKK which with the total expenditure of 272 960 thousand SKK resulted in deficit of some 25 818 thousand SKK. Surplus earnings of 4 198 thousand SKK were recorded from self-operated hunting grounds of the Forests of the Slovak Republic, s.e. As for leased hunting grounds, these completed their fiscal year with modest surplus earnings of 641 thousand SKK. Other categories of hunting grounds recorded operating deficits.

12.7 Rural development

In the programming period 2007–2013, rural development is to be funded through mechanisms of the *National Strategic Plan of Rural Development 2007–2013* (NSPRD) based on Council Regulation (EC) No 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD). NSPRD is a baseline document for EAFRD funding and represents a reference tool for the development of the *Rural Development Programme for 2007–2013*. The document defines global objective as “multifunctional agriculture, food industry, forestry and sustainable rural development” and emphasis the need for ecological management of rural regions, enhancement of rural quality of life, and diversification of rural economies based on new job opportunities, education, restoration and development of rural settlements. Implementation of these measures should contribute to mitigation of economic differences between particular regions of Slovakia.

The total allocation of funding for forestry measures could reach the total of 9 831 million SKK (Table 12.7–1) in the programming period. The funding should come from the EU funds, central state budget and internal sectoral resources. The funding shall be provided through two RDP strands:

- S1 – *Enhancement of competitiveness of agricultural and forestry sectors*
- S2 – *Enhancement of the environment and landscape.*



Figure 40 The Rural Development Programme is the most important instrument of public forestry support.



Figure 41 Rural development actions strive to promote ecological practices and improve the quality of life of rural communities.

Table 12.7–1 Funding available for forestry measures from RDP 2007–2013

Source	Milion SKK			
	EÚ	Central budget	Sectoral resources	Total
S1 – Enhancement of competitiveness of agricultural and forestry sectors				
Adding value to forestry products	375	125	—	500
Infrastructure enhancing development and adaptation of agriculture and forestry	475	475	—	950
Enhancement of commercial value of forests (including own resources of eligible applicants)	1 091	363	1 454	2 908
Specialised education and information activities	131	44	—	175
Use of consulting and advisory services	38	12	—	50
S2 – Enhancement of the environment and landscape				
Afforestation of agricultural land	115	31	22	168
NATURA 2000 compensations – forest land	203	52	—	255
Silvi--environmental compensations	706	186	—	892
Restoration of forest sector capacity and introduction of preventive measures	3 164	791	—	3 955
Σ RDP till 2013	6 298	2 079	1 476	9 853

Source: Department of Rural Development, MA SR.

Prepared by: NFC-FRI Zvolen.

12.8 Recreation and wellness

Natural environment richly endowed with forest communities offers public endless opportunities for recreation, relaxation, outdoor pursuits, wellness, cultural, spiritual and aesthetic experience. Forests and meadows with recreational facilities delicately set in natural surroundings are special places that bring people together and leave visitors enriched. Way marked forest trails are ideal venues for biking, horse riding, scooters, cross-country skiing and many other outdoor activities.

Management objectives in forests with significant recreational and health benefiting services focus primarily on the enhancement of their aesthetic values and biological diversity to attract visitors with a wide range of different backgrounds, expectations and requirements without compromising their production capacity.

The survey on the frequency of recreational use of forests showed that 93.3 per cent of Slovak population visited forests at least once last year compared to 95.2 per cent a year earlier. The average number of recreational visits to forests per individual and year reached 30.3 visits in 2007.

Percentage of forests designated primarily for recreational and health benefiting functions is at the moment rather modest (1.6 per cent). Nevertheless, forests are in general (except for military zones, game reserves, important conservation sites) freely accessible for recreation regardless of ownership. Forests with public roaming rights constitute 94 per cent of the total forest land in Slovakia.



Figure 42 Forest roads can be used for a variety of outdoor pursuits.

Table 12.8–1 Area of forests primarily used for recreation (ha)

Function	Function			Total
	Principal	Secondary	Third	
Recreation	27 570	1 009	—	28 579
Spa - wellness	3 352	125	—	3 477
Publicly accessible forests	—	—	1 818 500	1 818 500
Total	30 922	1 134	1 818 500	1 850 556

Source: Compendium of Slovak Forestry Statistics, NFC-IFRI Zvolen, 2008.

Prepared by: NFC-FRI Zvolen.

The positive impact of forests on human health and wellbeing has been well documented. Beneficial properties of forests aid in treatment of many physical and mental disorders; even greater is their role in preventive medicine. Forest communities create aesthetically pleasing natural environment well responding to physical and mental needs of patients

and convalescents. Restorative & healing power of forests, spa forests in particular, is thus undeniable though difficult to measure.

Cultural and spiritual values

Forests also harbour a myriad of natural monuments, protected areas, biosphere reserves, historic landmarks and spiritual places. There are 26 forest sites with a total of 101 designated protected trees. The most valuable forest areas include the Carpathian primeval beech woods (Stužica, Havešová, Rožok, Vihorlat). On 28 June 2007, the beech woods were for their exceptional natural and scientific values entered into the List of UNESCO World Heritage Sites.

Table 12.8.1–1 UNESCO World Heritage Sites

Name	Area (ha)	Buffer zone (ha)	Of which FL (%)
Carpathian primeval beech woods	5 766	13 818	100
Slovak and Aggtelek Karst caves	—	616	0.37

Prepared by: NFC-FRI Zvolen.

In addition, there are more than 340 technical and cultural monuments related to forests or forestry. The National Monument List, which is an official register of immovable national cultural monuments, comprises 38 water and 8 railway structures, 39 technical facilities and sawmills, and 69 memorial plates and buildings listed under the forest entry.

12.9 Land Use Reform

The Land Use Reform (LUR) is a collective term for a spectrum of various measures of regulatory, technical, economic and ecological nature facilitating improvement of living conditions of rural communities and creating preconditions for integrated development of rural areas.



Figure 43 Land Use Reform is overseen by MA SR.

The need for LUR is based on a current status of ownership and tenure rights to agricultural and forest land resulting from the historical development of economic, regulatory and societal conditions in Slovakia. The reform is supervised by MA SR through its network of regional and district land offices responsible for its practical implementation. The regulatory framework is provided by the Act No 330/1991 Coll. on land use reform in the wording of the pursuant regulations. The main objective of LUR is to eliminate discrepancy between the land ownership in the Cadastre Register and actual ownership and unify / adjust small, ill-shaped and inaccessible plots to fit needs of individual land owners.

In 2007, baseline documents were provided for 58 cadastre areas for which LUR projects had been drafted. Project results are integrated into reviewed cadastre records and represent binding baseline documents for regional and forest planning.



13. FULFILMENT OF THE PROGRAMME MANIFESTO OF THE SLOVAK GOVERNMENT AND TASKS RESULTING FROM FORESTS – RELATED GOVERNMENTAL PROCEEDINGS

13.1 Interim report

The document, announced in 2006, defined major sectoral challenges and objectives for the programming period. The list of main topical areas included:

National Forest Programme – the main instrument for sustainable development of national forest resources

In the document, the Government pledged to implement and support sustainable management of national forests to enhance ecological balance and stability of landscape whilst exercising rational use of production and non-production forest functions. On top of that, the Government laid obligation to fully embrace new national forest policy defined by respective nfp.

Nfp was approved by the Government Decree No 549/2007 from 27 June 2007 and subsequently confirmed by the Slovak National Council Decree No 531/2007. The implementation of nfp objectives shall be supported by generally binding regulatory mechanisms.

The new Act No 326/2005 Coll. on forests, enacted in 2005, did not sufficiently provide for diverse needs of forestry practice; as a result, the Act was amended and came into force in 2007 as the Act No 360/2007 Coll. The regulation further amended the Act No 217/2004 on forest reproduction material and a number of other acts in the wording pursuant to the Act No 545/2004 Coll. The amendment defined in detail the term forest plot and concurrently added competence of sectoral administration to decide on a plot type recategorisation. In addition, provisions on compensations for lost non-production forest functions were specified based on 2-year field experience.

International obligations

In 2007, the Ministry of Agriculture compiled a number of forestry-related documents of strategic importance (e.g. the Concept of Agrarian Development for 2007–2013, National Forest Programme) which take due account of the Programme Manifesto and international obligations arising from the membership in the UN, EU and OECD. These documents are considered essential for the implementation of international obligations at a national level and conformity of national forest policy with international initiatives on forests.

Intactness of state forest estate

The intactness of the state forest estate is regulated by the Act No 92/1991 Coll. on conditions of release by way of passing state ownership on other subjects in the wording of the pursuant regulations.

Timely restructuring of land ownership rights enhanced by the improvements in the ongoing restitution process

In July 2008, MA SR submitted to the Government the *Report on the Transformation of*

Ownership and Tenure Rights to Forest Plots. The document should provide all-round update on the latest developments in the transformation process based on restitution laws.

Legal framework for resolving forest plots of unknown owners – the instrument for land market development

In April 2008, MA SR passed on legislators a land association's bill. The bill among other issues addresses also the administration of plots of unknown owners and details treatment of shares of common, state-owned properties.

In addition, MA SR drafted amendment to the Act No 180/1995 Coll. on specific measures regulating ownership of forest plots in the wording of the pursuant regulations. The amendment finally defines the treatment and use of properties of unknown owners. MA SR also drafted amendment to the Act No 330/1991 Coll. on land reform, land ownership, land offices, land register and land associations in the wording of the pursuant regulations to facilitate land reform completion.

Introduction of effective controlling mechanisms for timber felling and forest management

Timber felling and forest management are monitored on a continuous basis by bodies of state administration on forests following provisions of the Act No 326/2005 Coll. on forests.

Unification of generally binding regulations and establishment of legislative, technical and financial framework for the scheme compensating for restricted ownership rights

The aforementioned objective should be secured through the amended version of the Act No 360/2007 Coll. on forests. Other relevant regulations include the bill on game management and hunting and bill on nature and landscape protection. Proposed regulations should improve compensation procedure and provide technical and financial instruments for regular compensation payments.

Compensations for restrictions in common management practices are currently regulated by the Act No 543/2002 Coll. on nature and landscape protection in the wording of the pursuant regulations and the Act No 326/2005 Coll. on forests in the wording of the pursuant regulations. The latter governs compensations for damage incurred on forest plots and restrictions of ownership rights. It introduces the possibility of claiming compensations for the following: land recategorisation; restricted use of forest plots and stands; increased management costs; specific management regimes.

At the same time, the *Rural Development Programme* for 2007–2013 mechanisms have been set up to fund compensations from the EU support schemes. The procedure is regulated by the Government Orders No 146/2008 laying down detailed rules for the support in SCIs located on forest land and No 152/2008 laying down detailed rules for silvi-environmental payments.

13.2 Review of strategic objectives of the Concept of Agrarian Development for 2007–2013

156

The Concept of Agrarian Development for 2007–2013 – chapter Forestry defines the principal strategic objective as:

“Ensuring sustainable management of forest resources based on rational exploitation of their economic, ecological and social services for the benefit of the whole society and rural communities in particular.”

The objective comprises three main goals fulfilment of which shall ensure:

- enhancement of the long-term sectoral competitiveness and sustainable utilisation of forest goods and services (economic goal)
- conservation of biological diversity, vitality, and resilience of forest ecosystems maintaining their integrity in view of global climate change scenarios (ecological goal)
- enhancement of the quality of life by protecting and improving social and cultural aspects of forests and forestry (social goal).

At the beginning of 2007, the document was further detailed to include the implementation process and responsibility of particular forestry bodies involved in it. The Concept was also used to guide development of other sectoral documents referring to forestry and decision-making. Particular tasks with mostly long-term impact were readily incorporated into nfp. The comprehensive review of task implementation is provided in particular chapters of this report.

14. MEASURES PROPOSED TO ENSURE IMPLEMENTATION OF CONCEPTUAL OBJECTIVES IN 2009

1. Elaboration of the assessment report detailing the implementation of emergency measures applied to mitigate forest decline and plan of measures for the immediate future. The report shall be based on the approved Forest Health Report.

Authority: MA SR
 Cooperation: NFC Zvolen
 Deadline: March 2009
 Level of involvement: Government

2. Development of the Integrated Environmental and Economic Account for Forests (IEEAF)

Authority: MA SR
 Cooperation: NFC Zvolen
 Deadline: March 2009
 Level of involvement: Sector

15. ANNEXES

15.1 Tables

Table 15.1–1 Sectoral fiscal indicators – Part I

No	Indicator	Unit	Factual figures				Estimate for 2008	Outlook for 2009
			1990	2005	2006	2007		
1	Earnings and revenue	million SKK	4 531	13 779	*13 816	15 409	15 489	15 518
2	Timber earnings		2 604	11 355	10 980	12 195	12 462	12 503
3	Ostatné Earnings and revenue		920	2 399	*2 714	3 214	2 945	2 922
4	Other earnings and receipts		565	1 476	1 661	1 869	1 661	1 711
5	Direct costs of felling operations		916	5 703	5 393	6 441	6 501	6 699
6	Total cost of silvicultural operations		1 094	1 890	2 210	2 465	2 229	2 437
7	Total cost of felling operations		1 584	7 163	7 079	8 021	8 111	8 342
8	Total production costs		4 326	13 061	12 664	14 348	14 305	14 458
9	– Material costs including depreciation		1 976	5 139	5 616	6 760	6 679	6 825
10	Depreciation		596	834	839	976	972	1 003
11	Personnel costs		2 056	4 175	3 660	3 900	4 220	4 367
12	– labour costs		1 490	2 985	2 649	2 834	3 031	3 123
13	Economic result (profit, loss)		205	718	**1 152	1 061	1 184	1 060
14	Total state subsidies		1 222	198	346	357	540	571
15	– state subsidies for forestry operations		1 007	25	122	10	82	93
16	– state investment subsidies		108	45	84	162	312	332
17	– state subsidies for other activities		107	128	140	185	146	146
18	Overdue assets		105	746	680	632	616	595
19	Overdue obligations to December 31		10	67	71	94	75	69

Source: Green Reports, special questionnaire from forest owners and tenurers, analytical standards of state forest enterprises, sectoral statistical record Les V (MA SR) 5-01, Les F (MA SR) 7-01, Les V (MA SR) 1-04, Les D (MA SR) 2-04, Les P (MA SR) 6-01, Uč POD 1-01, Uč POD 2-01, NFC-IFRI Zvolen, Compendium of Slovak Forestry Statistics, 2008

Prepared by: NFC-FRI Zvolen

* including labour costs of subjects providing services ; ** data adjusted using refined values of other earnings and revenue

Table 15.1–2 Sectoral fiscal indicators – Part II

No	Indicator	Unit	Factual figures				Estimate for 2008	Outlook for 2009
			1990	2005	2006	2007		
1	Σ forest regeneration	ha	18 964	13 504	15 561	13 698	13 755	14 935
2	– artificial regeneration		15 500	8 922	9 256	9 027	9 421	9 202
3	Treatment of young forest stands		16 968	11 382	11 348	10 789	10 703	10 711
4	Protection of young forest stands		141 920	65 715	68 357	65 055	71 271	70 780
5	Forest protection (direct costs)	1 000 SKK	95 000	136 895	190 257	205 077	171 458	191 565
6	Cleaning	ha	34 143	29 078	28 383	25 595	26 448	25 972
7	Thinning		37 143	46 072	46 566	42 513	45 682	45 970
8	Σ timber felling	1 000 m ³	5 276	10 190	8 357	8 367	8 649	8 574
9	– conifer		2 777	6 927	5 150	5 344	5 405	5 294
10	– broadleaf		2 499	3 263	3 207	3 023	3 244	3 280
11	Σ incidental felling (from line 8)		2 611	6 533	4 266	4 701	4 461	4 346
12	– conifer		1 726	6 153	3 831	4 272	4 008	3 920
13	– broadleaf		885	380	435	429	453	426
14	Σ timber purchase		49	5 163	162	306	170	180
15	– conifer		30	5 065	75	81	80	80
16	– broadleaf		19	98	87	225	90	100
17	Σ timber sale		5 070	9 287	7 794	8 050	8 147	8 317
18	– conifer		2 723	6 229	4 764	4 959	5 017	5 095
19	– broadleaf		2 347	3 058	3 030	3 091	3 130	3 222
20	Stumpage sale (from line 17)		60	783	418	173	414	462
21	– conifer		25	748	308	140	314	310
22	– broadleaf		35	35	110	33	100	152
23	Σ domestic timber sale		4 720	8 505	7 409	7 761	7 885	7 983
24	– conifer		2 531	5 610	4 550	4 734	4 841	4 896
25	– broadleaf		2 189	2 895	2 859	3 027	3 044	3 087
26	Timber export (from line 17)*		350	781	385	289	262	334
27	– conifer		192	619	215	225	176	199
28	– broadleaf		158	162	170	65	86	135
29	Σ investments	million SKK	553	932	1 174	1 161	1 379	1 046
30	Construction works		279	403	520	495	866	444
31	Machinery & equipment		274	462	577	402	475	567
32	Other**		—	67	77	264	38	35
33	Forest road network (to December 31)	km	20 547	21 193	21 196	21 198	21 211	21 227
34	Unpaved forest roads (to December 31)		14 937	15 892	15 894	15 908	15 939	15 950
35	Length of managed watercourses		23 640	18 746	18 559	18 510	17 957	16 457
36	Area of managed forest properties	1 000 ha	1 977	2 006	2 007	2 007	2 007	2 007
37	Technical staff	persons	36 316	13 396	12 463	11 924	12 261	12 137
38	– workers		25 536	8 246	7 435	7 195	7 195	7 158
39	Average monthly earnings	SKK	3 419	15 543	17 232	18 455	19 472	20 113

* exports organised by forest owners (users); ** e.g. FMP elaboration, other intangibles

Table 15.1–3 Aggregated fiscal indicators – state subjects – Part I

No	Indicator	Unit	Factual figures				Estimate for 2008	Outlook for 2009
			1990	2005	2006	2007		
1	Earnings and revenue	million SKK	4 531	9 708	*8 889	9 895	9 859	9 768
2	Timber earnings		2 604	7 635	6 502	7 031	7 262	7 203
3	Other earnings and receipts		920	2 059	*2 374	2 864	2 585	2 552
4	Direct costs of silvicultural operations		565	874	941	1 129	901	941
5	Direct costs of felling operations		916	3 953	3 613	3 992	4 001	4 099
6	Total costs of silvicultural operations		776	1 137	1 220	1 415	1 129	1 287
7	Total costs of felling operations		970	4 752	4 559	5 284	5 311	5 492
8	Total production costs		4 326	9 341	8 714	9 758	9 605	9 658
9	Material costs including depreciation		1 976	3 649	4 166	5 250	5 129	5 225
10	Depreciation		596	474	489	606	602	623
11	Personnel costs		2 056	2 841	2 280	2 409	2 593	2 605
12	– labour costs		1 490	2 048	1 631	1 734	1 831	1 823
13	Economic result (profit, loss)		205	367	*175	137	254	110
14	Total state subsidies		1 115	172	125	174	340	361
15	– state subsidies for forestry operations		1 007	14	13	10	12	13
16	– state investment subsidies		1	30	9	12	212	232
17	– state subsidies for other activities		107	128	103	152	116	116
18	Overdue assets		105	626	550	512	506	475
19	Overdue obligations to December 31		10	17	31	49	35	29

Source: Green Reports, special questionnaire from forest owners and tenurers, analytical standards of state forest enterprises, sectoral statistical record Les V (MA SR) 5-01, Les F (MA SR) 7-01, Les V (MA SR) 1-04, Les D (MA SR) 2-04, Les P (MA SR) 6-01, Uč POD 1-01, Uč POD 2-01, NFC-IFRI Zvolen, Compendium of Slovak Forestry Statistics, 2008

Prepared by: NFC-FRI Zvolen

* including labour costs of subjects providing services

Table 15.1–4 Aggregated fiscal indicators – state subjects – Part II

No	Indicator	Unit	Factual figures				Estimate for 2008	Outlook for 2009
			1990	2005	2006	2007		
1	Σ forest regeneration	ha	18 964	8 059	9 419	7 504	7 555	8 665
2	– artificial regeneration		15 500	5 255	5 185	4 950	5 421	5 252
3	Treatment of young forest stands		16 968	8 018	8 151	7 373	7 403	7 511
4	Protection of young forest stands		141 920	36 463	37 528	36 152	42 271	41 280
5	Forest protection (direct costs)	1 000 SKK	95 000	90 825	134 457	166 205	129 458	148 565
6	Cleaning	ha	34 143	19 564	19 634	16 844	17 688	17 212
7	Thinning		37 143	27 256	28 993	25 959	28 982	29 170
8	Σ timber felling	1 000 m ³	5 276	6 507	4 767	4 661	4 949	4 824
9	– conifer		2 777	4 435	2 774	2 826	2 905	2 794
10	– broadleaf		2 499	2 072	1 993	1 835	2 044	2 030
11	Σ incidental felling (from line 8)		2 611	4 356	2 362	2 501	2 461	2 446
12	– conifer		1 726	4 115	2 095	2 257	2 208	2 220
13	– broadleaf		885	241	267	244	253	226
14	Σ timber purchase		49	5 003	12	146	0	0
15	– conifer		30	4 995	5	1	0	0
16	– broadleaf		19	8	7	145	0	0
17	Σ timber sale		5 070	6 194	4 511	4 603	4 697	4 817
18	– conifer		2 723	4 127	2 542	2 650	2 767	2 795
19	– broadleaf		2 347	2 067	1 969	1 953	1 930	2 022
20	Stumpage sale (from line 17)		60	683	47	40	14	12
21	– conifer		25	678	22	38	14	10
22	– broadleaf		35	5	25	2	0	2
23	Σ domestic timber sale		4 720	5 616	4 303	4 518	4 635	4 733
24	– conifer		2 531	3 684	2 480	2 608	2 741	2 746
25	– broadleaf		2 189	1 932	1 823	1 910	1 894	1 987
26	Timber export (from line 17)*		350	577	208	85	62	84
27	– conifer		192	442	63	42	26	49
28	– broadleaf		158	135	145	43	36	35
29	Σ investments	million SKK	553	807	1 024	963	1 209	871
30	Construction works		279	363	465	469	806	379
31	Machinery & equipment		274	387	502	316	395	487
32	Other**		0	57	57	178	8	5
33	Forest road network (December 31)	km	20 547	9 945	9 947	9 843	9 855	9 870
34	Unpaved forest roads (December 31)		14 937	7 683	7 684	7 697	7 727	7 737
35	Length of managed watercourses		23 640	18 746	18 559	18 510	17 957	16 457
36	Area of managed forest properties	1 000 ha	1 976	1 174	1 123	1 114	1 112	1 110
37	Technical staff	persons	36 316	6 836	5 913	5 384	5 731	5 617
38	– workers		25 536	3 406	2 605	2 395	2 415	2 388
39	Average monthly earnings	SKK	3 419	19 040	22 669	25 253	26 277	26 977

* exports organised by forest owners (users); ** e.g. FMP elaboration, other intangibles

Table 15.1–5 Fiscal indicators – non-state subjects – Part I

No	Indicator	Unit	Factual figures				Estimate for 2008	Outlook for 2009
			1990	2005	2006	2007		
1	Earnings and revenue	million SKK	1 288	4 071	4 927	5 514	5 630	5 750
2	Timber earnings		990	3 720	4 478	5 164	5 200	5 300
3	Other earnings and receipts		187	340	340	350	360	370
4	Direct costs of silvicultural operations		245	602	720	740	760	770
5	Direct costs of felling operations		423	1 750	1 780	2 449	2 500	2 600
6	Total costs of silvicultural operations		318	753	990	1 050	1 100	1 150
7	Total costs of felling operations		614	2 411	2 520	2 737	2 800	2 850
8	Total production costs		1 258	3 720	3 950	4 590	4 700	4 800
9	Material costs including depreciation		353	1 490	1 450	1 510	1 550	1 600
10	Depreciation		109	360	350	370	370	380
11	Personnel costs		546	1 334	1 380	1 491	1 627	1 762
12	– labour costs		396	937	1 018	1 100	1 200	1 300
13	Economic result (profit, loss)		30	351	977	924	930	950
14	Total state subsidies		111	26	221	183	200	210
15	– state subsidies for forestry operations		111	11	109	0	70	80
16	– state investment subsidies		—	15	75	150	100	100
17	– state subsidies for other activities		—	—	37	33	30	30
18	Overdue assets		296	120	130	120	110	120
19	Overdue obligations to December 31		123	50	40	45	40	40

Source: Green Reports, special questionnaire from forest owners and tenurers, analytical standards of state forest enterprises, sectoral statistical record Les V (MA SR) 5-01, Les F (MA SR) 7-01, Les V (MA SR) 1-04, Les D (MA SR) 2-04, Les P (MA SR) 6-01, Uč POD 1-01, Uč POD 2-01, NFC-IFRI Zvolen, Compendium of Slovak Forestry Statistics, 2008

Prepared by: NFC-FRI Zvolen

Table 15.1–6 Key fiscal indicators – non-state subjects – Part II

No	Indicator	Unit	Factual figures				Estimate for 2008	Outlook for 2009
			1990	2005	2006	2007		
1	Σ forest regeneration	ha	1 924	5 445	6 142	6 194	6 200	6 270
2	– artificial regeneration		1 766	3 667	4 071	4 077	4 000	3 950
3	Treatment of young forest stands		870	3 364	3 197	3 416	3 300	3 200
4	Protection of young forest stands		12 295	29 252	30 829	28 903	29 000	29 500
5	Forest protection (direct costs)	1 000 SKK	41 000	46 070	55 800	38 872	42 000	43 000
6	Cleaning	ha	5 480	9 514	8 749	8 751	8 760	8 760
7	Thinning		7 145	18 816	17 573	16 553	16 700	16 800
8	Σ timber felling	1 000 m ³	966	3 683	3 590	3 706	3 700	3 750
9	– conifer		491	2 492	2 376	2 518	2 500	2 500
10	– broadleaf		475	1 191	1 214	1 188	1 200	1 250
11	Σ incidental felling (from line 8)		409	2 177	1 904	2 200	2 000	1 900
12	– conifer		358	2 038	1 736	2 015	1 800	1 700
13	– broadleaf		51	139	168	185	200	200
14	Σ timber purchase		0	160	150	160	170	180

Table 15.1–6 – Key fiscal indicators – non-state subjects – Part II

No	Indicator	Unit	Factual figures				Estimate for 2008	Outlook for 2009
			1990	2005	2006	2007		
15	– conifer	1 000 m ³	0	70	70	80	80	80
16	– broadleaf		0	90	80	80	90	100
17	Σ timber sale		929	3 093	3 283	3 447	3 450	3 500
18	– conifer		484	2 102	2 222	2 309	2 250	2 300
19	– broadleaf		445	991	1 061	1 138	1 200	1 200
20	Stumpage sale (from line 17)		100	100	371	133	400	450
21	– conifer		65	70	286	102	300	300
22	– broadleaf		35	30	85	31	100	150
23	Σ domestic timber sale		802	2 889	3 106	3 243	3 250	3 250
24	– conifer		394	1 926	2 070	2 126	2 100	2 150
25	– broadleaf		408	963	1 036	1 117	1 150	1 100
26	Timber export (from line 17)*		127	204	177	204	200	250
27	– conifer		90	177	152	183	150	150
28	– broadleaf		37	27	25	21	50	100
29	Σ investments	million SKK	71	125	150	198	170	175
30	Construction works		51	40	55	26	60	65
31	Machinery & equipment		20	75	75	86	80	80
32	Other**		—	10	20	86	30	30
33	Forest road network (December 31)	km	7 249	11 248	11 249	11 355	11 356	11 357
34	Unpaved forest roads (December 31)		3 108	8 209	8 210	8 211	8 212	8 213
35	Length of managed watercourses		0	0	0	0	0	0
36	Area of managed forest properties	1 000 ha	430	832	884	893	895	897
37	Technical staff	persons	5 900	6 560	6 550	6 540	6 530	6 520
38	– workers		4 350	4 840	4 830	4 800	4 780	4 770
39	Average monthly earnings	SKK	5 600	11 900	12 324	12 858	13 500	14 200

Source: Green Reports, special questionnaire from forest owners and tenurers, analytical standards of state forest enterprises, sectoral statistical record Les V (MA SR) 5-01, Les F (MA SR) 7-01, Les V (MA SR) 1-04, Les D (MA SR) 2-04, Les P (MA SR) 6-01, Uč POD 1-01, Uč POD 2-01, NFC-IFRI Zvolen, Compendium of Slovak Forestry Statistics, 2008

Prepared by: NFC-FRI Zvolen

* exports organised by forest owners (users); ** e.g. FMP elaboration, other intangibles

Table 15.1–7 Fiscal indicators – state subjects under MA SR authority – Part I

No	Indicator	Unit	Factual figures				Estimate for 2008	Outlook for 2009
			1990	2005	2006	2007		
1	Earnings and revenue	million SKK	4 179	8 700	*7 914	9 067	9 059	8 981
2	Timber earnings		2 301	7 021	5 972	6 462	6 712	6 679
3	Other earnings and revenue		884	1 675	*1 942	2 605	2 347	2 302
4	Direct costs of silvicultural operations		511	828	880	1 068	838	877
5	Direct costs of felling operations		607	3 766	3 412	3 784	3 827	3 913
6	Total costs of silvicultural operations		776	1 066	1 154	1 349	1 061	1 216
7	Total costs of felling operations		970	4 544	4 333	5 058	5 121	5 280
8	Total production costs		4 016	8 483	7 827	8 977	8 847	8 894
9	Material costs including depreciation		1 853	3 476	4 004	5 094	4 973	5 067
10	Depreciation		557	394	405	523	510	528
11	Personnel costs		1 928	2 636	2 079	2 201	2 401	2 416
12	– labour costs		1 397	1 910	1 491	1 592	1 693	1 686
13	Economic result (profit, loss)		163	217	**87	90	212	87
14	Total state subsidies		1 101	111	56	109	288	308
15	– state subsidies for forestry operations		994	4	0	0	0	0
16	– state investment subsidies			27	0	5	205	225
17	– state subsidies for other activities		107	80	56	104	83	83
18	Overdue assets		105	541	479	448	454	434
19	Overdue obligations to December 31		10	17	12	28	25	24

Source: Green Reports, special questionnaire from forest owners and tenurers, analytical standards of state forest enterprises, sectoral statistical record Les V (MA SR) 5-01, Les F (MA SR) 7-01, Les V (MA SR) 1-04, Les D (MA SR) 2-04, Les P (MA SR) 6-01, Uč POD 1-01, Uč POD 2-01, NFC-IFRI Zvolen, Compendium of Slovak Forestry Statistics, 2008

Prepared by: NFC-FRI Zvolen

* including labour costs of subjects providing services; ** data adjusted using refined values of other earnings and revenue

Table 15.1–8 Fiscal indicators – state subjects under MA SR authority – Part II

No	Indicator	Unit	Factual figures				Estimate for 2008	Outlook for 2009
			1990	2005	2006	2007		
1	Σ forest regeneration	ha	17 497	7 182	8 597	6 695	6 864	7 950
2	– artificial regeneration		14 308	4 597	4 553	4 320	4 861	4 690
3	Treatment of young forest stands		14 084	7 934	7 637	7 269	7 300	7 400
4	Protection of young forest stands		136 220	33 553	34 662	33 397	39 336	38 300
5	Forest protection (direct costs)	1 000 SKK	41 000	88 247	132 471	163 329	125 045	144 250
6	Cleaning	ha	30 775	17 431	17 672	14 946	15 501	15 100
7	Thinning		35 384	25 005	26 488	23 618	26 934	27 260
8	Σ timber felling	1 000 m ³	4 800	6 125	4 386	4 258	4 590	4 454
9	– conifer		2 501	4 222	2 565	2 598	2 717	2 591
10	– broadleaf		2 299	1 903	1 821	1 660	1 873	1 863
11	Σ incidental felling (from line 8)		2 415	4 234	2 224	2 348	2 305	2 290
12	– conifer		1 572	4 005	1 985	2 132	2 076	2 088

Table 15.1–8 – Fiscal indicators – state subjects under MA SR authority – Part II

No	Indicator	Unit	Factual figures				Estimate for 2008	Outlook for 2009
			1990	2005	2006	2007		
13	– broadleaf	1 000 m ³	843	229	239	216	229	202
14	Σ timber purchase		49	5 003	12	6	0	0
15	– conifer		30	4 995	5	1	0	0
16	– broadleaf		19	8	7	5	0	0
17	Σ timber sale		4 732	5 707	4 129	4 229	4 323	4 440
18	– conifer		2 490	3 885	2 331	2 438	2 561	2 584
19	– broadleaf		2 242	1 822	1 798	1 791	1 762	1 856
20	Stumpage sale (from line 17)		60	675	31	25	6	10
21	– conifer		25	672	8	24	6	8
22	– broadleaf		35	3	23	1	0	2
23	Σ domestic timber sale		4 398	5 152	3 939	4 162	4 267	4 366
24	– conifer		2 307	3 459	2 282	2 409	2 541	2 544
25	– broadleaf		2 091	1 693	1 657	1 753	1 726	1 822
26	Timber export (from line 17)*		334	555	190	67	56	74
27	– conifer		183	426	49	29	20	40
28	– broadleaf		151	129	141	38	36	34
29	Σ investments	million SKK	541	615	803	769	1 075	750
30	Construction works		274	243	346	391	698	325
31	Machinery & equipment		267	325	453	261	371	420
32	Other**			47	4	117	6	5
33	Forest road network (to December 31)	km	18 672	8 970	8 997	8 998	9 010	9 025
34	Unpaved forest roads (December 31)		13 474	6 975	6 979	6 990	7 000	7 000
35	Length of managed watercourses		22 958	18 054	17 867	17 855	17 303	15 803
36	Area of managed forest properties.	1 000 ha	1 829	1 090	1 039	1 031	1 030	1 028
37	Technical staff	persons	33 693	6 212	5 344	4 929	5 276	5 188
38	– workers		23 700	3 069	2 309	2 174	2 195	2 183
39	Average monthly earnings	SKK	3 456	19 051	22 837	25 342	26 357	27 077

Source: Green Reports, special questionnaire from forest owners and tenurers, analytical standards of state forest enterprises, sectoral statistical record Les V (MA SR) 5-01, Les F (MA SR) 7-01, Les V (MA SR) 1-04, Les D (MA SR) 2-04, Les P (MA SR) 6-01, Uč POD 1-01, Uč POD 2-01, NFC-IFRI Zvolen, Compendium of Slovak Forestry Statistics, 2008

Prepared by: NFC-FRI Zvolen

* exports organised by forest owners (users); ** e.g. FMP elaboration, other intangibles

Table 15.1–9 Fiscal indicators – state subjects under MD SR authority and forestry colleges*** – Part I

No	Indicator	Unit	Skutočnosť				Estimate for 2008	Outlook for 2009
			1990	2005	2006	2007		
1	Earnings and revenue	million SKK	352	1 008	975	828	800	787
2	Timber earnings		303	614	530	569	550	524
3	Other earnings and revenue		36	384	432	259	238	250
4	Direct costs of silvicultural operations		54	46	61	61	63	64
5	Direct costs of felling operations		309	187	201	208	174	186
6	Total costs of silvicultural operations			71	66	66	68	71
7	Total costs of felling operations			208	226	226	190	212
8	Total production costs		310	858	887	781	758	764
9	Material costs including depreciation		123	173	162	156	156	158
10	Depreciation		39	80	84	83	92	95
11	Personnel costs		128	205	201	208	192	189
12	– labour costs		93	138	140	142	138	137
13	Economic result (profit, loss)		42	150	88	47	42	23
14	Total state subsidies		14	61	69	65	52	53
15	– state subsidies for forestry operations		13	10	13	10	12	13
16	– state investment subsidies		1	3	9	7	7	7
17	– state subsidies for other activities			48	47	48	33	33
18	Overdue assets		0	85	71	64	52	41
19	Overdue obligations to December 31		0	0	19	21	10	5

Source: Green Reports, special questionnaire from forest owners and tenurers, analytical standards of state forest enterprises, sectoral statistical record Les V (MA SR) 5-01, Les F (MA SR) 7-01, Les V (MA SR) 1-04, Les D (MA SR) 2-04, Les P (MA SR) 6-01, Uč POD 1-01, Uč POD 2-01, NFC-IFRI Zvolen, Compendium of Slovak Forestry Statistics, 2008

Prepared by: NFC-FRI Zvolen

* including labour costs of subjects providing services; *** till 2004 reported as “Key fiscal indicators of state subjects under ministerial authority other than MA SR”

Table 15.1–10 Fiscal indicators – state subjects under MD SR authority and forestry colleges*** – Part II

No	Indicator	Unit	Factual figures				Estimate for 2008	Outlook for 2009
			1990	2005	2006	2007		
1	Σ forest regeneration	ha	1 467	877	822	809	691	715
2	– artificial regeneration		1 192	658	632	630	560	562
3	Treatment of young forest stands		2 884	84	514	104	103	111
4	Protection of young forest stands		5 700	2 910	2 866	2 755	2 935	2 980
5	Forest protection (direct costs)	1 000 SKK	54 000	2 578	1 986	2 876	4 413	4 315
6	Cleaning	ha	3 368	2 133	1 962	1 898	2 187	2 112
7	Thinning		1 759	2 251	2 505	2 341	2 048	1 910
8	Σ timber felling	1 000 m ³	476	382	381	403	359	370
9	– conifer		276	213	209	228	188	203
10	– broadleaf		200	169	172	175	171	167
11	Σ incidental felling (from line 8)		196	122	138	153	156	156
12	– conifer		154	110	110	125	132	132
13	– broadleaf		42	12	28	28	24	24

Table 15.1–10 – Fiscal indicators – state subjects under MD SR authority and forestry colleges*** – Part II

No	Indicator	Unit	Factual figures				Estimate for 2008	Outlook for 2009
			1990	2005	2006	2007		
14	Σ timber purchase	1 000 m ³	0	0	0	140	0	0
15	– conifer		0	0	0	0	0	0
16	– broadleaf		0	0	0	140	0	0
17	Σ timber sale		338	487	382	374	374	377
18	– conifer		233	242	211	212	206	211
19	– broadleaf		105	245	171	162	168	166
20	Stumpage sale (from line 17)		0	8	16	15	8	2
21	– conifer		0	6	14	14	8	2
22	– broadleaf		0	2	2	1	0	0
23	Σ domestic timber sale		322	464	364	356	368	367
24	– conifer		224	225	198	199	200	202
25	– broadleaf		98	239	166	157	168	165
26	Timber export (from line 17)**		16	22	18	18	6	10
27	– conifer		9	16	14	13	6	9
28	– broadleaf		7	6	4	5	0	1
29	Σ investments	million SKK	12	192	221	194	134	121
30	Construction works		5	120	119	78	108	54
31	Machinery & equipment		7	62	49	55	24	67
32	Other***			10	53	61	2	0
33	Forest road network (December 31)	km	1 875	975	950	845	845	845
34	Unpaved forest roads (December 31)		1 463	708	705	707	727	737
35	Length of managed watercourses		682	692	692	655	654	654
36	Area of managed forest properties.	1 000 ha	147	84	84	83	82	82
37	Technical staff	persons	2 623	624	569	455	455	429
38	– workers		1 836	337	296	221	220	205
39	Average monthly earnings	SKK	2 944	18 928	21 096	24 292	25 355	25 765

Source: Green Reports, special questionnaire from forest owners and tenurers, analytical standards of state forest enterprises, sectoral statistical record Les V (MA SR) 5-01, Les F (MA SR) 7-01, Les V (MA SR) 1-04, Les D (MA SR) 2-04, Les P (MA SR) 6-01, Uč POD 1-01, Uč POD 2-01, NFC-IFRI Zvolen, Compendium of Slovak Forestry Statistics, 2008

Prepared by: NFC-FRI Zvolen

* exports organised by forest owners (users); ** e.g., FMP elaboration, other intangibles; *** till 2004 reported as “Key fiscal indicators of state subjects under ministerial authority other than MA SR”; **** including emergency felling

Table 15.1–11 Regional Forest Office – Administrative Code procedures and other procedures

Procedures based on Act No 326/2005 Coll on forests in the wording of the pursuant regulations	No of procedures	
	Administrative Code	Other
Designation of protection forests (§ 16)	80	
Designation of special-purpose forests (§ 16)	19	
Approval of forest restoration methods (§ 19 Sec. 3)	3	
Approval of forest management projects (§ 37)	0	
Establishment of forest units (§ 39 Sec. 3)	72	
Approval of plan drafts (§ 41 Sec. 13)	87	
Decision on plan adjustments (§ 43 Sec. 2)	128	
Imposing forest protection measures [§ 28 Sec. 1, Letter i) and § 28 Sec. 4] should these extend behind the jurisdiction of a particular DFO	0	1
Assessment of reports and issuance of report records (§ 41 Sec. 9)	3	58
Issuance of certified forest manager licences, administration of the Register of Certified Forest Managers, decision on licence and registration withdrawal (§ 47)	2	88
Issuance of approval for emergency felling above the planned volume for a particular forest / tenure unit (§ 59, Sec. 2, Letter n)	22	5
Other administrative tasks related to generally binding regulations executing the Forest Act (§ 66)	0	304
State supervision of forests (§ 62)	104	82
Execution of state authority under its jurisdiction, management of DFOs and their supervision (§ 59, Sec. 2, Letter a)		28
Approval of regional planning schemes (§ 6, Sec. 2)		7
Approval of proposals for protected deposit area and proposals for the enlargement of exploitation areas (§ 6, Sec. 2)		13
Binding standpoint on planning decisions affecting forest properties (§ 6, Sec. 3) should these extend above the jurisdiction of a particular DFO		
Issuance and revocation of bans and restrictions on public use of forests and other forest exploitation (§ 30, Sec. 4) should these extend above the jurisdiction of a particular DFO		0
Forestry-related advisory services (§ 59, Sec. 2, Letter m)		671
Procedures based on other generally binding regulations	No of procedures	
	Administrative Code	Other
Issuance of standpoints based on Act No 50/1976 Coll.	0	42
Issuance of standpoints based on Act No 586/2003 Coll.	0	16
Issuance of standpoints based on Act No 543/2002 Coll.	0	21
Issuance of standpoints on emergency remedial measures based on Act No 71/1967 Coll.	3	4
Issuance of procedural decisions based on Act No 71/1967 Coll.	163	4
Appeal procedures against decisions of DFOs based on Act No 71/1967 Coll.	94	5
Procedures investigated by prosecutor's office based on Act No 153/2001 Coll.	1	0
Inspections conducted by inspecting bodies at RFOs based on Act No 10/1996 Coll.	0	9

Table 15.1–11 – Regional Forest Office – Administrative Code procedures and other procedures

Procedures based on other generally binding regulations	No of procedures	
	Administrative Code	Other
Agenda and issuance of decisions based on Act No 211/2000 Coll.	11	35
Court investigated procedures based on Act No 99/1963 Coll.		16
Participation in court hearings based on Act No 99/1963 Coll.		6
Total	792	1470

Source: Forestry Department, MA SR

Table 15.1–12 District Forest Office – other procedures

Procedures based on Act No 326/2005 Coll on forests in the wording of the pursuant regulations	Other procedures
	No
Issuance of approvals on municipal and zone planning schemes (§ 6, Sec. 2)	461
Issuance of binding standpoints on planning decisions affecting forest properties (§ 6, Sec. 3)	325
Issuance of binding standpoints on construction location and land use in forest protection zones (§ 10, Sec. 2)	339
Administration of Timber Mark Register and registers of other authorised timber marking methods (§ 23 Sec. 4)	337
Issuance and revocation of bans and restrictions on public use of forests and other forest exploitation (§ 30, Sec. 4)	311
Restrictions and other regulations to land use (§ 32, Sec. 3)	11
Administration of records on forest management (§ 49, Sec. 7)	18
Appointment and revocation of forest rangers (§ 52)	1 209
Organisation of forest ranger examinations and administration of forest ranger lists (§ 52)	977
Issuance of standpoints on soil protection in procedures related to prevention and rectification of environmental damage on forest properties based on specific legal provisions (§60, Sec.2, Letter j)	10
Forestry-related advisory services (§ 60, Sec.2, Letter k)	5 791
Cooperation with authorities responsible for handling public resources (§ 60, Sec.2, Letter l)	32
Execution of state supervision of forests (§ 62)	1 714
Execution of state supervision of non-forest land forests, e.g. timber haulage (§ 62)	585
Execution of other tasks based on generally binding regulations issued to execute the provisions of Forest Act in the wording of the pursuant regulations (§ 66)	2 393
Procedures based on other generally binding regulations	Other procedures
	No
Administration of national register of sources of forest reproductive material based on Act No 217/2004 Coll. under their jurisdiction	507
Issuance of standpoints based on Act No 50/1976 Coll.	534
Issuance of standpoints based on Act No 586/2003 Coll.	164
Issuance of standpoints based on Act No 543/2002 Coll.	142
Procedures investigated by prosecutor's office based on Act No 153/2001 Coll.	60
Inspections conducted by inspecting bodies of DFOs based on Act No /1996 Coll.	35
Court investigated procedures based on Act No 99/1963 Coll.	7
Participation in court hearings based on Act No 99/1963 Coll.	8
Agenda related to complaint handling based on Act No 152/1998 Coll.	23
Participation in committees on land reform projects based on Act No 330/1991 Coll.	167
Issuance of standpoints on land reform projects based on Act No 330/1991 Coll.	107

Table 15.1–12 – Regional Forest Office – Administrative Code procedures and other procedures

Procedures based on Act No 326/2005 Coll on forests in the wording of the pursuant regulations	Other procedures
	No
Participation in reprivatisation procedures based on Act No 229/1991 Coll.	310
Issuance of extracts and information from the Register of Land Associations based on Act No 71/1967 Coll.	377
Total	16 954

Source: Forestry Department, MA SR

Table 15.1–13 District Forest Offices – Administrative Code procedures

Procedures based on Act No 326/2005 Coll on forests in the wording of the pursuant regulations	Decisions
	No
Designation of forest property (§ 3, Sec. 3)	42
Issuance of statements doubting the property category (§ 3, Sec. 2)	196
Permanent exemption of forest properties (§ 5) – permanent change to forest property use	92
Permanent exemption of forest properties (§ 5) – permanent change of property category	288
Temporary exemption of forest properties (§ 5)	202
Restrictions in forest property use (§ 5)	144
Approval of extensions to a standard period of regeneration of non-stocked forest land (§ 20, Sec. 4)	72
Approval of extensions to a standard period of young forest establishment (§ 20, Sec. 6)	27
Approval of timetables for incidental felling (§ 23, Sec. 6)	24
Decision on uses of other properties (§ 24, Sec. 3)	7
Decision on forest road uses (§ 25, Sec. 4)	1
Approval of exemptions from bans on specific uses of forest properties based on § 31 Sec. 6	649
Introduction of additional measures ensuring citizen safety and property protection based on § 33, Sec. 2	57
Imposing measures based on § 34, Sec. 3	6
Approval of certified forest managers for forest units exceeding 2000 ha (§ 47, Sec. 6, Letter b)	1
Imposing/revoking professional management of particular forests (§ 49, Sec. 1)	1
Decision on either establishment or revocation of legal pawn rights (§ 49 Sec. 5)	0
Ban or restrictions in certain activities (§ 62, Sec. 2, Letter c)	8
Imposing measures on removal of irregularities identified by state inspection of forests (§ 62, Sec. 2, Letter d)	105
Decision on forest offences (§ 63)	364
Decision on other administrative sectoral offences (§ 65)	150
Imposing measures on the rectification of consequences of illegal procedures (§ 65, Sec. 3)	53
Decision on compensations for a loss of non-production forest functions (§ 9, Letter b)	53
Decision on penalties (§ 9, Sec. 10)	0
Decision on contributory payment returns (§ 9, Sec. 11)	4
Decision on a division of forest property should resulting property be smaller than 10 000 m ² (§ 11)	12
Imposing forestry amelioration measures and decision on a method and payment of incurred costs (§ 26)	0

Table 15.1–12 – Regional Forest Office – Administrative Code procedures and other procedures

Procedures based on Act No 326/2005 Coll on forests in the wording of the pursuant regulations	Decisions
	No
Imposing forest protection measures [§ 28, Sec. 1, Letter. i) and Section 4]	6
Procedures based on other generally binding regulations	Decisions
	No
Decision on the establishment or revocation of sources of forest reproductive material based on § 7, Sec. 7 of Act No 217/2004 Coll.	173
Specification of the protection period for felling in approved sources based on § 7, Sec.8 of Act No 217/2004 Coll.	155
Imposing special measures based on § 30, Sec. 2 and § 31 of Act No 217/2004 Coll.	2
Decision on entrance of association into the Register of Land Associations based on § 27, Sec. 1 of Act No 181/1995 Coll.	79
Decision on the entrance of changes to the Register of Land Associations based on § 27, Sec. 1 of Act No 181/1995 Coll.	242
Decision on emergency correction tools based on Act No 71/1967 Coll.	72
Decision on procedural issues based on Act No 71/1967 Coll.	482
Access to information based on Act No 211/2000 Coll.	509
Total	4 278

Source: Forestry Department, MA SR

Table 15.1–14 Execution of state authority on game management 2007

A. Administrative procedures					National statistics				
No	Procedure	Act No 71/67 Coll. on administrative procedure	Number Enquiries	Issued decisions				Other (E.G. withdrawn)	
a	b	c	1	Approved	Rejected	Aborted	Stopped	Unfinished	
1.	Appeal against DFOs decisions listed in Table A, No. 1 – 12 of the DFO analysis standards	§ 58	243	125	101	5	4	7	4
2.	Scrutiny of the District Office decision based on Table A, No. 1. - 12 of DFO analysis standards	§ 65	30	10	10		5	1	4
3.	Procedure reopening – ordered	§ 62	2				1		1
	– approved		4	1	1			2	
4.	Prosecutor's protest – retracted from DFO – against the decision of RFO	§ 69	55	2					53
			2	1					1
5.	Decision investigated by court	§ 70	29	8	5		3	13	
B. Procedures not regulated by Administrative Code									
No	Procedure	Legal norm			No				
a	b	c			d				
1.	Complaints handling- justified/ unjustified	Act No 152/98 Coll. on complaints			8 / 22				
2.	Advanced level of hunting exams - applied/ present / successful	Examination order			90 / 79 64				

Source: Forestry Department, MASR

Table 15. 1–15 Administrative procedures

No	Procedure	Act No 23/62 Coll. on hunting in the wording of the pursuant regulations and provisions of Act No 71/67 Coll. on administrative procedure	Number Enquiries	Status				Other (E.G withdrawn)
				Approved	Rejected	Aborted	Stopped	
a	b	c	1	2	3	4	5	6
1.	Approval of hunting grounds, game enclosures and independent pheasantries	§ 5, 6, 7, 8, 13	92	54	11	15	16	12
2.	Decision on approval of leasing contracts	§ 16 Sec. 1	248	193	7	21	17	13
3.	Termination of leasing contracts	§ 16 Sec. 4 Letter e)	2	2				
4.	Termination of leasing contracts	§ 16 Sec. 4 Letter d)	17	14	1		2	
5.	Approval of game population restrictions in non-hunting grounds	§ 29 Sec. 5	19	19				
6.	Imposing disciplinary measures based on MA SR Order No 46/1994 - 100 from 29 March 1994 issuing Unified Hunting and Disciplinary Order (UHDO)	§ 19 Sec. 1 UHDO	818	762	3	5	30	21
7.	Offences under Act No 372/1990 Coll.	—	1	1				
8.	Total No of revocations submitted to lines 1 – 7 of which a) dealt under own jurisdiction	§§ 53, 56, 57 of Administrative Code (AC)	229	59	26			
	– b) delegated to higher authority (RFO)	§§ 57, 58 of AC	2	2				
	– c) settled outside appeal procedure	§§ 65, 66 of AC	228					
	– d) ordered renewal of procedure		2		1			
	– approved following the proposal of procedure party	§ 62 of AC	6					
	– e) prosecutor's protest	§ 69 of AC	54	54	3			

Source: Forestry Department, MA SR

Table 15.1–16 Procedures not regulated by Administrative Code

No	Procedure	Provisions of Act No 23/62 Coll. on hunting in the wording of the pursuant regulations	Total number enquires	Status		
				Approved	Rejected	Unfinished
a	b	c	1	2	3	4
1.	Approval of Land Association statutes	§ 4 Sec. 2	180	176	2	2
2.	Approval of leasing contracts	§ 16 Sec. 1	87	58	1	25
3.	Approval of game management and hunting plans	§ 24 Sec. 2	4 735	4 722	12	1
4.	Permission for unplanned hunts	§ 29 Sec. 4	327	327		
5.	Issuance (extension) of hunting licences	§ 31 Sec. 3	17 710	17 698	7	5
6.	Registered complaints	—	17	5	11	1

Table 15.1–17 Inspection

No	Type	No of inspections / No of hunting grounds	Inspections carried out by DFO staff	Inspections carried out by DFO volunteers
a	b	1	2	3
1.	Inspections of game husbandry	375 / 435	363	46

Table 15.1–18 Disciplinary procedures related to hunting

No	Cases	Total number
a	b	1
1.	All disciplinary offences reported in 2007	851
2.	of which dealt by police	15
3.	Disciplinary procedures opened in 2007	839
4.	Disciplinary procedures concluded by a first degree decision of DFO	808
5.	First degree procedures unfinished by 31 December 2007	34
No	II. Overview of disciplinary offences reported to District Offices by 31 December 2007	Total number
a	b	
1.	Violation of provisions on game selection (improper hunting, concealed trophies, incorrect processing)	704
2.	Other	120

Source: Forestry Department, MA SR

15.2 REFERENCES

1. FAO UN. 2006. Global planted forests thematic study: results and analysis, by A. Del Lungo, J. Ball and J. Carle. Planted Forests and Trees Working Paper 38. Rome (also available at www.fao.org/forestry/site/10368/en).
2. FAO UN. 2007. State of the World's Forests 2007. Rome 2007, 144 p.
3. Fifth Ministerial Conference on the Protection of Forests in Europe. Conference Proceedings, 5–7 November 2007, Warsaw, Poland, 272 p., ISBN 83-922396-9-5.
4. Forest inventory of Slovakia 1949–1953. 1956. Slovak Agriculture Press, Bratislava, 555 p.
5. Forest inventory. 1960. Ministry of Agriculture, Forestry and Water Management, 614 p.
6. KUNCA, A. *et al.* 2008. Incidence of harmful agents in Slovak forests in 2007 and prediction for 2008. Research Paper. NFC-FRI Zvolen, 101 p., ISBN 978-80-8093-052-3.
7. NFC-IFRI. 2008. Compendium of Slovak forestry statistics (SFMP, PFI), 31 December 2007. Zvolen.
8. KONÓPKA, J. *et al.* 1999. Analysis of trends and current status of forestry in the Slovak Republic (1990–1998). Forestry Studies, No 55, Forest Research Institute Zvolen, 268 p., ISBN 80-07-01173-0.
9. MORAVČÍK, M. *et al.* 2007. Trends in Slovak agriculture, food production, forestry and rural development – chapter forestry. Report. NFC-FRI Zvolen, 66 p.
10. MORAVČÍK, M., NOVOTNÝ, J., TOMA, P. *et al.* 2007. National Forestry Programme. MA SR, NFC-FRI Zvolen, 63 p., ISBN 978-80-8093-036-3.
11. MORAVČÍK, M. *et al.* 2007. The Green Report 2007. MA SR, NFC-FRI Zvolen, Bratislava, 164 p., ISBN 978-80-8093-018-9.
12. MORAVČÍK, M., TOMA, P., KRÁL, F. 2008. National Forestry Programme Action Plan. LES / Slovenské lesokruhy, No 7–8, 2008, 24 p.
13. PAVLENDÁ, P. *et al.* 2006. Monitoring of Slovak forests. Forest Focus. PMS Forests. Annual report. NFC-FRI Zvolen, 116 p.
14. State of Europe's Forests 2007. The MCPFE Report on sustainable forest management in Europe. Jointly prepared by the MCPFE Liaison Unit Warsaw, UNECE and FAO, 247 p., ISBN 10:83-922396-8-7.
15. ŠMELKO, Š., ŠEBEŇ, V., BOŠELA, M., MERGANIČ, J., JANKOVIČ, J. 2008. National inventory and monitoring of Slovak forests 2005–2006. LES / Slovenské lesokruhy, No 5–6, 2008, 15 p.
16. FAO UN. 2006. Global Forest Resources Assessment 2005 – Progress towards sustainable forest management. Rome, 320 p.
17. UNECE, FAO. 2005. European Forest Sector Outlook Study 1960–2000–2020. Main report. UN Geneva, 234 p.

15.3 CONTRIBUTORS

Editor:

Ing. Martin Moravčík, CSc., National Forest Centre Zvolen

For the National Forest Centre:

Doc. Ing. Jozef Konôpka, CSc., Ing. Jozef Tutka, CSc., Prof. Ing. Vladimír Čaboun, CSc., Ing. Mikuláš Černota, Ing. Miroslav Kovalčík, Ing. Ingrid Kriššáková, Ing. Roman Longauer, CSc., Ing. Juraj Macko, Ing. Ludmila Marušáková, Prof. Ing. Július Novotný, CSc., Ing. Milan Oravec, CSc., Ing. Pavel Pavlenda, PhD., Ing. Tibor Priwitzer, PhD., Ing. Marián Radocha, CSc., Ing. Milan Sarvaš, PhD., Ing. Zuzana Sarvašová, PhD., Ing. Matej Schwarz, Ing. Peter Siakel'st., Ing. Miriam Sušková, Ing. Roman Svitok, CSc., Ing. Vladimír Šebeň, PhD., Ing. Igor Štefančík, CSc., Ing. Anna Tučeková, PhD., Ing. Mária Žiaková, CSc.

For the Forestry Department of the Ministry of Agriculture of the Slovak Republic:

Ing. Marián Ondrejčák, Ing. Pavel Toma, Ing. Peter Hulman, Ing. Katarína Šimová, Ing. Juraj Balkovič, Ing. Boris Greguška, Ing. Jozef Dóczy, Ing. Zdenko Lajda, Ing. Eva Hušťáková

Credits for photographs:

Prof. Ing. Vladimír Čaboun, CSc. (photographs No: 1, 2, 4, 8, 14, 25, 27, 30, 33, 39, 41)
 Ing. Matej Schwarz (photographs No: 2, 3, 12, 13, 20, 21, 26, 32, 37, 38)
 Ing. Vladimír Šebeň, PhD. (photographs No: 5, 6, 7, 9, 16, 19, 22, 23, 24)
 Ing. Alexander Halák, PhD. (photographs No: 17, 18, 28)
 Ing. Ludmila Marušáková (photographs No: 31, 34, 35)
 Ing. Milan Zúbrik, PhD. (photographs No: 11, 21)
 Mgr. Slavomír Jendek (photographs No: 40, 43)
 Ing. Martin Moravčík, CSc. (photograph No 36)
 Ing. Viera Petrášová, CSc. (photograph No 29)
 Ing. Miriam Sušková (photograph No 13)
 Ing. Jozef Vladovič, PhD. (cover photograph)

Layout and Design:

Luboš Frič, Lubica Pilná

Translation:

Ing. Zuzana Kmeťová

Published by:

National Forest Centre – Forest Research Institute Zvolen

Contributing agencies and institutions:

Ministry of Agriculture of the Slovak Republic, Bratislava

Ministry of Economy of the Slovak Republic, Bratislava

Ministry of the Environment of the Slovak Republic, Bratislava

Forests of the Slovak Republic, s.e. Banská Bystrica
Forests and Estates Ulič, state enterprise
State Forests of the Tatra National Park, Tatranská Lomnica
Military Forests and Estates of the Slovak Republic, s.e. Pliešovce
School Forests Kysihýbel, Forestry College Banská Štiavnica
School Forests, Forestry College Prešov – Cemjata
Technical University Zvolen
University Forest Enterprise Zvolen
Agricultural Paying Agency, Bratislava
Institute of Forest Ecology of the Slovak Academy of Sciences, Zvolen
Svätý Anton Museum
Slovak Forestry Chamber, Zvolen
Slovak Hunting Union, Bratislava
Statistical Office of the Slovak Republic, Bratislava
Association of the Forest Sector Employers of the Slovak Republic