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# Regional profile of wood mobilisation challenges - Slovenia



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## Template of protocol for regional profiles

### Introduction

Work package 2 of SIMWOOD is entitled “Regional profiles of Wood Mobilisation Challenges”. The aims of WP2 are to:

- assess the current state of knowledge in the model regions in all socio-economic, technical and environmental domains relevant for stronger wood mobilisation and carry out specific studies to close urgent knowledge gaps;
- collect a comprehensive set of best-available, consistent data and information on wood mobilisation domains for all regional forest types, and the European context;
- identify the regions’ main barriers and opportunities for stronger wood mobilisation.

An important first step to deliver on these objectives is to prepare a regional profile that will act as a baseline for the rest of the work in the project. This profile should provide:

- an overview of data/knowledge that is currently available in the regions relating to wood mobilisation<sup>1</sup> by identifying and collating data from a wide range of sources, including national and regional databases, forest information and decision support systems as well as published research findings and grey literature;
- information on the knowledge gaps that exist that may be constraining wood mobilisation;
- a description of local initiatives that have tried to address the problem of mobilisation of wood, i.e. local solutions.

The template is organised in two sections. The first section provides the contextual information, which gives an overview of the situation in relation to the forests and forest owners in the region with an emphasis on characteristics that influence wood mobilisation. The data required in this section are organised into the five mobilisation domains (forest ownership; forest governance; forest management; forest functions; forest harvesting). It is important that the data are consistent so please ensure that you supply the data in the form specified<sup>2</sup>. For each data item listed it is important to also provide a commentary as to the significance of that information for wood mobilisation focussing on whether it is a barrier or a constraint<sup>3</sup>. It is very important that you enter some text in these commentaries – if the particular data item has no relevance for wood mobilisation in your region, please note that in the commentary.

It is essential that the source of the data be specified and some indication as to the quality, i.e. if data are derived from surveys you should indicate the sample size and the form of sampling. If the information/data is not available from the sources indicated in the previous page please use expert opinion noting the organisation in which the expert is based.

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<sup>1</sup> Wood mobilisation is defined as the factors and processes involved in bringing wood to market in the context of sustainable forest management.

<sup>2</sup> If you have any questions regarding the protocol or you require clarification please email WP2 leader (aine.nidhubain@ucd.ie).

<sup>3</sup> Note this is not a commentary on the quality/availability of the data but rather as indicated a commentary on the significance of the data

Section 2 of the template provides you with the opportunity to identify and describe in detail initiatives, i.e. solutions that have been successful in increasing wood mobilisation. This information is vital to the overall objectives of SIMWOOD as it provides the first indication of potential pilot projects.

You will find a glossary at the end of this protocol. Please consult when completing the document.

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## 1. Introduction (prepared by SFS)

Slovenia belongs to the most forested countries in Europe. In 2012 the forest area covered 1.183.434 ha of land which represent 58,4 % coverage of forests. The surface of productive forests amounts to 1.080.805 ha, 98.947 ha are protection forests and 9.501 ha are forest reserves.

Most Slovenian forests are located within the area of beech, fir-beech and beech-oak sites (70 %), which have a relatively high production capacity. 77 % of forests in Slovenia are private owned, 23 % of forests are public (owned by the state or local communes). Larger and undivided forest estates of state-owned forests enable good professional forest management. Private forest estates are small, with an average area of only 2,6 ha and even these are further fragmented into several separate plots. For the great majority the economic interest to manage these forests is relatively low. Private forest property is becoming even more fragmented as the number of forest owners is increasing. According to the latest data, there are already 314.000 (with co-owners even 489.000) forest owners in Slovenia. The major fragmentation of forest property and the number of forest owners and co-owners present a serious obstacle to professional work in private forests, to optimal timber production and utilisation of the existing forest potential.

According to the data from the forest management plans by the Slovenia Forest Service, the growing stock of Slovenian forests amounts to 338.000.000 m<sup>3</sup> or 285 m<sup>3</sup>/ha. The share of growing stock of coniferous trees is 46 %, of deciduous trees 54 %. The annual increment is 8.420.000 m<sup>3</sup> of wood or 7,1 m<sup>3</sup>/ha.

In recent years the cut in Slovenian forests reached around 4 million m<sup>3</sup> annually, 55 % of which have been conifers and 45 % deciduous trees. The cut falls behind the possible one according to forest management plans and it amounts to 68 % of it and 46 % of the current increment.

Damages in forests are mostly caused by weather (wind, sleet, snow) and by insects (mainly by bark beetles). Bark beetles are the most common reason for sanitary cut (33 % of sanitary cut). On average sanitary cut amounts to a third of the entire felling in forests - around 30 %, and in different years it ranges between 19 % and 45 % of the total cut. In February 2014 an ice break devastated the Slovenian forests in central part of the country and damaged over 9mio m<sup>3</sup> of wood on about 500.000 ha.

Preservation of forests in general is good - forests are well preserved both in terms of vegetation and fauna. Good condition and the multifunctional role of the forests is also confirmed by the fact, that forests covers a large share of the 35,5 % of the Slovenian territory included in the European ecological network Natura2000. There are 11 forest habitat types in Slovenia from the list of European endangered habitat types, determined by the Habitats Directive, mostly in a favourable condition.

Forests, which are exceptionally important for the protection of lands from landslides, forests on steep slopes or water banks, forests exposed to wind, forests which in torrent areas withhold excessive outflow of water, forests near the upper forest line and in highly steep slopes are defined as protective forests (92.817 ha).

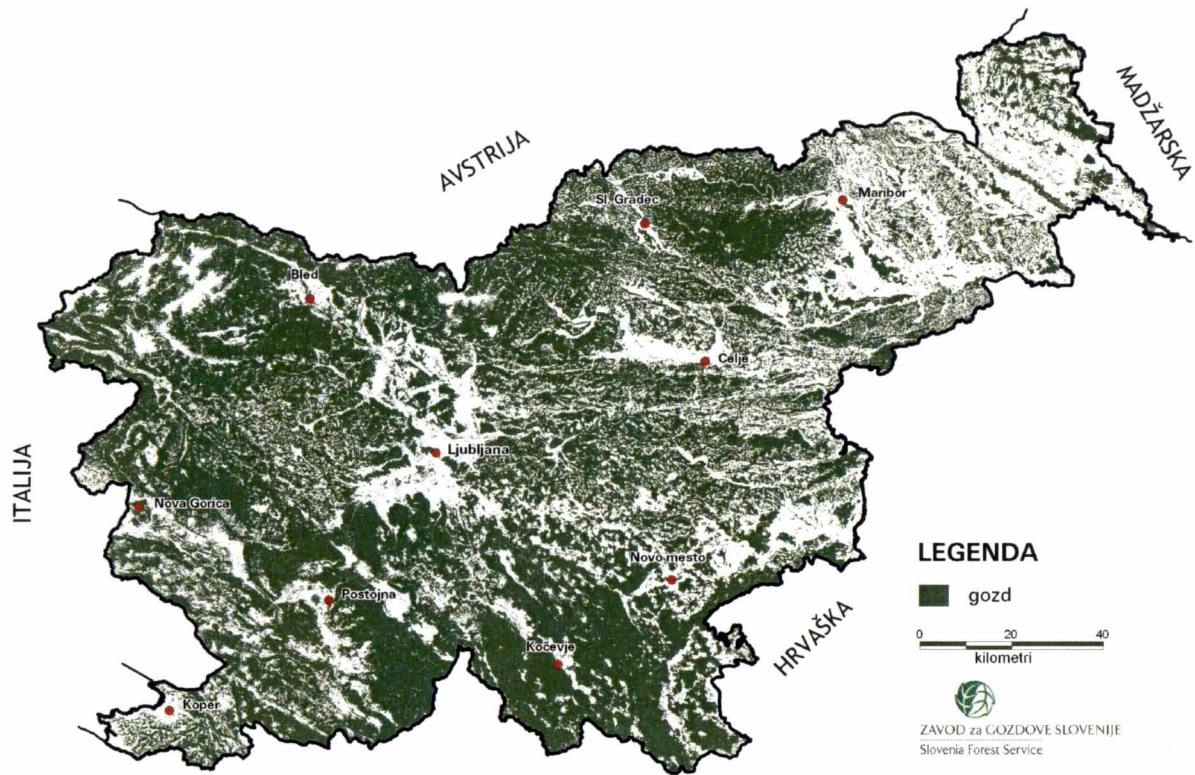


Figure 1: Forest cover in Slovenia (Slovenia Forest Service)

## 2. Context

Please could you indicate what you think are the five most important factors influencing the mobilisation of wood in your model region. (Prepared by SFS)

No.	Factor	Evidence to support judgement
1	Fragmentation of forest holdings	Forest holdings in Slovenia are very fragmented, with the average size of 2,6 ha/owner,
2	Absence of associations among forest owners in the implementation of works in forests and sale of wood	Works in forests could be carried out more rationally if they would be implemented simultaneously in larger areas; in the conditions of fragmented holdings, this can be provided only by cooperation of forest owners
3	Insufficient technical equipment of forest owners for the work in forests	Owners are usually poorly equipped for the work in forest, as they do not find reasonable to invest into equipment because of small intensity of works
4	Insufficient level of interaction among industries, which are based on wood in the sense of industry organisation, production chains and logistics channels	
5	Low level of value added to wood in Slovenia, lack of competitive edge of the primary wood production and reduction of its capacities in past 20 years	

Tractor transport is inadequate. The problem of lacking of forest skidding trails in private forests is similar to the problem of the lacking of forest roads;

Low intensity of forest work – many forest owners, primarily those with small forest holdings (which dominate in Slovenia), do not pay enough attention to forest management. The majority is not trained for work in forest, and that is the main reason why many owners are not ready to carry out forest works despite the co-funding by the state and the EU. With the reduction of the of forests renewals by planting (where this is necessary) and of the necessary tending and silviculture works, forests deteriorate in the long run regarding the economic aspect;

Fragmentation of forest holdings – forest holdings in Slovenia are very fragmented, with the average size of 2,6 ha/owner, whereas co-owners are not taken into account;

Joint ownership is frequently a hindering factor in forest management; forest holdings are usually divided into separated parcels, which additionally hamper forest management and their development;



Insufficient technical equipment of forest owners for the work in forests – due to small size of forest holdings, forest owners are usually poorly equipped for the work in forest, as they do not find reasons to invest into equipment because of small intensity of such works. The consequences are less portion of cut wood in accordance of allowable cut in private forests and high number of fatal accidents among private forest owners. This problem can also be effectively solved to connect forest owners in associations.

Insufficient competence of forest owners for the work in forests – due to small intensity of works in forests as a consequence of small size of forest holdings, forest owners are insufficiently competent for the work in forests, which also reflects in poor economic results. This problem can also be effectively solved to connect forest owners in associations.

Low level of innovation regarding the marketing of other functions of forests, related to non-wood forest products and services provided by forests;

Insufficient level of interaction among wood based industries regarding the industry organisation, production chains and logistics channels;

Insufficient social awareness of the importance of wood and consequently insufficiently exploited wood potential;

Low level of value added to wood in Slovenia;

Lack of competitiveness of the primary wood processing industry and reduction of its capacities in the last decades.

## 2.1 Forest Ownership

In this section please present the most up-to-date data for your region where available. Please indicate the year of publication of the data; also indicate the year of survey, if different. Please provide a commentary outlining the significance of the data for wood mobilisation.

### 2.1.1 Productive forest area by ownership categories (prepared by SFS)

Table 2.1.1-1: Productive forest area by ownership categories (2012)

Ownership type	Area (hectares)	%
State	224.986,53	20,8
Local government or commune (NOT private community ownership)	21.136,98	2,0
Industrial private owners	834.681,41	77,2
Non-industrial private multiple ownership		
Non-industrial private individual or family owners		
Other categories relevant to your region	/	/
Total	1.080.804,92	100,0

#### Commentary:

The ownership structure of forests (data from SFS forest management plans – 2012) shows, that 77,2 % of forests are owned by private persons. Data about the structure of forest owners is not available in detail but industrial private ownership and non-industrial private multiple ownership are very rare in Slovenia. Due to process of denationalisation after 1991 a share of public (state owned and local communes) has decreased to 23 %, which put Slovenia among European countries with the lowest share of national forests.

The average private forest holding is small, with the area of 2,6 ha, and is usually divided into several separated parcels. The size of holdings is decreasing in the process of inheritance. This hampers the management with private forests and reduces interests from owners for forest management. In small forest holding, younger development phases are frequently neglected, which leads to poor growth of stable and quality forest.

### 2.1.2 Size distribution of forests (prepared by SFI)

Table 2.1.2-1 Productive forest area by number of holdings

Area	Number of owners	%	Area	%
<b>State</b>				
Under 1 ha	55	56,7	12	0,01
> 1 to 2 ha	12	23,4	17	0,01
> 24 to 5 ha	11	11,3	37	0,02
>5 to 10 ha	7	7,2	51	0,02
> 10-50 ha	5	5,2	91	0,04
> 50 – 100 ha	1	1,0	59	0,03
> 100-200 ha	0	0	0	0
> 200-500 ha	0	0	0	0
> 500-1000 ha	3	3,1	2.466	1,2
> 1000 ha	3	3,1	203.209	98,7
Total	97	100	205.942	100
<b>Local government/commune</b>				
Under 1 ha	108	32,9	28	0,1
> 1 to 2 ha	32	9,8	48	0,2
> 24 to 5 ha	43	13,1	135	0,5
>5 to 10 ha	30	9,2	217	0,9
> 10-50 ha	71	21,7	1.660	6,5
> 50 – 100 ha	11	3,35	766	3,0
> 100-200 ha	11	3,4	1522	6,0
> 200-500 ha	14	4,3	4221	16,6
> 500-1000 ha	5	1,5	3455	13,6
> 1000 ha	3	0,9	13.434	52,7
Total	328	100	25.486	100
<b>Non-industrial private individual /family owners</b>				
Under 1 ha	218.991	63,2	69.155	9,8
> 1 to 2 ha	48.663	14,1	69.199	9,8
> 24 to 5 ha	45.809	13,2	144.280	20,4
>5 to 10 ha	20.039	5,8	139.605	19,7
> 10-50 ha	12.339	3,6	219.596	31,0
> 50 – 100 ha	435	0,1	28.348	4,0
> 100-200 ha	130	0,04	17.688	2,5
> 200-500 ha	41	0,01	12.364	1,7
> 500-1000 ha	3	0	2.310	0,3
> 1000 ha	5	0	6.127	0,9
Total	346.455	100	708.671	100
<b>Industrial private owners, Non-industrial private multiple ownership, Other</b>				
Under 1 ha	1.863	55,7	563	1,1
> 1 to 2 ha	348	10,4	497	1,0
> 24 to 5 ha	396	11,8	1.282	2,5

>5 to 10 ha	300	9,0	2.129	4,2
> 10-50 ha	350	10,5	7.061	13,8
> 50 – 100 ha	40	1,2	2.562	5,0
> 100-200 ha	25	0,8	3.549	7,0
> 200-500 ha	16	0,5	4.929	9,6
> 500-1000 ha	3	0,1	1.873	3,7
> 1000 ha	4	0,1	26.748	52,3
Total	3.345	100	51.191	100

**Commentary:**

The data are available for the number of owners not for the number of holdings and are extracted from database for year 2012. The data in table are based on the land register, which is covered with land use by Ministry of agriculture and the environment. These data deviate by 20.000 ha from Slovenia Forest Service's database which are based on the stand map.

Archdioceses, enterprises and agrarian communities and other are classified under the category Industrial private owners, non-industrial private multiple ownership, other. The forest area owned by Slovenian archdioceses account approx. 15.000 ha and the forest area owned by agrarian communities is approx. 50.000 ha.

**2.1.3 Characteristics of non-industrial private forest owners (NIPFs) (prepared by SFI)**

a) Please provide the following information on the socio-demographic characteristics of NIPFs

**AGE:**

Forest area	Average [years]	Range [years]
<1 ha	59	19 - 82
1 to less than 5 ha	50	18 - 99
5 to less than 15 ha	52	19 - 84
15 to less than 30 ha	49	18 - 81
>30 ha	47	17 - 75
Do not know	50	18 - 78
Total	51	17 - 99

**GENDER:**

Forest area	Male [%]	Female [%]
<1 ha	48,9	51,1
1 to less than 5 ha	59,6	40,4
5 to less than 15 ha	69,8	30,2
15 to less than 30 ha	75,0	25,0
≥30 ha	67,4	32,6
Do not know	34,0	66,0
Total	59,0	41,0

## NUMBER OF HOUSEHOLD MEMBERS:

Forest area	1 [%]	2 [%]	3 [%]	4 [%]	≥ 5 [%]
<1 ha	14,0	27,9	20,6	27,2	10,3
1 to less than 5 ha	7,1	15,5	16,5	31,7	29,2
5 to less than 15 ha	9,4	18,0	18,0	27,3	27,3
15 to less than 30 ha	6,3	16,7	16,7	18,8	41,7
≥30 ha	2,2	21,7	10,9	10,9	54,3
Do not know	15,4	15,4	19,2	30,8	19,2
Total	9,0	18,7	17,3	27,9	27,0

## OCCUPATION:

Forest area	Persons in employment [%]	Self-employed [%]	Employed [%]	Other [%]	I don't want to answer [%]
<1 ha	53,4	3,8	42,1	0,0	0,8
1 to less than 5 ha	50,4	7,1	41,8	0,4	0,4
5 to less than 15 ha	53,5	8,8	37,7	0,0	0,0
15 to less than 30 ha	68,6	8,6	22,9	0,0	0,0
≥30 ha	36,8	26,3	36,8	0,0	0,0
Do not know	60,4	1,9	35,8	0,0	1,9
Total	53,0	6,9	39,4	0,2	0,5

## EDUCATION:

Forest area	Primary school [%]	Vocational school [%]	Secondary school [%]	High school or more [%]	I don't want to answer [%]
<1 ha	4,6	8,7	38,9	47,8	0,0
1 to less than 5 ha	4,1	11,5	45,3	36,9	2,2
5 to less than 15 ha	5,9	15,6	50,8	24,8	2,9
15 to less than 30 ha	6,5	17,4	45,7	30,4	0,0
≥30 ha	5,6	11,1	38,9	44,4	0,0
Do not know	2,3	4,6	41,6	46,2	5,2
Total	4,5	11,2	44,4	38,0	2,0

## Commentary:

The data are taken from the two research carried out by Slovenian Forest Institute within the framework of two national projects. In early 2011 the first telephone survey of the forest owners has been carried out on the territory of Slovenia. The number of respondents who owns the forest is in total 634. The other telephone survey was carried out in one municipality in Slovenia on a sample of 102 forest owners. The results are divided into classes according to the forest area. In our opinion, the result is representative at the state level.

**2.1.4 Forest owner objectives (prepared by SFS)**

Please indicate the proportion of forest area / ownership category, with different management objectives for their forest. If a typology has been completed in your region that does not coincide with the list presented below please provide your regional typology

Table 2.1.44-1 Percentage of forest area by ownership type and forest management objective.

	Production (timber and/or NWFP)	Amenity (including landscape, amenity, recreation)	Conservation	Multiple objectives (all of above)	No management
State					
Local government or commune (NOT private community ownership)	forest functions				
Industrial private owners					
Non-industrial private multiple ownership (joint private ownership)					
Non-industrial private individual or family owners					
Other categories relevant to your region					

**Commentary:**

Description of forest owners' objectives is based on Slovenian system for valorisation of forest functions, which has been carried out at preparation of Regional forest management plans for the period 2011 – 2012 for whole Slovenia. Data for different forest owners' categories are not available.

Functions are defined on three levels of importance:

1<sup>st</sup> level – forest function defines management with forests

2<sup>nd</sup> level - forest function influences management with forests

3<sup>rd</sup> level - forest function partially influences management with forests

Detailed data about forest areas where special goals of forest management are pronounced are given in following table:

**Table:** Forest areas with forest functions on different levels of pronunciation (ha) – data are from year 2010

Forest function	1st level		2nd level		3rd level		Total ha
	ha	%	ha	%	ha	%	
Protection of forest soils and stands	190.941	15	309.039	25	737.873	60	1.237.853
Hydrological function	63.240	5	554.471	45	623.144	50	1.240.856
Biodiversity	62.469	5	740.606	60	438.864	35	1.241.939
Climatic	35.579	3	43.179	3	1.162.067	94	1.240.825
Protective – protection of infrastructure	27.105	83	5.390	17			32.496
Health	28.556	2	74.190	6	1.138.079	92	1.240.825
Recreation	30.295	3	62.087	6	907.048	91	999.431
Tourism	30.800	2	30.208	2	1.178.758	95	1.239.766
Educational function	7.615	1	5.288	0	1.226.888	99	1.239.790
Research	9.421	100	0	0	0	0	9.421
Conservation of natural heritage	36.739	17	180.978	83	0	0	217.717
Conservation of cultural heritage	5.376	3	165.241	97	0	0	170.617
Aesthetic	35.189	29	86.501	71	0	0	121.690
Defence function	14.125	47	15.638	53	0	0	29.762
Wood production	740.328	64	302.934	26	112.609	10	1.155.871
Non wood forest products	17.715	7	249.979	93	0	0	267.694
Hunting and game management	35.029	100	0	0	0	0	35.029

### 2.1.5 Harvesting activities of private forest owners

- a) Indicate what percentage of private forest owners that have harvested in the past five years (prepared by SFS)

According to the analysis of land holding structure (Analiza posestnega stanja in predlogi za učinkovitejše zagotavljanje izpolnjevanja zakonskih obveznosti v zasebnih gozdovih na gozdnogospodarskem območju Bled = Analysis of land holding structure and proposals for efficient fulfillment of legal obligations in private forests in the forest management unit Bled, 2005), the proportion of active forest owners estimates in range 40–50 %. The number of active owners varies from year to year, but never exceeds 50 %. These proportions are valid for the entire country.

- b) Provide any additional data you have on who has harvested, where etc. (prepared by SFI)

#### WHO HAS HARVESTED

Forest area	Forest owner or household members [%]	Forest owner or household members + other [%]	Other [%]
<1 ha	43,8	25,9	30,4
1 to less than 5 ha	58,5	16,3	25,2
5 to less than 15 ha	62,2	22,8	15,0
15 to less than 30 ha	54,2	18,8	27,1
≥30 ha	42,2	31,1	26,7
Do not know	48,9	11,1	40,0
Total	54,8	19,9	25,3

#### AT LEAST ONE HOUSEHOLD MEMBER IS QUALIFIED FOR FELLING TREES

Forest area	Yes [%]	No [%]
<1 ha	43,6	56,4
1 to less than 5 ha	70,4	28,9
5 to less than 15 ha	78,9	20,2
15 to less than 30 ha	71,4	28,6
≥30 ha	73,7	26,3
Do not know	50,9	49,1
Total	64,8	34,7

#### PREDOMINANT PART OF THE OWNER'S FOREST IS IN DISTANCE OF LESS THAN 10 KM FROM THE PLACE OF RESIDENCE

Forest area	Yes [%]	No [%]
<1 ha	71,4	28,6
1 to less than 5 ha	72,1	27,9
5 to less than 15 ha	69,3	30,7
15 to less than 30 ha	65,7	34,3
≥30 ha	52,6	47,4
Do not know	64,2	35,8
Total	69,9	30,1

#### Commentary:

The data are obtained from two research carried out by Slovenian Forest Institute within the framework of two national projects (the same as in Chapter 2.1.3.). In early 2011 the first telephone



survey of the forest owners has been carried out on the territory of Slovenia. The number of respondents who owns the forest is in total 634. The other telephone survey was carried out in one municipality in Slovenia on a sample of 102 forest owners. The results are divided into classes according to the forest area. In our opinion, the result is representative at the state level.

## 2.2 Forest Governance

In this section please present the most up-to-date information for your region where available. Please indicate the year of publication of the data; also indicate the year of survey, if different. Please provide a commentary outlining the significance of the data for wood mobilisation.

### 2.2.1 Actors and their programmes (prepared by SFI)

a) What organisations/actors (that is associations, cooperatives, membership organisations) exist to help woodland owners make decisions about woodland management?

- Slovenia Forest Service
- Association of forest owners
- Chamber of agriculture and forestry of Slovenia
- High school of forestry and carpentry Postojna
- Biotechnical faculty, Department for forestry and renewable forest resources
- Slovenian forestry institute

b) For each organisation listed, give name, short description, goals (programme) and structure.

#### Slovenia Forest Service

Slovenia Forest Service (SFS) is a national public forestry service with 700 employees, mostly foresters. SFS main goal is planning of the development of all the forests in Slovenia, no matter of ownership on following fields: forest management planning, silvicultural plans, planning of protection of forests, selection of trees for harvest purposes; extension activities for forest owners; planning of construction and maintenance of forest roads, direction of game and wild animals populations, education of forest owners and public; participation in forest research. In terms of organisational structure, it consists of a central unit (state level) with its expert departments and 14 regional units (regional level). SFS has its own human resources development structure. Tasks of the SFS as public forestry service are determined in the Act on Forests.

(<http://www.zgs.si/eng/about-sfs/organization/slovenia-forest-service/index.html>)

#### Association of forest owners

Association of forest owners of Slovenia was founded in 2006 with the fundamental objective to integrate and represent the local forest owners' associations at the state level. Association currently has twenty-two local associations of forest owners with a total of around 3.000 active members (2012) what is very small in comparison with around 460.000 forest owners in Slovenia. The main task of the Association is to represent and coordinate the interests of its members. Association stimulates the development of private forestry sector and enhances and strengthens the economic

power of the forest owners. It educates and raises awareness of forest owners and cares for the issuance of forestry literature.

(<http://www.gozd-les.com/slovenski-gozdovi/gozdarske-organizacije/zveza-lastnikov-gozdov> - in Slovene)

#### Chamber of Agriculture and Forestry of Slovenia

Chamber of Agriculture and Forestry of Slovenia is the umbrella interest organization of natural and legal persons in the Republic of Slovenia engaged in agriculture, forestry and fishery. Its central task is to protect and represent the forest owner`s interests, to consult them and accelerate economical and environment friendly activities. The Chamber works on 3 levels: Chamber`s Headquarters in Ljubljana, 13 district subsidiaries established throughout Slovenia, 59 local units operating on a local level.

(<http://www.kgzs.si/gv/eu-in-svet/english.aspx>)

#### High school of forestry and carpentry Postojna

High school offers an acquisition of a profession for professional forester, a timber cutter, a tractor driver, a wood buyer and a head of the forestry production.

#### Biotechnical faculty, Department for forestry and renewable forest resources

Biotechnical faculty is the only forestry educational institution at university level in Slovenia. The study programme qualifies students for complete ecosystem forest work in accordance with modern principles of close-to-nature, multipurpose and sustainable management. Such a scheme requires linkage among ecological, economic and technical sciences. (<http://www.bf.uni-lj.si/en/deans-office/study-programmes/academic-study-programmes/forestry-and-renewable-forest-resources/>) The Faculty is also involved in research activities.

#### Slovenian forestry Institute

The Slovenian forestry Institute is a public research institute of national importance, which conducts basic and applied research on forests and forest landscapes, forest ecosystems, wildlife ecology, hunting, forest management, and other uses of the resources and services forests provide. As part of its research programme and related studies, the Institute also provides forestry and environmental services in the public interest. Another of the Institute`s functions is to provide scientific knowledge on all aspects of sustainable development. The Institute's research and development is conducted by scientists who are supported by other members of the Institute`s professional staff and management. Its research programme is organized into six departments, all of which study forests from the standpoint of the sustainable development of society, in balance with the environment.

(<http://en.gozdis.si/about/>)

c) What projects, networks, partnerships or agreements are relevant to wood mobilisation? This section refers not to membership organisations, but to programmes which are implemented to encourage ownership to mobilise wood. For example, Nor Woods in England.

- Rural development programme (RDP): one of the national focuses of the RDP 2014-2020 is also developing short supply chains and the forest-wood chains and improving the quality (<http://www.program-podezelja.si/en/>).

- Machinery ring (in Slovenia there are 46 machinery rings).
- EU projects: provide awareness and promotion of the use of wood (e.g. Proforbiomed; Biomassstradecentre I and II, BioEUParks, Agriforenergy I and II)

<http://proforbiomed.eu/>

<http://www.biomassstradecentre2.eu/Biomass-Trade-Centrell/>

<http://www.bioeuparks.eu/>

<http://www.agriforenergy.com/content/index.php>

d) What methods have been used to:

- Engage people and make decisions?
  - workshops
  - public exhibition of forest management plans
  - public exhibition of the Rural development programme
  - pre-feasibility studies
- Disseminate or share information?
  - workshops
  - various events associated with the forestry (e.g. Slovenian forest week, European forest week, best forest owner in year, study rings, demo events and fairs)
  - forest educational trails
  - other events related to project activities
  - press releases
  - social media
- Build trust and empower local organisations and businesses.
  - project activities
  - workshops

Where known, please distinguish between different owner types.

### 2.2.2 Regulations

a) What regulations must be followed if wood is to be harvested? (prepared by SFI)

- Act on Forests
- Order for the designation of norms for work in forests (only for public forests executors)
- Rules on forest management plans and game management plans
- Rules concerning the construction, maintenance and application method of forest traffic routes
- Rules on felling, managing wood residues, harvesting and stacking of timber assortments
- Rules on the protection of forests
- Decree on concessions for the exploitation of forests owned by the Republic of Slovenia
- Rules on the minimum conditions to be met by the executors of works in forests

More about regulations you can read at:

<http://www.zgs.si/slo/zavod/informacije-javnega-znacaja/zakonodaja/index.html> - in Slovene

- b) What is the level of awareness/compliance with the regulations and how does this affect mobilisation? Please think about how regulations can encourage or discourage mobilisation; this will differ between countries and cultures so don't hesitate to state what might seem obvious to you! (prepared by SFS)

Table 2.2.4-1 Regulations and wood mobilisation

Owner type	Awareness	Compliance	Impact on harvesting / mobilisation
State	Very high (90 %)	High (80 %)	Principles of close to nature forestry which have legal grounds cause some limitations to harvesting and in some cases negatively influence on mobilisation of wood
Local government or commune (NOT private community ownership)	High (80 %)	High (80 %)	Same as above
Private owners	Moderate (60 %)	High (80 %)	Same as above – negative impact more pronounced in small size forest ownership

**Commentary:**

Due to frequent contacts of SFS foresters with forest owners and 20 year of Forest Act regulations on the field of forestry are well known among forest owners, especially in the group of larger estates.

**2.2.3 Incentives** (prepared by SFS)

- a) What incentives are available to forest owners for wood mobilisation (e.g. grants, taxes, prizes)?

Forest owners are responsible for the implementation of all necessary works in their forests. Because of the public importance of forests and their general benefits, the state contributes to investment primarily in private forests, including the maintenance of forest roads. The state entirely funds works in protective forests and torrential areas. Owners of private forests receive subsidies for investment in forests (forestry equipment, forest roads) also from the EU funds – Rural development programme.

Implementation of all works in state-owned forests is provided by the state through the Farmland and Forest Fund of the Republic of Slovenia, which manages state forests and also funds the majority of necessary works.

The state ensures the function of the public forestry service in all forests, ensures payments of compensations for limited use of ownership right in forests, which were declared forests with special purpose, contributes to the construction of forest roads, funds the acquisition and conservation of seeds of forest tree species and in the case of major damages after torrential floods or fires contributes to renewal of damaged forests.

Available budget funds are expected to enable funding and co-funding of the implementation of works in the scope determined in the adopted forest management plans. The share of co-funding of individual tending works in forests is proportionate to their contribution to general benefits. The state thus primarily funds works on the prevention and reduction of disturbances in the functioning of forests and works in protective forests and forests in torrential areas. The state funds and co-funds primarily those works which contribute to the provision of publicly beneficial functions of forests.

b) What incentives for wood mobilisation have been adopted in the region (e.g. grants, taxes, prizes)?

According to above mentioned grounds following incentives, which affect also on wood mobilisation have been adopted in the region:

Financing and co-financing investments in forests – reforestation, tending of forest stands, maintenance of the habitat of wild animals in private forests.

Funds from the budget of the Republic of Slovenia are provided according to the yearly Program of investment in forests prepared by Slovenia Forest Service.

The budget of the Republic of Slovenia in accordance with the Law on Forests also provide resources for maintenance of forest roads and construction / reconstruction of forest roads.

State also finance or co-finance of additional activities in forestry such as compensation due to the limitation of ownership in the woods with a specific purpose in private ownership, the purchase of protective forests and forests with special purpose, supports cooperation and aggregation of forest owners into associations.

a. What has been the impact?

Table 2.2.3-1 Incentives and wood mobilisation

Owner type	Incentives available	Degree to which these have been adopted	Impact on harvesting / mobilisation
State	Purchase of new forestry technology and personal protective equipment.	90	Positive, rise of forest production efficiency

Local government or commune (NOT private community ownership)	Constructing forest roads and skidding trails, purchase of new forestry technology, personal protective equipment.	90	Positive, rise of forest production efficiency
Private owners	Constructing forest roads and skidding trails, purchase of new forestry technology, personal protective equipment.	100	Positive, rise of forest production efficiency, limited only on few forest holdings

**Commentary:**

Amount of funding and co-funding of investment in forests is decreasing in past five years what also affects result of those financial support mechanisms. An important goal is to simplify the system of funding and co-funding as much as possible and make it more understandable to the entire public. Co-funding of activities which increase added value of wood and other products acquired from forests, and economic activities which exploit non-material functions of forests are based on EU Rural Development Programme and not fully utilized.

**2.2.4 Advice and information**

a) What advisory services, consultants etc. exist to help woodland owners make decisions about woodland management? (prepared by SFS)

1. Slovenia Forest Service (ZGS/SFS);
2. Slovenian Forestry Institute (SFI);
3. Faculty for Forestry and Renewable resources (BF);
4. Chamber of Agriculture and Forestry of Slovenia (KGZS);
5. Association of forest owners (ZLGS).

b) Who provides it and whether it is free or must be paid for? (prepared by SFS)

Most of the advisory services are paid from the state budget and therefore free for forest owners. Only small part is paid through membership fee (Agriculture and Forestry chamber (KGZS) and Private Forest owners association (ZLGS).

c) For each organisation listed, give name, short description, goals and structure – described also at 2.2.1 paragraph (prepared by SFS and SFI)

### 1. Slovenia Forest Service (ZGS/SFS)

Slovenia Forest Service (SFS) is a national public forestry service with 700 employees, mostly foresters. SFS main goal is planning of the development of all the forests in Slovenia, no matter of ownership on following fields: forest management planning, silvicultural plans, planning of protection of forests, selection of trees for harvest purposes; extension activities for forest owners; planning of construction and maintenance of forest roads, direction of game and wild animals populations, education of forest owners and public; participation in forest research. In terms of organisational structure, it consists of a central unit (state level) with its expert departments and 14 regional units (regional level). SFS has its own human resources development structure. Tasks of the SFS as public forestry service are determined in the Act on Forests.

### 2. Slovenian Forestry Institute (SFI)

The Slovenian forestry Institute is a public research institute of national importance, which conducts basic and applied research on forests and forest landscapes, forest ecosystems, wildlife ecology, hunting, forest management, and other uses of the resources and services forests provide. As part of its research programme and related studies, the Institute also provides forestry and environmental services in the public interest. Another of the Institute's functions is to provide scientific knowledge on all aspects of sustainable development. The Institute's research and development is conducted by scientists who are supported by other members of the Institute's professional staff and management. Its research programme is organized into six departments, all of which study forests from the standpoint of the sustainable development of society, in balance with the environment.

(<http://en.gozdis.si/about/>)

### 3. Biotechnical faculty, Department for Forestry and Renewable forest resources (BF)

Biotechnical faculty is the only forestry educational institution at university level in Slovenia. The study programme qualifies students for complete ecosystem forest work in accordance with modern principles of close-to-nature, multipurpose and sustainable management. Such a scheme requires linkage among ecological, economic and technical sciences. (<http://www.bf.uni-lj.si/en/deans-office/study-programmes/academic-study-programmes/forestry-and-renewable-forest-resources/>) The Faculty is also involved in research activities.

### 4. Chamber of Agriculture and Forestry of Slovenia (KGZS)

Chamber of Agriculture and Forestry of Slovenia is the umbrella interest organization of natural and legal persons in the Republic of Slovenia engaged in agriculture, forestry and fishery. Its central task is to protect and represent the forest owner's interests, to consult them and accelerate economical and environment friendly activities. The Chamber works on 3 levels: Chamber's Headquarters in Ljubljana, 13 district subsidiaries established throughout Slovenia, 59 local units operating on a local level.

(<http://www.kgzs.si/gv/eu-in-svet/english.aspx>)



## 5. Slovenian association of forest owners (ZLGS)

Association of forest owners of Slovenia was founded in 2006 with the fundamental objective to integrate and represent the local forest owners' associations at the state level. Association currently has twenty-two local associations of forest owners with a total of around 3.000 active members (2012) what is very small in comparison with around 460.000 forest owners in Slovenia. The main task of the Association is to represent and coordinate the interests of its members. Association stimulates the development of private forestry sector and enhances and strengthens the economic power of the forest owners. It educates and raises awareness of forest owners and cares for the issuance of forestry literature.

(<http://www.gozd-les.com/slovenski-gozdovi/gozdarske-organizacije/zveza-lastnikov-gozdov> - in Slovene)

d) What percentage of owners are members of the organisations listed above? (prepared by SFS)

Slovenia Forest Service (ZGS/SFS), Slovenian Forestry Institute (SFI) and Faculty for Forestry and Renewable resources (BF) are institutions established by the state and therefore their services are available to all forest owners. Membership in Agriculture and Forestry chamber (KGZS) is obligatory and fee is paid according to the taxation data of the property. Association of forest owners (ZLGS) and forest owners societies are financed by the fee and contributions of their members.

e) What information relating to wood mobilisation has been disseminated, and how? (prepared by SFS)

Main issues within forestry extension activities related to wood mobilisation are economical part of forest production, efficiency at forest operation, need for cooperation and aggregation of forest owners for common management of forests and common appearance on forest products market.

Dissemination of information is mostly carried out on seminars, workshops, leaflets, on fairs and through individual contact with forest owners.

f) What effect has that information had?

If possible complete the following table:

Table 2.2.4-1 Use of professional support (prepared by SFS)

Type of private forest owner	Providers of professional advice	Costs paid by: (e.g. government; landowner; local association)	Extent to which this service is used	Explanation for usage
State	SFS, BF, SFI	Government	50 %	
Local government or commune (NOT	SFS, BF, SFI	Government	50 %	

private community ownership)				
Private owners	SFS, Chamber of Agriculture and Forestry of Slovenia, Association of forest owners	Government, landowners (fee)	70 %	

**Commentary** (include here why the level of usage is as it is, i.e. information on barriers to usage in terms of economics, culture, tradition).

### 2.2.5 Decision support systems (prepared by SFI)

- a) Outline what decision support systems (i.e. any computer based system that can be used to aid decision-making in forestry) that are available to forest managers/owners (please provide link to webpage where available; otherwise give reference)

Slovenia Forest Service developed few DSS based on forest inventory, forest management and other relevant information's (forest functions, cadastre, ownership...). Two of them are published online and one has a public free access:

- Forest data viewer available at: <http://prostor.zgs.gov.si/pregledovalnik/?locale=en>,
- cadaster of forest roads: EGC available at <http://zgs.gisportal.si/web/profile.aspx?id=EGC@ZGS>.

Forest data viewer is in use in the last year, while latter EGS is still in stage of development and will be open for public when it is finished.

There are also some minor computer based programs (e.g. cost calculation, measurement and unit calculation, etc.) that are available on website of Slovenian forestry Institute ([www.gozdis.si](http://www.gozdis.si)). Slovenian forestry Institute developed also program for optimization of cable crane yarding based on LiDAR data and program will be available for free, but only in the pilot area of project NewFOR who financed its development. This program will be available until the end of September 2014, while payable computer software known as Gnezda is available on CD.

There exist also payable web-sites to collect information about forest estates for sale, wood assortment prices and contact details for subcontractors (e.g. [http://www.mojgozd.net/01\\_apl/07\\_CMS/index.php/sl/](http://www.mojgozd.net/01_apl/07_CMS/index.php/sl/)). The site is organized under association of forest owners and few commercial companies.

- b) Describe the extent to which decision support systems are used by the private and public sector.

The most commonly is used public DSS accessible on the website of the Slovenia Forest Service both for private and public sector. Slovenia Forest Service has also internal DSS used for the purpose of forest managing, preparing forest plans and other plans and it applies to all forests in Slovenia.

## 2.3 Forest Management

In this section please present the most up-to-date inventory data for your region where available. Please indicate the year of publication of the data; also indicate the year of survey, if different. Please provide a commentary outlining the significance of the data for wood mobilisation.

### 2.3.1 Total area of productive forest<sup>4</sup> (prepared by SFS)

Table 2.3.1.-1: Total productive area by species and forest type.

Forest type <sup>5</sup>	Public (ha)			Private (ha)			Total (ha)		
	Hard-wood	Soft-wood <sup>6</sup>	Total	Hard-wood	Soft-wood	Total	Hard-wood	Soft-wood	Total
Boreal forest									
Hemiboreal forest,									
Hemiboreal forest, nemoral softwoodous and mixed broadleaved-softwoodous forest	69 %	31 %	<b>1.464,85</b>	64 %	36 %	<b>20.868,33</b>	65 %	35 %	<b>22.333,18</b>
Alpine coniferous forest	83 %	17 %	<b>13.784,72</b>	82 %	18 %	<b>45.393,66</b>	82 %	18 %	<b>59.178,38</b>
Acidophylous oak and oak-birch forest									
Mesophytic deciduous forest	34 %	66 %	<b>11.954,31</b>	33 %	67 %	<b>74.748,43</b>	33 %	67 %	<b>86.702,74</b>
Beech forest	48 %	52 %	<b>52.035,67</b>	43 %	57 %	<b>343.914,40</b>	44 %	56 %	<b>395.950,07</b>
Mountainous beech forest	35 %	65 %	<b>146.453,00</b>	53 %	47 %	<b>272.342,00</b>	48 %	52 %	<b>418.795,00</b>
Thermophilous deciduous forest	50 %	50 %	<b>17.187,85</b>	41 %	59 %	<b>62.006,77</b>	43 %	57 %	<b>79.194,62</b>
Softwoodous forest of the Mediterranean, Anatolian and Macaronesian regions	77 %	23 %	<b>318,54</b>	83 %	17 %	<b>505,45</b>	80 %	20 %	<b>823,99</b>
Mire and swamp forests	89 %	11 %	<b>37,90</b>	86 %	14 %	<b>34,28</b>	88 %	12 %	<b>72,18</b>
Floodplain forest	16 %	84 %	<b>5.185,50</b>	19 %	81 %	<b>12.569,26</b>	18 %	82 %	<b>17.754,76</b>
Non-riverine alder, birch / aspen forest									
Plantations and self-sown exotic forest									

#### Commentary (include definition of productive forest you use):

<sup>4</sup> Productive forests – Use the definition used in your national inventory and please provide this definition in your report.

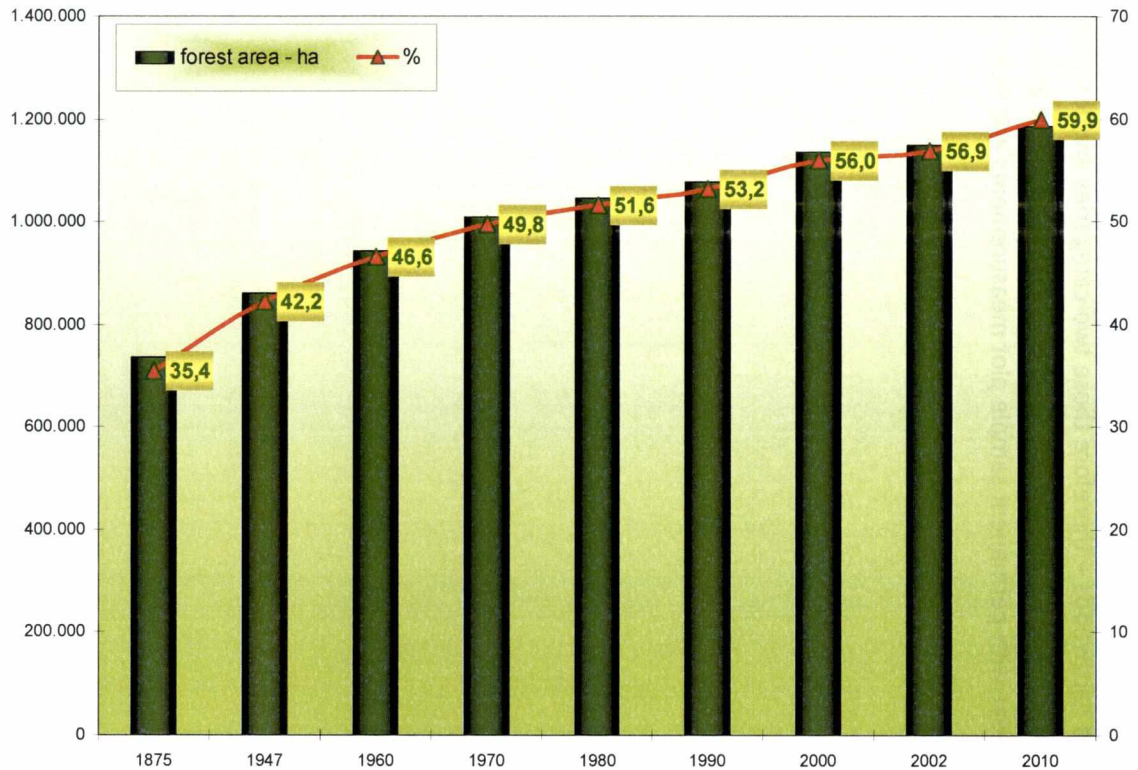
<sup>5</sup> Refer to the DOW where original assignment of your region to a forest type has been made (see [http://www.eea.europa.eu/publications/technical\\_report\\_2006\\_9](http://www.eea.europa.eu/publications/technical_report_2006_9)

<sup>6</sup> Refer to glossary; if it is appropriate for your region to present poplar species separately please do so.

Productive forests in Slovenia are multifunctional forests which do not include protective forests and forests with special purpose where forest management is not allowed.

Due to mostly mixed forests in Slovenia it is hard to define the area of softwoods and hardwoods – therefore those two categories are described with the proportion of broadleaves and conifers in growing stock, according to the data from SFS forest management databases (SFS data about growing stock in forest compartments and sub compartments – 10 % of those data is renewed every year with permanent sample plot measurements and field estimations of SFS planners).

### 2.3.2 Changes in % forest cover over the past ten years, gross and by net additions and reductions (prepared by SFS)



#### Commentary:

The area covered by forests in Slovenia has been constantly increasing for 130 years. The trend of change is not equally distributed across Slovenia. The area covered by forests is increasing in places where there is much forest from the aspect of landscape diversity, while the areas with intensive agriculture and suburban areas are facing strong pressure on forests, which despite efforts to preserve forests gradually lead to clearance of already scarce remains of forests.

Table: Change in the area covered by forests in Slovenia in the 2002–2012 period

Year	2002	2005	2010	2012
Forest area (in 000 ha)	1202	1217	1217	1185
Forest cover (in %)	59,3	59,8	59,8	58,4

Source: National Forest Programme, register of the actual use of lands

**2.3.3 Predicted change of forest cover over the next ten years by ownership type and species (prepared by SFS)**

Table 2.3.3-1: Predicted change of forest cover in next ten years by ownership type and species.

Ownership	Softwoods (hectares +/-)	Hardwoods (hectares +/-)
Public		
Private		
Net change		

Where information is available for more detailed categories of ownership (e.g. state, local government; industrial private; non-industrial joint; non-industrial family) please extend the table to show those categories.

**Commentary (include here the basis of the prediction).**

The increase in forest area or the so-called reforestation of abandoned agricultural land in Slovenia is after more than 130 years of closure. The forest area for two years successively decreased in 2010 and 2011 but has again slightly increased in 2012 namely by 157 ha. The same trend is expected in following years, so forest area will stay the same on national level. Suburban areas and areas of intensive agriculture are still facing major pressures on forest and forest land.

**2.3.4 Present composition of forests in terms of single species stands (prepared by SFS)**

Where information is available for more detailed categories of ownership (e.g. state, local government; industrial private; non-industrial joint; non-industrial family) please extend the table to show those categories.

Table 2.3.4-1 Present composition of productive forests in terms of single species stands

Ownership	% single species stands
Private	46
Public	61
Total	51

**Commentary:**

Definition of single tree species stand has been set to 75 % of one species in forest stand.

### 2.3.5 Total productive area by age-class, species and forest type (prepared by SFI)

Table 2.3.5-1 Total productive area by age class<sup>7</sup> distribution & by species.

	Area (hectares)							
	Regeneration stand	Pole stand	Mature stand	Rejuvenation stage stand	Uneven-aged stand	Pioneer (succession) forest + shrubs		
<b>Private forests</b>								
Softwood	2.393	84.821	166.991	42.303	49.764	8.014		
Hardwood	2.133	164.837	218.034	49.436	46.704	53.981		
<b>Public forests</b>								
Softwood	1.411	24.702	52.225	12.977	17.167	2.388		
Hardwood	1.381	35.600	60.560	17.416	13.786	8.971		
<b>All forests</b>								
Softwood	3.805	109.523	219.216	55.280	66.930	10.401		
Hardwood	3.513	200.437	278.594	66.851	60.490	62.951		

#### Commentary:

For Slovenian forests there is no available data on the productive area by age-classes but by developmental phases and stand structure. Also, in the databases there is no data on the forest area by tree species, but it's only growing stock by tree species and total forest area of stands. Therefore we calculated the area according to the proportions of tree species in the growing stock. So that in the table above are missing the areas where the growing stock is 0 m<sup>3</sup> (total 46.533 ha of forests or 4 %).

All of the data in the table are valid for the year 2012 and are collected through the forest inventory on every 10 years carried out by Slovenia Forest Service (SFS).

<sup>7</sup> If data on age-class distribution are not retained in your model region please present by size distribution



### 2.3.6 Total growing stock<sup>8</sup> (m<sup>3</sup>) by species and age-class (prepared by SFI)

Table 2.3.6-1 Total growing stock (m<sup>3</sup>) by species and age-class.

		Growing stock (m <sup>3</sup> )						
Private forests	Regeneration stand	Pole stand	Mature stand	Rejuvenation stage stand	Uneven-aged stand	Pioneer (succession) forest + shrubs		
Softwood	153.409	20.456.321	66.752.733	11.727.777	14.917.523	637.167		
Hardwood	113.248	35.476.080	75.825.326	12.021.315	11.904.510	6.088.934		
<b>Public forests</b>								
Softwood	110.305	6.802.447	23.399.773	4.247.689	6.144.469	129.282		
Hardwood	85.753	7.862.270	22.800.290	4.941.144	4.222.000	996.951		
<b>All forests</b>								
Softwood	263.714	27.258.768	90.152.506	15.975.465	21.061.991	766.449		
Hardwood	199.000	43.338.350	98.625.616	16.962.460	16.126.510	7.085.885		

#### Commentary:

For Slovenian forests there is no available data on the productive area by age-classes but by developmental phases and stand structure. The minimum diameter (dbh) of a single tree that has a measurable volume and is included in the growing stock is 10 cm.

All of the data in the table are valid for the year 2012 and are collected through the forest inventory on every 10 years carried out by Slovenia Forest Service (SFS).

<sup>8</sup> Please indicate what the minimum size of a single tree that has measurable volume and is included in the growing stock is your region (e.g. in Ireland ≥ 6 cm)

### 2.3.7 Forest management alternative/silvicultural regime (prepared by SFS)

If data on forest type by forest management alternative are available please provide.

Table 2.3.7-1: Forest management alternative<sup>1</sup> used in productive forest area.

Forest Management Alternative	Private (ha)	Public (ha)	Total
Unmanaged forest nature reserve (FMA 1)	2.641,13	7.170,21	9.811,34
Protection forests – felling is allowed	55.123,10	37.694,38	92.817,48
Forests with special purpose – felling is allowed	50.895,52	27.969,00	78.864,52
Multipurpose forests – Close to nature forestry	755.901,30	215.699,38	971.600,68
Coppice forests	25.585,76	4.753,96	30.339,72
Total	890.146,81	293.286,93	1.183.433,74

1. See Duncker, P. S., S. M. Barreiro, G. M. Hengeveld, T. Lind, W. L. Mason, S. Ambrozy, and H. Spiecker. 2012. Classification of forest management approaches: a new conceptual framework and its applicability to European forestry. *Ecology and Society* **17**(4): 51.

#### Commentary:

Silvicultural regime has been described with main categories of Slovenian forests:

Unmanaged forest nature reserve are Forests with special purpose where management is not allowed on legal basis, Protection forests – felling is allowed, but protection function is very pronounced, Forests with special purpose where management / felling is allowed and all other forests -multipurpose forests where Close to nature, multifunctional and sustainable forestry is carried out, based on SFS forest management plans.

### 2.3.8 Management plans by forest ownership type (prepared by SFS)

- a) Please indicate/estimate the percentage of the forest area that you think will have a management plan.

Where information is available for more detailed categories of ownership (e.g. state, local government; industrial private; non-industrial joint; non-industrial family) please extend the table to show those categories.

Table 2.3.8-1: Ownership type by management plan.

Ownership	Species	% of area
Public	Conifer	100
	Broadleaf	100
Private	Conifer	100
	Broadleaf	100
Total		100

#### Commentary:

Forest management plans (FMP) are prepared by Slovenia Forest Service and elaborated for a period of ten years. Cover document is National Forest Programme. On its basis regional forest management plans and forest management plans for forest management units. In those management plans description of the state of forests and their development trends, goals of management in the future are defined, guidelines and measures for the rational implementation of these goals are set.

Lowest level in forest management planning are silvicultural plans, which are also produced by SFS. Planning unit is forest compartment not property.

In planning process Slovenia Forest Service co-operates with environmental organizations. Full attention is given to forests, designated as forests with a special purpose and to all forests located in NATURE 2000 regions. Forest management plans are also plans for maintaining favourable conditions in Natura 2000 sites and for its conservation.

The procedure of adopting forest management plans, as defined by law, enables co-operation of forest owners and the public in public debates. Plans for forest management units are at the end of the procedure adopted by the Ministry of Agriculture and Environment, Forestry and Food. In the case of forest management regions forest management plans are adopted by the government of the Republic of Slovenia.

### 2.3.9 Hazard risks by type (prepared by SFS)

Table 2.3.9-1: The total amount of wood (m<sup>3</sup>) that was damaged by various biotic/abiotic factors during the past five years (2008-2012 inclusive).

Hazard	Public	Private	Total (m <sup>3</sup> )
Pests			1.277.385,20
Fungi, diseases			765.890,80
Game			26.032,66
Wind			957.476,17
Snow			332.865,89
Sleet			25.306,19
Avalanche			26.651,24
Fire			16.270,63
Imissions			17.854,77
Forest production			278.137,73
Other – different causes			404.677,33
Total			4.128.548,61

#### Commentary:

Data are only available for amount of felling (m<sup>3</sup>) in time period 2008 – 2012 and not defined for private and public forests separately.

### 2.3.10 Certification (prepared by SFI)

Table 2.3.10-1 Estimated forest area by ownership type that is certified by an internationally recognised system.

Ownership	System	% of forest area
Public	PEFC	0
	FSC	20
Private	PEFC	1
	FSC	2
<b>Total</b>		<b>23</b>

#### Commentary:

In Slovenia all national forests and 4 larger private forest owners are certified by the FSC system. A quarter of a million ha representing 22% of the total forest area is certified (approx. 220.000 ha public forests and approx. 28.000 ha private forests).

According to the PEFC scheme, approx. 10.000 ha of forests belonging to 320 owners have been certified through a regional certificate in 2013.

The data about certified forest area were taken from the Market statement 2013 for Slovenia.

## 2.4 Forest Functions

In this section please present the most up-to-date data for your region where available. Please indicate the year of publication of the data; also indicate the year of survey, if different. Please provide a commentary outlining the significance of the data for wood mobilisation.

### 2.4.1 Carbon stock per forest type (and % change over the last ten years if available) (prepared by SFI)

Table 2.4.1-1 Carbon stock by forest type and species

Forest type/Area	Total carbon (million tonnes) 2012		% change since 2002
	Hardwood	Softwood	
Boreal forest	/	/	
Hemiboreal forest,	/	/	
Hemiboreal forest, nemoral softwoodous and mixed broadleaved-softwoodous forest	681.000	863.833	
Alpine coniferous forest	1.303.282	4.237.162	
Acidophylous oak and oak-birch forest	/	/	
Mesophytic deciduous forest	5.013.433	1.698.485	
Beech forest and Mountainous beech forest	47.419.149	26.146.880	
Thermophilous deciduous forest	2.011.984	1.057.035	
Softwoodous forest of the Mediterranean, Anatolian and Macaronesian regions	15.063	42.115	
Mire and swamp forests	673	3.257	
Floodplain forest	1.298.448	196.553	
Non-riverine alder, birch / aspen forest	/	/	
Plantations and self-sown exotic forest	/	/	

#### Commentary:

At the moment, there are no available data on carbon stock by above specified forest types in Slovenia. Therefore, we used the data on the growing stock (m<sup>3</sup>) provided by Slovenia Forest Service and calculated these cubic meters into carbon stock. The calculation was carried out according to the methodology described in the Slovenia's national inventory report for 2014 ([https://unfccc.int/national\\_reports/annex\\_j\\_ghg\\_inventories/national\\_inventories\\_submissions/items/8108.php](https://unfccc.int/national_reports/annex_j_ghg_inventories/national_inventories_submissions/items/8108.php)). Data in the table are valid for the aboveground biomass.

#### 2.4.2 Non-wood forest products (mushrooms, cork, foliage, seeds, berries, medicinal plants, game animals, fish, fur, xmas trees etc.) (Prepared by SFS)

- a) Are forests in the region important for the provision of non-wood forest products Select from the following (Very important; Important; Minor importance; Not important)

Non wood forest products are important output – this forest function is pronounced on 1<sup>st</sup> level (very important) on 16.760 ha of forests, on the 2<sup>nd</sup> level (important) on 311.403 ha. Importance of forests is higher on plateaus in the Alps (Pokljuka, Jelovica, Pohorje) and on Mediterranean area in SW Slovenia (wild asparagus).

Hunting is an activity related to sustainable wild game management, which besides the right to use natural goods also includes a commitment to perform public service on that field in order to preserve and protect wild game and their habitat. All planned measures in wild game populations and hunting grounds are managed by hunting clubs (families), and on 12 hunting grounds with special purpose – 10 of them are managed by Slovenia Forest Service, 2 of them are independent - professional hunters are employed.

- b) What is the volume of business (amount and commercial value) in each case?

Name of product	Unit	Quantity	Value (EUR)
Game - hides, skins and trophies	No.	10.269	4.698.961
Wildmeat	No.	44.496	2.972.263
Mushrooms	tons	1.000	1.000.000
Food (Chestnut)	tons	750	375.000
Christmas trees	No.	50.000	1.000.000

#### 2.4.3 Flood control, water quality regulation and supply, air quality regulation, pollution control, soil protection or other regulation service (prepared by SFS)

- a) Are forests in the region important for the provision of the above regulation services? Select from the following (Very important; Important; Minor importance; Not important)

Important - Slovenia is very diverse in terms of terrain. Forests cover more than three quarters of the terrain with the inclination of more than 20 %, and as much as 90 % of the terrain with the inclination of more than 35 %. In Slovenia, erosion occurrences can be found in the area of 9.000 km<sup>2</sup>, while stronger erosion occurrences are present in torrential areas which cover 4.900 km<sup>2</sup>, with more than 10.000 km of flood channels. Forests regulate water drain by mitigating erosion power of raindrops and with great infiltration and containing capacity of forest soil. Hydro-meteorological role of forests is important in Slovenia because of terrain conditions and large quantities of precipitation in Slovenian mountains, which are one of the most precipitated areas in the entire Alpine arc. Ratios between the highest and lowest annual outflow of Slovenian waters indicate that the majority of Slovenian waters have torrential characteristics. Without forests, those characteristics would be strengthened considerably. Due to a high containing and filtration



capacities of forest soil, forests are of an exceptional importance for the preservation of sources of clean potable water.

Climate extremes in forests are mitigated considering the climate outside of forests. By exchanging air with their surroundings, making shade and blocking wind close to ground, forests mitigate climate extremes also in their surroundings. Various particles from polluted air are disposed in forests, and forests act as a filter, which is particularly important in the proximity of the biggest pollution sources (Zasavje, Velenje, Mežica).

Valorisation of forest functions – 1<sup>st</sup> level (forests are very important for provision of forest functions): hydrological function - 57.753 ha, climatic function - 36.497 ha, flood and water erosion control (areas of high water and torrential areas) - 30.154 ha.

b) Are there estimates at the regional (or other) scale of the value of these services?

No.

#### **2.4.4 Tourism (birdwatching, outdoors sports, walking, hunting, fishing, including local amenity etc.) (Prepared by SFS)**

a) Are forests in the region important for the provision of tourism? Select from the following (Very important; Important; Minor importance; Not important)

Recreational function of forests is pronounced on first level on 26.775 ha of forests, touristic function of forests (1<sup>st</sup> level) - 19.765 ha

b) Are there estimates at the regional (or other) scale of the value of forest tourism?

Forest is an important element of the environment for many tourist centres and points, as well as for rural tourism objects; to which forests provide the main content. According to surveys, 60 % of tourist visit Slovenia because of its unspoiled nature. An increasing number of people come to rural tourism farms with the intention to recreate in natural environment.

There are more than 3.700 cultural heritage units in which forest is an important element. Forests offer numerous opportunities for the development of tourism related to the popularisation of cultural heritage, which includes improving conduct and increasing awareness of its importance for the preservation and development of cultural diversity of Slovenia.

Tourism is one of the most important supplementary activities or farm holdings. According to data from 2000 census on agricultural holdings, 14,1 % of the censured family agricultural holdings deal with tourism. This share should be increased and tourist offer should be diversified and improved, which also requires financial investment.

**2.4.5 Biodiversity conservation (e.g., % of forests with a local, national, and international conservation status) (prepared by SFS)**

- a) Are forests in the regions important for biodiversity conservation (e.g., % of forests with a local, national, and international conservation status)? Select from the following (Very important; Important; Minor importance; Not important)

Very important - Forests are rich with different communities and numerous organisms have their habitats in forests. High biodiversity of Slovenian forests is a consequence of very diverse climate, surface and terrain. Slovenia is situated in the junction of sub-Mediterranean and continental climate, while at high altitudes both climates pass over to mountain climate.

The Natura 2000 network covers 35,5 % of the Slovenian territory. As much as 71 % of the area (532.331 ha) of the network is covered by forests, while 50 % of all forests are listed into the Natura 2000 because of the importance of individual habitat types and species considered rare and endangered according to EU criteria. In those areas Slovenia is committed to provide favourable conservation status in 11 forest habitat types of Community importance and for forest plants and animals of species important for Europe.

Biodiversity conservation function of forests on 1<sup>st</sup> degree level is pronounced on 60.517 ha of forests.

- b) Describe the importance of regional forest biodiversity at the region, national and international level (e.g., rare/ threatened ecosystems, habitats, population/species and hot spots).

Forests are rich with valuable natural features. A total of 8876 valuable natural features have been registered in Slovenian forests.

Diversity of autochthonous wild animals in terms of species and population, diversity of their genetic pool and their habitats are exceptional values and important natural asset of Slovenia. Wild animals are a public good and are owned by the state, and that is why the preservation of autochthonous species of wild animals and their habitats is a national interest. Particular attention is paid to large carnivores (bear, wolf and lynx), which were in the past exterminated in the majority of European countries. Today, Slovenia is one of the rare countries in Europe which preserve stable populations of large carnivores, also because of activities in the area of the promotion of coexistence between man and large carnivores.

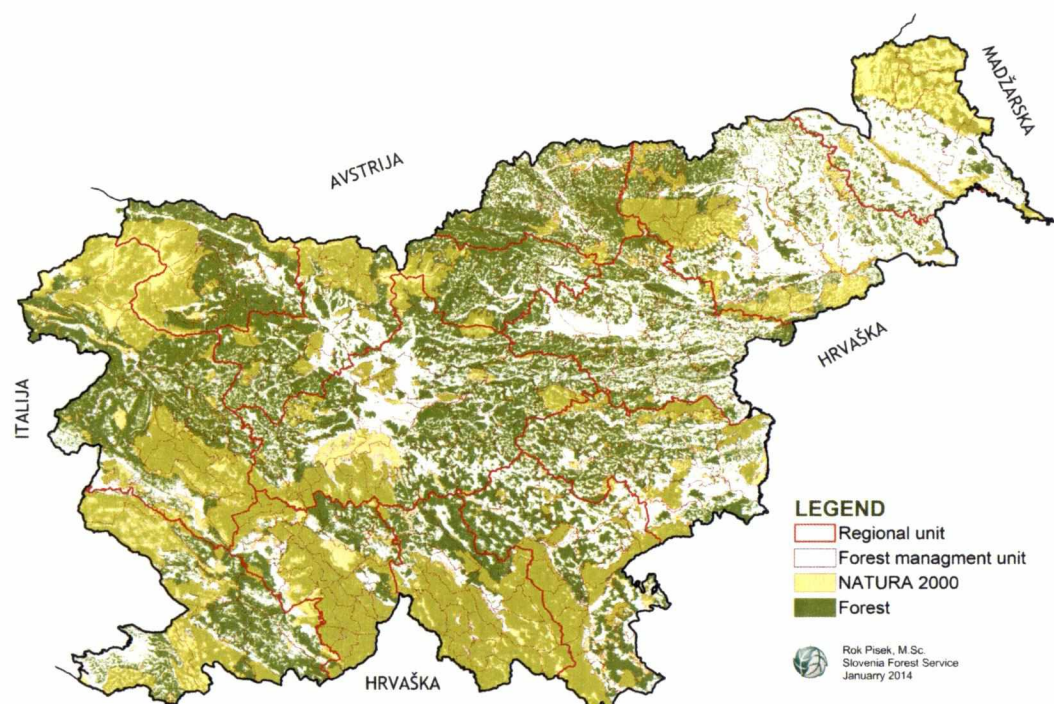


Figure: Natura 2000 areas in Slovenia

#### 2.4.6 Payment for ecosystem services (prepared by SFS)

- a) Are there, locally, nationally, or internationally, schemes for the payment of any of the ecosystem services above?

No special schemes have been developed for payment of ecosystem services.

#### Commentary:

System of funding and co-funding of silvicultural and protection works in forests has special emphasis on functions of forests. The state funds and co-funds primarily those works which contribute to the provision of publicly beneficial functions of forests.

#### 2.4.7 Deadwood (prepared by SFS)

Table 2.4.7-1. Distribution of deadwood with the forest estate

Type	Volume (m <sup>3</sup> )
Lying	
Stumps	
Standing	

Litter	
Below ground	
Other	
Total	

Table 2.4.7-2.a. Distribution of deadwood in forests (source data from permanent sample plots)

	cm	Standing (N./ha)			Lying (N/ha)			SUM (N/ha)			SUM (m <sup>3</sup> /ha)
		conif.	broadl.	sum	conif.	broadl.	sum	conif.	broadl.	sum	
SUM	10-29	3,9	4,5	8,4	5,8	7,8	13,5	9,7	12,3	22,0	7,60
	30-49	0,5	0,6	1,1	0,7	0,9	1,6	1,3	1,5	2,8	4,41
	50+	0,1	0,1	0,2	0,1	0,1	0,2	0,2	0,2	0,4	1,12
	SUM	4,5	5,2	9,7	6,6	8,8	15,3	11,1	14,0	25,1	13,13

## 2.5 Forest Harvesting

In this section please present the most up-to-date data for your region where available. Please indicate the year of publication of the data; also indicate the year of survey, if different. Please provide a commentary outlining the significance of the data for wood mobilisation.

### 2.5.1 Markets

#### 2.5.1.1. Annual harvest volume and increment

Table 2.5.1-1 Annual harvest volume (in m<sup>3</sup> over bark) in 2012. (Prepared by SFI)

Annual harvest volume	Hardwood	Softwood	Total
<b>Private forests</b>			
Logs	147.442	1.058.649	1.206.091
Pulpwood	5.330	127.038	132.368
Other industrial roundwood	13.857	21.173	35.030
Fuelwood	908.189	184.223	1.092.412
Total	1.074.818	1.391.083	2.465.902
<b>Public forests</b>			
Logs	120.304	485.359	605.662
Pulpwood	296.168	130.954	427.122
Other industrial roundwood	9.458	24.709	34.167
Fuelwood	100.844	7.442	108.286
Total	526.774	648.463	1.175.237
<b>All forests</b>			
Logs	267.746	1.544.008	1.811.754
Pulpwood	301.498	257.992	559.489
Other industrial roundwood	23.316	45.882	69.197
Fuelwood	1.009.033	191.665	1.200.698
Total	1.601.592	2.039.546	3.641.139

Table 2.5.1-2 Annual increment (in m<sup>3</sup> over bark) in 2012. (Prepared by SFS)

Annual increment	Hardwood	Softwood	Total
Private forests	2.728.387,13	3.693.757,25	6.422.144,38
Public forests	969.613,54	1.100.125,49	2.069.739,03
All forests	3.698.000,67	4.793.882,74	8.491.883,41

Where information is available for more detailed categories of ownership (e.g. state, local government; industrial private; non-industrial joint; non-industrial family) please extend the table to show those categories.

**Commentary:**

In table 2.5.1-1 the information's were obtained from statistics by The Joint Forest Sector Questionnaire (JFSQ). The data are divided into four categories: logs, pulpwood, other industrial roundwood and fuelwood.

### 2.5.1.3 Details of market in region (prepared by SFI)

Table 2.5.1-3: Details of sawmills operating in region.

	Hardwood	Softwood	Total
No of Sawmills			2101 / (70)
Yearly demand for raw material			650.500 m3
Assortment (main quality dimensions)			Target sawn wood
Average distance (km) from forest to the factory			52
Average timber value per main product type at the roadside (€/m <sup>3</sup> )			
The details on cost below should be by main logging system, forest type/owner type where available			
Average felling cost (€/m <sup>3</sup> )			
Average extraction <sup>1</sup> costs (€/m <sup>3</sup> )			
Average haulage <sup>2</sup> costs (€/m <sup>3</sup> )			
Market development (increasing, stable, decreasing)			decreasing

1. Extraction – within forest haulage; 2: transport from forest to mill

#### Commentary:

According to The Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES) 2101 companies (sole proprietors, limited liability companies, joint-stock company, performer of supplemental farming activity) registered sawmilling and planning of wood C16.100 (according to standard classification of activities) as their main activity.

In frame of the ID: WOOD project (South East Europe Transnational Cooperation Programme) a survey with the title "Sawmills in Slovenia" was carried out in 2013. The aim of the survey was to obtain an overview about technological equipment of Slovenian sawmills. The questionnaire was sent to 880 companies from the AJPES list, but only 70 of them replied. The data given below are based on answers provided by the survey participants.

- The total capacity of all sawmills participating in the survey was around 650.500 m3/year (since not all companies provided the correct data).
- In 2012 the sawmills (participating in survey) sawn 459.337 m3 of wood which is around 70 % of the available capacities.
- Most of the companies indicated that they are sawing more than 80 % of coniferous and less than 20 % of deciduous species. Only a few companies indicated that they saw more than 80% of hardwoods.

- Average transportation distance of raw material from forest to the sawmills is 52 km. The most common range of feedstock transport is between 20 and 50 km. There is also a high share of those companies with feedstock transportation distances less than 20 km.
- Target sawn wood is the most common product type, followed by construction wood and standard wood.
- The products are mainly sold locally, regionally and in Slovenia. A relatively high share of sawmills use their products for their own use in further production steps. Only a few sawmills involved in the survey export their products abroad.



Table 2.5.1-4: Details of pulpmills/panelboard mills operating in region.

	Hardwood	Softwood	Total
No of factories	/	/	4
Yearly demand for raw material			Approx. 350.000 m <sup>3</sup>
Assortment (main quality dimensions)	Pulpwood	Pulpwood	Pulpwood
Average distance (km) from forest to the factory	/	/	/
Average timber value per main product type at the roadside (€/m <sup>3</sup> )	38,1	28,2	66,3
The details on cost below should be by main logging system, forest type/owner type where available			
Average felling cost (€/m <sup>3</sup> )	/	/	27,30
Average extraction cost (€/m <sup>3</sup> )	/	/	
Average haulage <sup>2</sup> costs (€/m <sup>3</sup> )	/	/	/
Market development (increasing, stable, decreasing)	/	/	Stable

1. Extraction – within forest haulage; 2: transport from forest to mill

#### Commentary:

The information's in table relate only to the roundwood. The total number of factories is divided into pulp factory, factory for production of medium-density fibreboard (MDF) and factory for production of particle boards. In this table the plywood mills, shuttering panel mills and chemical factories are excluded.

The average timber value is obtained from the database of the Statistical office of the Republic of Slovenia (SURS) and it applies to the price of timber on the truck road.

Regarding the second part of the table, the average felling cost and extraction cost are available only in total. The number (27,30 €/m<sup>3</sup>) is obtained from the concession holders report (Poročilo o delu in zaključni račun Sklada kmetijskih zemljišč in gozdov RS za leto 2012) and it's the average for 1 mio m<sup>3</sup> of felling of 14 Slovenian concession holders. The basis for the calculation of felling and extraction cost are the Slovenian norms.

The data in the table above are valid for the year 2012.

Table 2.5.1-5: Details of energy plants operating in region.

	Hardwood	Softwood	Total
No of plants	/	/	13
Yearly demand for raw material	/	/	/
Assortment (main quality dimensions)	Wood residues, chips	Wood residues, chips	Wood residues, chips
Average distance (km) from forest to the factory	/	/	/
Average timber value per main product type at the roadside (€/m <sup>3</sup> )			Wood chips (16 mm < P < 45 mm): - moisture 30 % → 66 €/t - moisture up to 20 % → 81 €/t
The details on cost below should be by main logging system, forest type/owner type where available			
Average felling cost (€/m <sup>3</sup> )	/	/	27,30
Average extraction cost (€/m <sup>3</sup> )	/	/	
Average haulage <sup>2</sup> costs (€/m <sup>3</sup> )	/	/	/
Market development (increasing, stable, decreasing)	/	/	Stable

1. Extraction – within forest haulage; 2: transport from forest to mill

#### Commentary:

In 2014 in Slovenia there are 13 plants (cogeneration systems, electric power plant and co-incineration) on wood biomass which power is 140 kW to 7,3 MW. Included are also systems where the proportion of wood biomass is up to 5 % (co-incineration) (reference: Agency Borzen, organizer of the electricity market, d.o.o.). At the moment there is no available data on yearly demand for raw material for those 13 plants.

Regarding the second part of the table, the average felling cost and extraction cost are available only in total. The number (27,30 €/m<sup>3</sup>) is obtained from the concession holders report (Poročilo o delu in zaključni račun Sklada kmetijskih zemljišč in gozdom RS za leto 2012) and it's the average for 1 mio m<sup>3</sup> of felling of 14 Slovenian concession holders. The basis for the calculation of felling and extraction cost are the Slovenian norms.

Table 2.5.1-6: Details of firewood market in region.

	Hardwood	Softwood	Total
Yearly demand for raw material	/	/	1.295.550 t – in households
Assortment (main quality dimensions)	Firewood	Firewood	Firewood
Average distance (km) from forest to consumer	/	/	/
Average timber value per main product type at the roadside (€/m <sup>3</sup> )	38,1	26,6	64,7
The details on cost below should be by main logging system, forest type/owner type where available			
Average felling cost (€/m <sup>3</sup> )	/	/	27,30
Average extraction cost (€/m <sup>3</sup> )	/	/	
Average haulage <sup>2</sup> costs (€/m <sup>3</sup> )	/	/	/
Market development (increasing, stable, decreasing)	/	/	Stable

1. Extraction – within forest haulage; 2: transport from forest to mill

#### Commentary:

The total yearly demand for raw material and the average timber value is obtained from the database of the Statistical office of the Republic of Slovenia (SURS). The timber value applies to the price of timber on the truck road.

Regarding the second part of the table, the average felling cost and extraction cost are available only in total. The number (27,30 €/m<sup>3</sup>) is obtained from the concession holders report (Poročilo o delu in zaključni račun Sklada kmetijskih zemljišč in gozdov RS za leto 2012) and it's the average for 1 mio m<sup>3</sup> of felling of 14 Slovenian concession holders. The basis for the calculation of felling and extraction cost are the Slovenian norms.

The data in the table above are valid for the year 2012.

#### 2.5.1.4 Percentage of demand that comes from within the region (prepared by SFI)

It depends on the roundwood assortments.

Generally there are supply surpluses of coniferous sawlogs and hardwoods of lower quality (fuel wood and pulpwood).

#### 2.5.1.5 Predicted changes in the market over the next 10 years (prepared by SFI)

In Slovenia, wood is recognized as a strategic and renewable resource with important future potential. This orientation is reflected in the Action plan to increase competitiveness of forest-wood chain in Slovenia by the year 2020 (Market statement, 2013). It supports the increase and modernization of wood processing, especially wood logs. Another important future programme for Slovenia is called Rural development Programme 2014-2020 which plan is to support rural development in the area of wood mobilization in privately owned forests and local wood processing. The most pertinent measures concerning wood market within the framework of this programme are: improving the economic value of forests, which can have a positive effect on the wood products market and adding value to agricultural and forestry products, which also foresees co-financing of investments in processing and marketing of wood.

In Slovenia the maximum allowable cut has an upward trend and consequently the quantity of timber on the market will increase. Otherwise, the market of timber is unstable and changes from year to year. The import and export of wood are also different depending on the type of product. Therefore it's difficult to predict changes in the market for so long period.

Currently the most increasing the amount of energy from renewable energy sources and will increase also in future. Due to market conditions and further increase of the use of wood for energy purposes, the deciduous tree wood segment structure shall change.

More about developments in the wood products market in Slovenia you can read at:  
[http://www.unece.org/fileadmin/DAM/timber/country-info/Slovenia\\_2013.pdf](http://www.unece.org/fileadmin/DAM/timber/country-info/Slovenia_2013.pdf)

#### 2.5.1.6 Sales of timber (prepared by SFI)

##### a) How is timber sold in your region?

The EU Timber Regulation, which came into force in March 2013, provides that only timber products which have been produced in accordance with the national legislation of the timber-producing country may enter the EU market. In Slovenia, these requirements have been implemented through the Act on Forests which manages the control and jurisdiction, imposes obligations and implements control over the flow of wood (Market statement, 2013).

The timber selling from national forests is carried out by concessionaires and it is based on Decree on Concessions for the Exploitation of Forests Owned by the Republic of Slovenia (2010). The market value of timber assortments is determined by the Republic of Slovenia in the Annual programme of exploitation of forests on the basis of monitoring of prices in Slovenia and the neighbouring countries and the price achieved at public auctions. In accordance with regulation, every log must have information about forest management department, forest management section, worksite, quantity and quality of timber assortments (Decree on Concessions for the Exploitation of Forests Owned by the Republic of Slovenia, 2010). There are a few types of sales of forest products from public and private forests: direct sale to an external buyer (fco buyer or fco forest storage), sale to an external buyer through interim storage, own processing and timber sale on the stump (Breznik, 2009. The performance of forest companies after liberalisation of the forest products market in Slovenia).

Table 2.5.1-7 Method of timber sales (%).

	Standing	Roadside	Mill	Other (please specify)	Total
Public	3	-	-	97 (Concessions)	100
Private	3	87	10	-	100
Total	3	42	5	50	100

b) How do forest owners market/advertise their timber sales?

The majority of private forest owners sell their wood to timber merchants.

Sale of wood under concessions is in the domain of concessionaires (forest companies) and is diversified (domestic wood processing industry, export).

Advertising in the internet portals is present but the significance is in our opinion negligible.

## 2.5.2 Logging enterprises (prepared by SFI)

### 2.5.2.1 Logging enterprises in region

Table 2.5.2-1 Characteristics of logging enterprises in the region.

Total <u>number</u> of logging enterprise (by activity:	Felling	468
	Haulage	377
	Felling +hauling	
	Chipping	93
	Transport	313
Number of all logging enterprises that are certified (FSC; PEFC or other)	FSC PEFC	Approx. 200 Less than 20
Average number of employees per logging enterprise		
% of workers in logging enterprises that are qualified (e.g. diploma)		

**Commentary:**

In the first part of the table (Total number of logging enterprise by activity) the number of logging enterprises who have registered the main activity are reported and do not include enterprises who has any of these activities registered as side activity. The data was purchased from Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES). AJPES manages the Slovenian Business Register as a central public database on all business entities, their subsidiaries, and other organization segments located in Slovenia which perform profitable or non-profitable activities. A constituent part of the business register is the court register, which includes legal entities (companies and their subsidiaries, subsidiaries of foreign companies, co-operatives, public and private institutes, public agencies and other legal entities) (<http://www.ajpes.si/?language=english>). The data is valid for the year 2014 except for the data about chips producers, which apply for 2012 and is a result of phone survey about biomass producers. There is no available information's regarding qualification level of workers as well as we don't have an average number of employees per logging enterprise. However micro and small enterprises prevail in Slovenia.

There is no data about the number of logging enterprises that are certified, but only the number of all enterprises that are certified. According to data the number of enterprises with the FSC Chain of Custody certificate (CoC) is increasing. Certified enterprises belong to all segments of the forest-wood chain not just to logging enterprises. At the moment, the PEFC Chain of Custody certificate has been awarded to a relatively small number of companies, most of them belonging to the paper production and processing industries and the trading and brokerage areas. The data about certified logging enterprises were obtained from the Market statement 2013 for Slovenia.

2.5.2.2. Regional harvesting

- a) What percentage of harvesting (felling operations and hauling operations) within the region is carried out by regional enterprises? If less than 50 % please characterise the enterprises from other regions that operate in your region.

Almost all harvesting within the region is carried out by regional forest enterprises and forest owners in their forests.

In 2014 (ice storm) there was some activity of Austrian forest companies in the sanitary felling in Northern parts of Slovenia.

2.5.2.3. Main developments in the logging enterprises

- a) What are the main developments specific to logging enterprises that you think could improve the harvesting of timber in your region?

Expansion of fully mechanised harvesting (harvesters and forwarders) might be a good way to raise profitability of forest operations, with modern approach professionalization in forestry can be achieved and efficiency increment will be the main result. However there are some ecological limitation that needs to be considered and must not be overlooked as well as policy limitations that

are at the moment decelerating the development of fully mechanised harvesting (e. g. Forest Law, the forest management system used, etc.). In case of combined business activities including purchase of wood at the forest road the more advanced logistical systems might improve competitiveness of forest companies and/or rearrange the value chain. On the other side, clustering of privately owned estates into a cost effective working sites is also a promising way to raise effectiveness of value chain.

### 2.5.3 Logging systems

#### 2.5.3.1 Felling operations (prepared by SFS)

Table 2.5.3-1 Volume harvested by felling type

% of the volume	Hardwood	Softwood
Motor manual felling	94	98
Mechanized felling	6	2

#### Commentary:

Mechanized felling is not developed in Slovenia despite grounds for introduction of that technology are set and implemented in forest management planning and legislation.

#### 2.5.3.2. Harvesting machines operating in area (prepared by SFS)

Table 2.5.3-2 Number of harvesting machines by type

Type	Number of machines
Machine equipped with energy head (e.g. shear head) : whole tree system	0
Machine equipped with harvester head : CTL or stem system	20
Other (please specify):	0

#### Commentary:

#### 2.5.3.3. Haulage/Extraction operations (prepared by SFS)

- a) Indicate the percentage volume extracted by various machine types

Table 2.5.3-3 Percentage of volume harvested by extraction type

% of the volume	Hardwood	Softwood
Skidder	5	5
Forwarder	30	30
Cable crane	20	20

Agricultural tractor	39	41
Horse	0	0
Other (please specify): Caterpillar tractor	5	5

b) The number of extraction machines in use within forests in the region

Table 2.5.3-4 Number of extraction machines

Type	Number of machines	Main characteristics (e.g. forwarder -8*8 wheeled)
Skidder	80	
Forwarder	15	
Cable crane	19	Cable cranes from 400m up to 800m with processor head
Agricultural tractor	270	2x4 and 4x4 adapted tractor
Horse	0	
Caterpillar tractor	30	
Forestry trailer	70	Capacity 3 – 15 tons

**Commentary:**

2.5.3.4. Changes in logging operations over past 10 years (e.g. new types of machines; new logging system for whole tree harvesting) (prepared by SFI)

Short analysis according to data of yearly research titled "Forestry mechanization and fuel consumption in enterprises registered for forestry activity in Slovenia" conducted by Statistical office of the republic of Slovenia shows some changes in last 10 years in structure of machinery types. Also some conclusions on this basis are possible:

- Introduction of mobile tower yarders with processor in last 20 years increased whole tree harvesting to majority method in cable crane extraction.
- Percentage volume with cable crane extraction doubled in last 10 years.
- Number of self-propelled mobile cable cranes with tower and processor increased for more than 80 % in last 10 years.
- Number for smaller tractor driven cable cranes remains the same, but number of classical cable crane machines dropped very fast for more than 50 % in last 10 years and today there operate in average only 2 or 3.
- Extraction of wood with adopted four wheel driven agricultural tractors and doubled drummed winch remains main extraction machine type in Slovenia. According to the research mentioned, number of those tractors increased for 1,3 times in last 10 years.
- Relatively expensive specialized skidder remains same share of extracted volume and number of machine in last 10 years. Many terrains appropriate for skidder are nowadays extracted with cable cranes or adopted agricultural tractors.



- Number of adopted caterpillar tractor decreasing in last 4 years.
- There is recognized 2,5 times raise factor of forestry tractor trailer in last 10 years.
- Because of increased volume of roundwood export we recognize also raise of forest trucks and trailers for long distance hauling for more than 3 times in last 10 years.
- Harvester and forwarder CTL method were permanently introduced in Slovenia after year 2002. Number of new machines increase rapidly with 1,5 times factor every year in last 10 years.
- There were large number of chipping machines introduces over past 10 years in forest production (greenchips). Capacities are oversized in all class sizes of machines.

2.5.3.5. Specific need in logging operation for the next 10 years (e.g. more cable crane machines need for mountainous regions) (prepared by SFI)

In next decade there are many factors (change of forestry services systems, different state forest managing and interest for wood mobilizations in private forests) that makes predictions unreliable. But following trends and needs there is some change recognized in wood extraction from hauling to trailing. So with investment in appropriate forest trails we can expect increased use of tractor trailers and forwarders. Also there is a gap in small sized cable cranes. Increasing of CTL method is expected. Maybe there are some opportunities for combinations of various extraction methods.

## 2.5.4 Logistics

### 2.5.4.1 Roothing (prepared by SFI)

- a) Indicate the road capacity (tons/truck), i.e. legal limit

Regulations of truck transport are in Slovenia managed by Road Traffic Safety Act.

Maximum weight for truck may not exceed 18 tons in case of two axles, 25 tons in case of three axles and 32 tons in case of four axles. For trucks with trailer maximum weight is limited on 40 tons. Only exceptions are trucks that carry containers and are due to EU directive limited to 44 tons (Rules on dimensions, masses and equipment of vehicles, Ur.l.RS 24/96 – in Slovene)

<http://www.uradni-list.si/1/content?id=10391>

- b) Road network for trucks in forests (e.g.)

- 0,80 km of road/100 ha PRIVATE forest
- 0,26 km of road/100 ha PUBLIC forest

- c) What percentage of the forest estate (private; public) has no access the public/private road network?

Approximately 1% in accordance of Slovenian legislation.

Where information is available for more detailed categories of ownership (e.g. state, local government; industrial private; non-industrial joint; non-industrial family) please extend the table to show those categories.

### 2.5.4.2. Terrain

- a) Complete the following table describing the forest estate by topography and slope (prepared by SFS)

Table 2.5.4-1 The forest estate by topography/slope

Category (slope)	Values in your country for each category (slope in % or °)	% of private forest area	% of public forest area
Flat or gently sloping terrain; mechanization is possible (%)	0 – 35 %	94	91
Sloping ground; mechanization is only possible with specific equipment (%)	36 – 49 %	5	8
Very sloping; only cable crane haulage is possible (%)	50 and more	1	1

- b) Complete the following table describing general access inside the forest for harvesting machines (prepared by SFI)

Table 2.5.4-2. The forest estate by soils

Soils	Total
Normal Soils (%)	98
Sensitive Soils (%)	2

**Commentary:**

Mixed stands are dominating in Slovenian forests, therefore it is difficult to divide forest estate by hardwood and softwood and further on to soil conditions. The information's in table above are obtained by using the geographic information software ArcGIS. In first phase, we used pedologic map (MKO, 2007; <http://rkg.gov.si/GERK/>) and classified type of soils according to the sensitivity. In second phase, we overlapped it with a stand map of Slovenia Forest Service in order to obtain proportions of forests that cover sensitive and normal soils.

**2.5.5 Climate constraints to harvesting (prepared by SFI)**

- a) Identify the relevant category (snow, rain, heat, wind...),

Any extreme weather constraints to harvesting. The most problematic use of harvesting is in the rainy weather and consequently in reduced the carrying capacity of the soil. Soil damage are reduced when the ground is frozen, but because of climatic conditions in Slovenia this happens rarely and lasts a short time. Therefore, in this time, the recommended work is 24 hours per day (Gozdnogospodarski načrt gozdnogospodarskega območja Bled 2011-2020, 2012 – in Slovene).

Restrictions and guidelines are specified in silviculture plans and orders carried out by Slovenian Forest Service (Navodila za pripravo del v sestojih, primernih za strojno sečnjo, 2009 – in Slovene).

- b) Describe the consequences on harvesting and haulage (stopped, reduced, with special equipment...) and duration (in months)

Adjustments to the work due to weather conditions are different for each worksite and are determined by the foreman.

**2.5.6 Environmental constraints to harvesting (prepared by SFI)**

- a) Identify the relevant category (sensitive soil, soil fertility protection, soil erosion, high environmental forest sites, specific forest functions...),
- Protected areas (special zones in Triglav national park, Natura 2000, ecologically significant areas, natural values).

- Ecological functions (protection of forest land and stands, hydrological function and the function of biodiversity conservation).
  - Superficial geomorphological natural values
  - Harvesting is normally not carried out on sensitive soils, in selection forest and rejuvenation stage stands, on swamps and in protective forests.
- b) Area concerned (ha) and
- c) Consequences for harvesting operations.

In rejuvenation stage stand it is recommended using a combination of manual harvesting with machines, skidding is carried out through mature stands to prevent the damage to regeneration.

During harvesting operations there are also some explicit time limits: daily time limit is in protective and protected areas during sunrise and sunset; seasonal time limits are in winter shelters because of game, on habitat of the capercaillie during breeding season (March–June), in forests where the social function is stressed out during high season of visitors. Special attention in deciding for or against harvesting operations is on the physical properties of forest soils both before and during harvesting. The directions are to stop the work where the soil damage greater than 20 cm of soil depth appears on more than 10 % of the length of the skidding trail.

## 2.6 Other

Describe here other factors not mentioned that are important relative to wood mobilisation in your region

Five most important factors have been mentioned in the introductory part of that document. Additional factors which specifically influence on the wood mobilisation are:

- Shortage of forest roads – although Slovenian forests in the period until 1990 were on average well open with roads (19.8 m/ha) because of a large number of constructed forest, there are still numerous areas, primarily in private forests, which require the construction of forest roads; construction of forest roads in closed forests is among the most important forest management measures;
- Shortage of forest towing paths – particularly on rocky terrain without forest towing paths it is not possible to properly transport wood to roads; wire transport is considerably more expensive and is reasonable in places where terrain configuration or environmental reasons make tractor transport inadequate. The problem of shortage of forest towing paths in private forests is similar in its scope to the problem of shortage of forest roads;
- Insufficient scope of performed forest growing work – many forest owners, primarily those with small forest holdings, which dominate in Slovenia, do not pay enough attention to forest management, and the majority is not trained for work in forest, and that is why many such owners are not ready to carry out forest growing works despite co-funding of by the state and the EU. With the abolition of the renewal of forests by planting where this is necessary and of cultivation works, forests deteriorate in the long run from the economic aspect;
- Insufficient competence of forest owners for the work in forests – due to small scope of works in forests as a consequence of small size of forest holdings, forest owners are insufficiently competent for the work in forests, which also reflects in poor results and more accidents at work. This problem can also be solved only by linking forest owners;
- Insufficiently directed research work in the area of innovation and entrepreneurship related to economic incidence of forests;
- Insufficient social awareness of the importance of wood and consequently insufficiently exploited wood potential;
- Low level of value added to wood in Slovenia.



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### 3. Glossary

**Plantation**<sup>1</sup>: Forest stands in which trees have been established by planting or/and deliberate seeding or coppicing with either native or non-native species that meet all of the following criteria: - one or two or a few species; -even-aged; regular spacing

**Solidwood**: timber including sawlogs, peeler logs and veneer logs.

**Pulpwood**: Wood for pulp or board (panel) industries (commonly cut into billets).

Ownership types;

**Local government or commune (NOT private community ownership)**: forest owned by local government or a commune, i.e. not private community ownership (see non-industrial private multiple ownership below)

**Industrial private owners**: Forests owned by companies, co-operations; private investors.

**Non-industrial private multiple ownership**: forest land that is privately owned collectively, i.e. in joint ownership by a group of individuals.

**Non-industrial private forest owners (NIPF owners)**: forest land that is privately owned by individuals/families; synonymous with family forestry, small-scale forestry, and farm forestry.

**Non-wood forest products (NWFP)** : mushrooms, cork, foliage, seeds, berries, medicinal plants, game animals, fish, fur, xmas trees.

1. Nieuwenhuis, 2010; Terminology of Forest Management . Terms and Definitions in English. Revised Version. Equivalent terms in French, German, Hungarian, Italian, Portuguese, Romanian, Spanish and Japanese. Vienna, IUFRO, 2010 (World Series Vol. 90-en) 176 pp.

**Softwood**: coniferous species.

**Hardwood**: broadleaves.

**Soils**:

"Normal" soil: soil accessible for common wheeled machines all year (or with few restrictions)

"Sensitive" soil (according to compaction): soil non accessible all year (or for a long period)