



# **Market analysis**

## **Availability of forest products and by-products**

### **Sweden**

Client:

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## 1. Introduction

SGS has been assigned by Engie - Electrabel to analyze the market availability of the feedstock used to produce wood pellets in Sweden, in order to assess to what extent the use of those materials for energy purpose might compete with the industrial use of those resources both locally and internationally.

This report will cover the following wood resources used as raw material by pellet producers in Sweden:

- Wood processing residues
- Round from forest thinning & harvesting
- Forests management residues

The industrial activities concerned by those materials are:

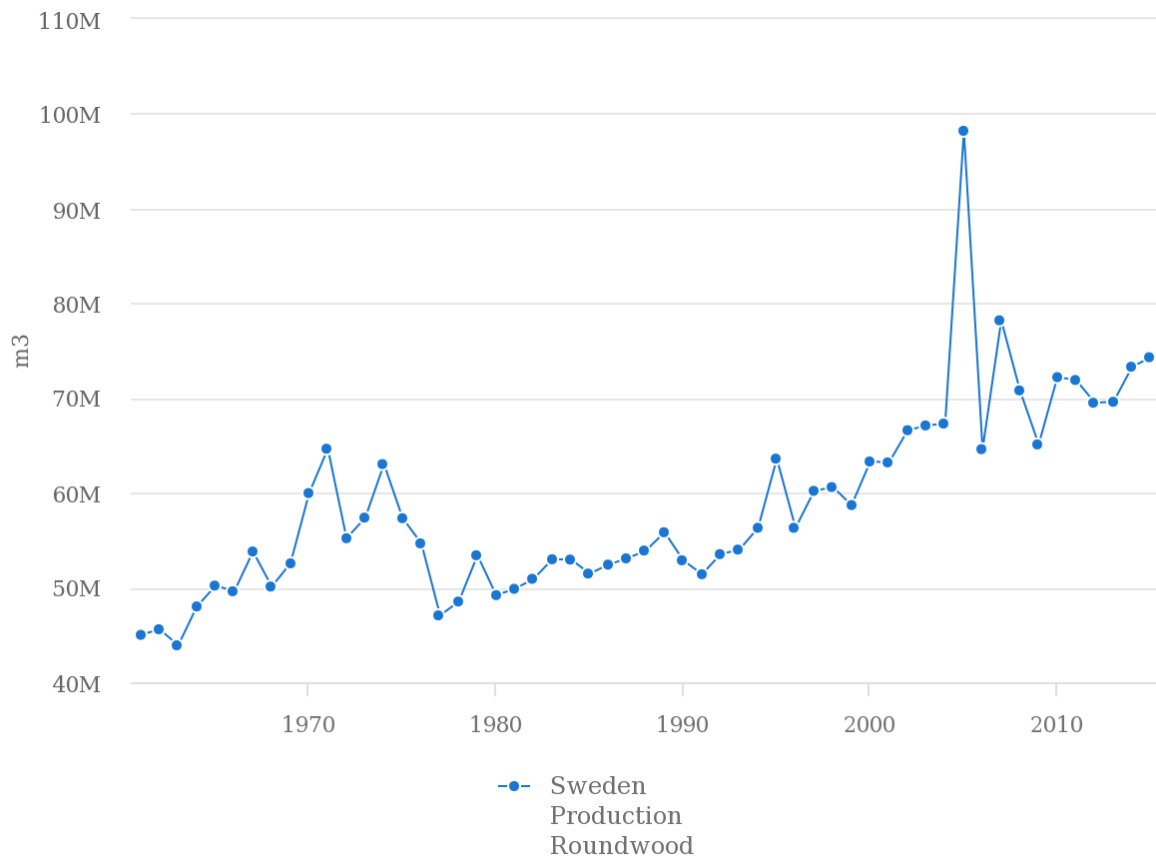
- pulp and paper
- wood panels production
- sawnwood production

The geographic range covered by the analysis includes the Kingdom of Sweden.

All the data from FAOstat consist in an aggregate of official, semi-official, estimated or calculated data.

## 2. Production volumes

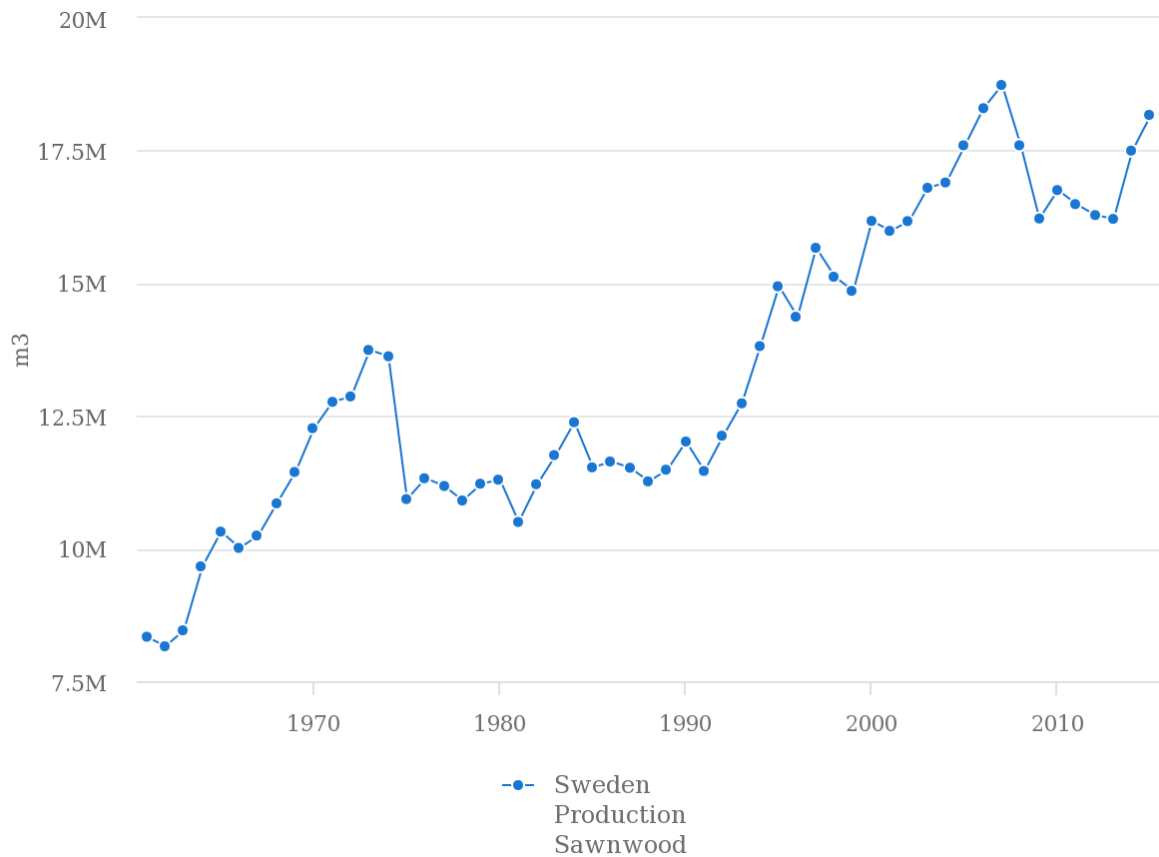
The production volumes of roundwood are shown in Figure 1. The estimated production volume in 1961 was 45 million m<sup>3</sup>. Until 1977, it grew with ups and downs to a maximum of 64.6 million m<sup>3</sup> in 1971 and decreased to a minimum in 1977 with 47 million m<sup>3</sup>. From 1977 to 2004, it increased steadily to 67 million m<sup>3</sup>. In 2005, it peaked at 98 million m<sup>3</sup>. The year after, it was followed by a major drop to 64 million m<sup>3</sup>. It grew again in 2007 to decrease until 2009. After that, the production values seem to follow the same growing trend as before 2004. The final production of roundwood in Sweden in 2015 is 74.3 million m<sup>3</sup>.



Source: FAOSTAT (Jun 22, 2017)

**Figure 1 : production of roundwood in Sweden (1961-2015)**  
(source : FAOstat)

The production of sawnwood in m<sup>3</sup> is shown in Figure 2. Except for two big drops in 1974 and 2007, the production of sawnwood followed a growing trend between 1961 and 2015. The production volume was 8.3 million m<sup>3</sup> in 1961. It increased until 1974 and faced a major decrease at that time. After the drop, it increased more slowly until 1991. At 11.5 million m<sup>3</sup>, it began to increase sharply to reach its maximum for the period in 2007, 18.7 million m<sup>3</sup>. After a second drop, it stagnated for five years between 2009 and 2013. The last two years saw the trend presents a new sharp increase to attain a volume of 18.2 million m<sup>3</sup> in 2015.



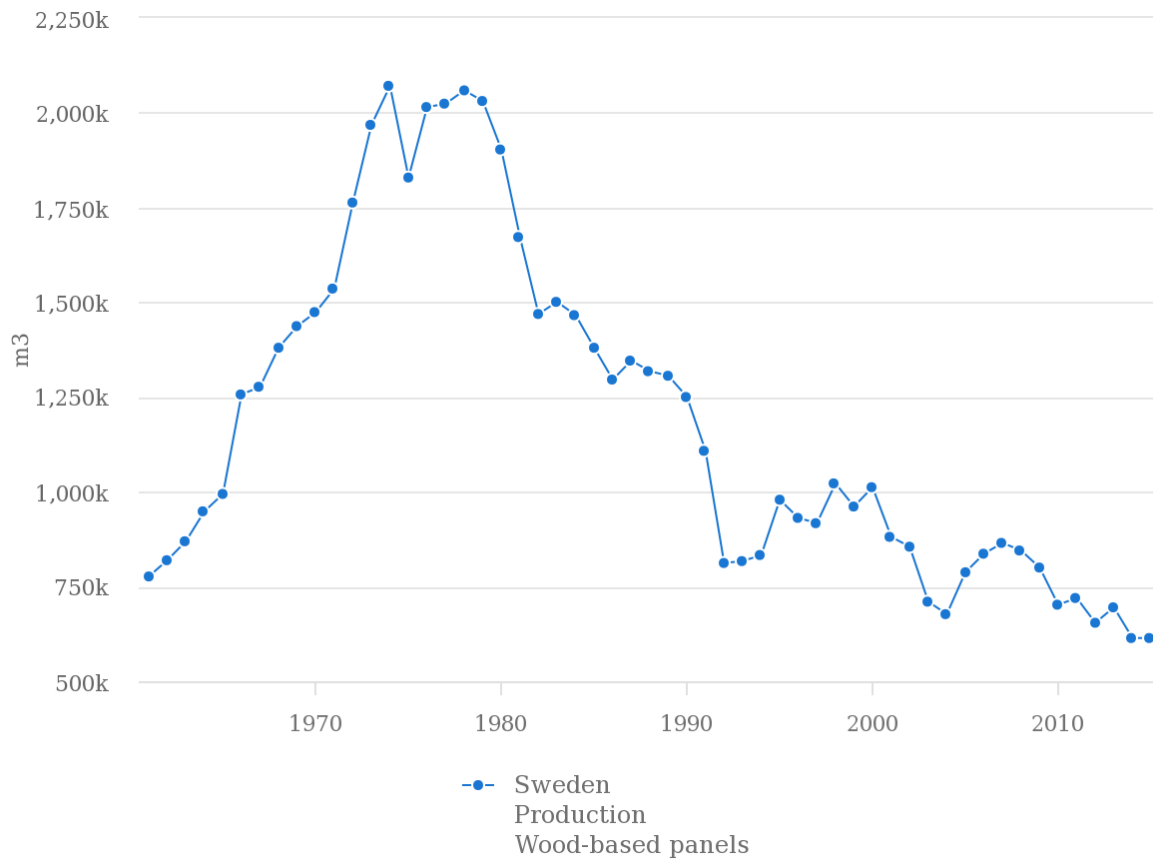
Source: FAOSTAT (Jun 22, 2017)

**Figure 2 : production levels of sawnwood in Sweden (1961-2015)**  
(source : FAOstat)

The production of wood-based panels in Sweden (Figure 3) is minimal compared to other productions. Its maximum barely exceeds 2 million m<sup>3</sup> in 1974. From 1961 to 1974, the production volume gained approximately 1.3 million m<sup>3</sup> from 776 thousand m<sup>3</sup> to its maximum over 2 million m<sup>3</sup>. Except from a small drop in 1975, it stagnated from 1974 to 1979. From that point, the production trend began to decrease. The three big drops began in 1979, 1989 and 2000. The values of 2015 are the lowest of the period with a production volume of 614 thousand m<sup>3</sup>.

The major decrease at the beginning of the 1990s might be linked to the economical crisis that happened in Sweden at that time. In the 1980s an estate and financial bubble formed. In the 1990s, the tax system was restructured in order to emphasize low inflation and the international economy slowed down, this caused the bubble to burst. The GDP went down by 5% and unemployment increased drastically between 1990 and 1993. It is considered as the worst economic crisis since the 1930s<sup>1</sup>.

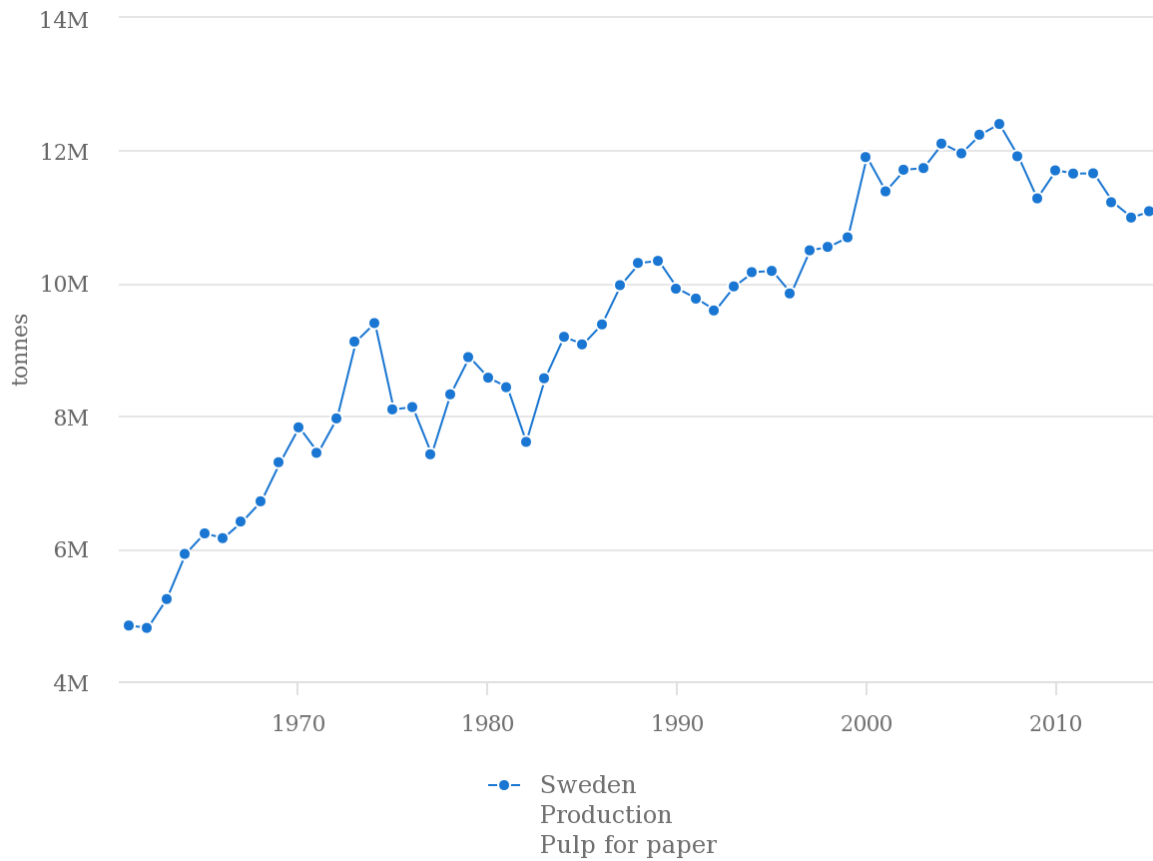
<sup>1</sup> [https://en.wikipedia.org/wiki/Economy\\_of\\_Sweden#Crisis\\_of\\_the\\_1990s](https://en.wikipedia.org/wiki/Economy_of_Sweden#Crisis_of_the_1990s)



Source: FAOSTAT (Jun 22, 2017)

**Figure 3 : production levels of wood-based panels in Sweden (1961-2015)**  
(source : FAOstat)

The production of pulp for paper is presented in Figure 4. In 1961, the production volume was 4.8 million tons. Since that year, it increased steadily, except for small drops, until 2007 and a production of 12.4 million t. As the sawnwood and the wood-based panels’ productions, pulp for paper production faced a decrease in 2007. From that year, the trend seems to be on the decline. The production was 11 million t in 2015.



Source: FAOSTAT (Jun 22, 2017)

**Figure 4 : production levels of pulp for paper in Sweden (1961-2015)**  
(source : FAOstat)

All the production volumes faced a decline from 2007 to 2009. This decrease could be linked to the global economic crisis of 2008.

The production volumes estimated by FAOstat and shown here agree with the volumes presented in the Swedish Statistical Yearbook of Forestry 2014.

### 3. Forest exploitation levels

According to Eurostat, the total growing stock in forests and other wooded land approximated 3 billion m<sup>3</sup> in 2015. Felling in forests available for wood supply was about 80.8 million m<sup>3</sup> in 2010. From 1990 to 2005 it increased from 60.4 million m<sup>3</sup> to 87.7 million m<sup>3</sup>.

Felling in forests available for wood supply in percent of net increment in the same category is greater than 100% for the years 2005 and 2010. In Sweden, it is far above the EU28 average. This normally means that the growing stock in forests available for wood supply should decrease. However, from 2000 to 2010, it increased from 2.3 billion m<sup>3</sup> to 2.4 billion m<sup>3</sup>.

Considering that period, both increment and felling decrease but felling is still over increment in terms of volume. An explanation for the increase of growing stock in forests available for wood supply is that other forested lands get included in the category available for wood supply. They help increasing the growing stock in forest available for wood supply without affecting the increment and felling volumes.

Even though most of data are not available for 2015, the growing stock in forests available for wood supply declined from 2010 to 2015. Explanations could be:

- Felling continues to grow
- Increment stays below felling
- Areas are converted from available for wood supply to not available

This point is further developed in SGS's report on forest sustainability.

	1990	2000	2005	2010	2015
Growing stock in forests and on other wooded land	2,507,400	2,709,700	2,913,900	2,953,100	2,995,500
Growing stock in forests available for wood supply	2,211,000	2,268,000	2,396,770	2,413,885	2,389,692
Increment in forests available for wood supply	91,951.46	86,682.65	74,159.67	79,346.85	/
Felling in forests available for wood supply	60,400	71,200	87,700	80,800	/
Felling in percent of net increment	65.69%	82.14%	118.26%	101.83%	/
Felling in percent of net increment for EU 28	56.10%	61.00%	65.00%	62.70%	/

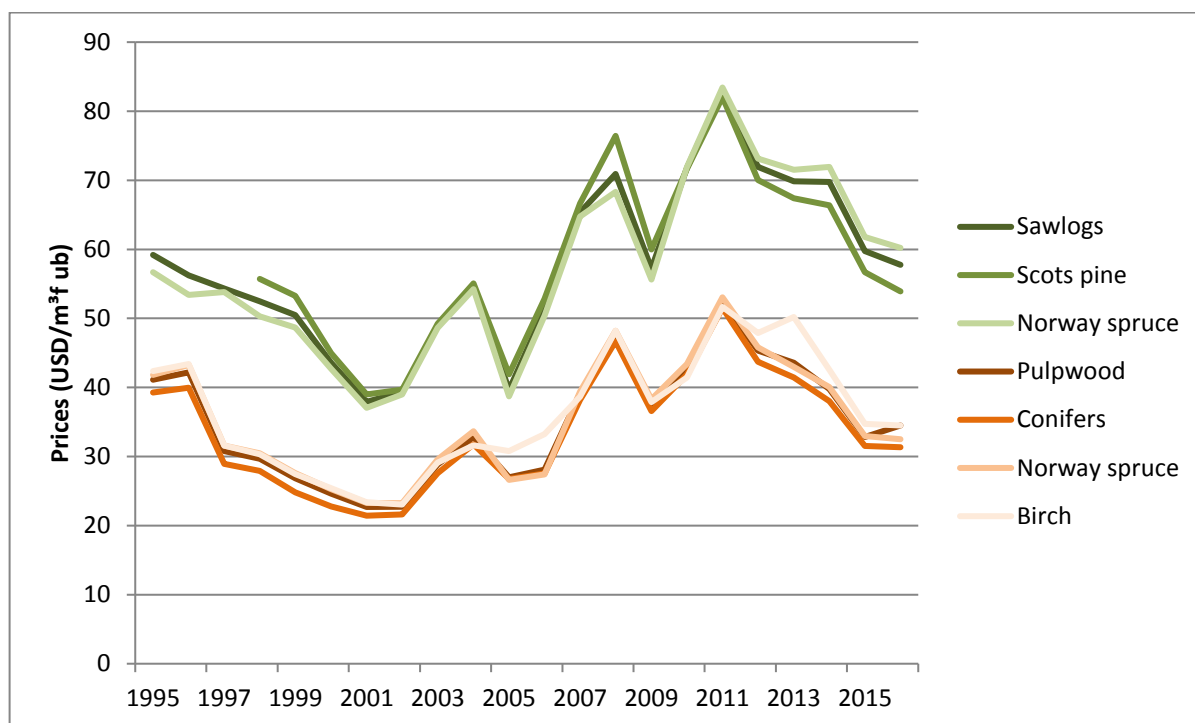
**Table 1: Evolution of wood volume from 1990 to 2010 (volume in 1000m<sup>3</sup>)**

(source : <http://epp.eurostat.ec.europa.eu>)



## 4. Price of wood resources

The prices of different wood products according to the official statistics of Sweden are presented in Figure 5. All the prices are converted from SEK to USD using for each year its exchange rate. The two main products are sawlogs and pulpwood; there is specification in tree species for each product. Concerning sawlogs, the prices from 1995 to 2001 decreased. Between 2002 and 2011, it followed an increasing trend even though it presents ups and downs. From that year, prices go down until 2015 and its final prices around 57 USD. The pulpwood unit prices followed the same trend as the sawlogs prices, except all prices are lower than sawlogs ones and the increases and decreases are less sharp.



**Figure 5 : Unit prices of different wood products (in USD/m<sup>3</sup>\*)**

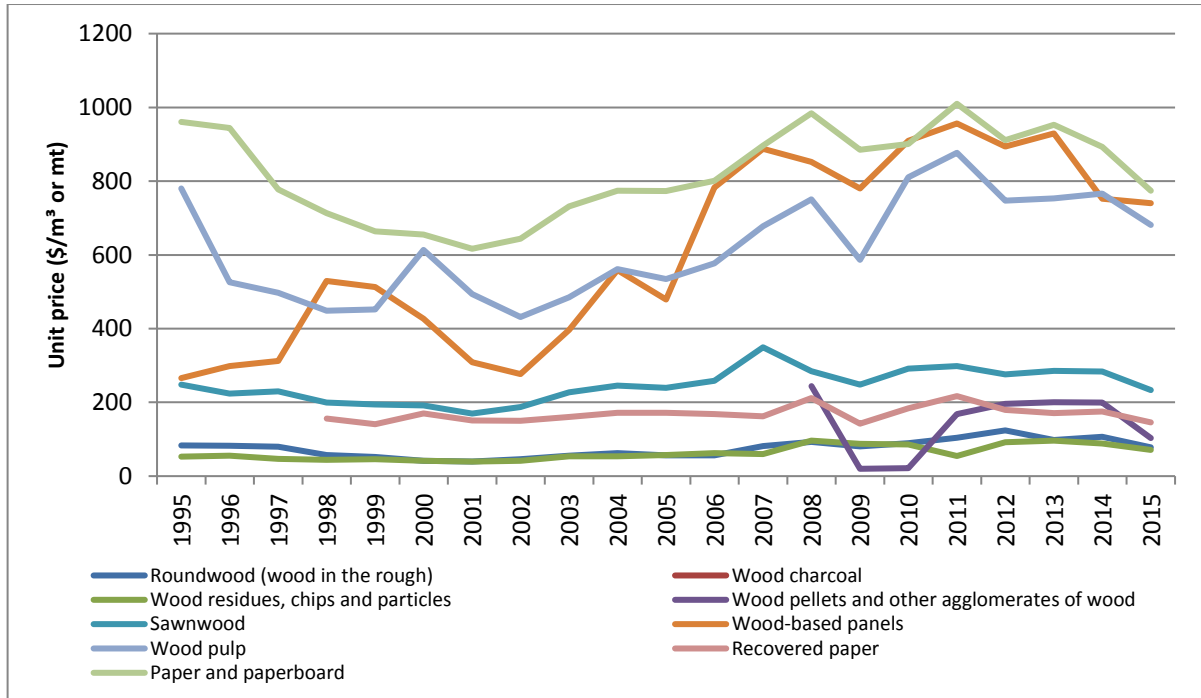
\*converted from SEK/m<sup>3</sup> for each year using the exchange rate of that year (<https://www.ofx.com/en-au/forex-news/historical-exchange-rates/>)

(source : source : Sveriges Officiella Statistik, Statistika Meddelanden)

Export and import prices according to the UNECE and FAO timber database are shown in Figure 6 and Figure 7.

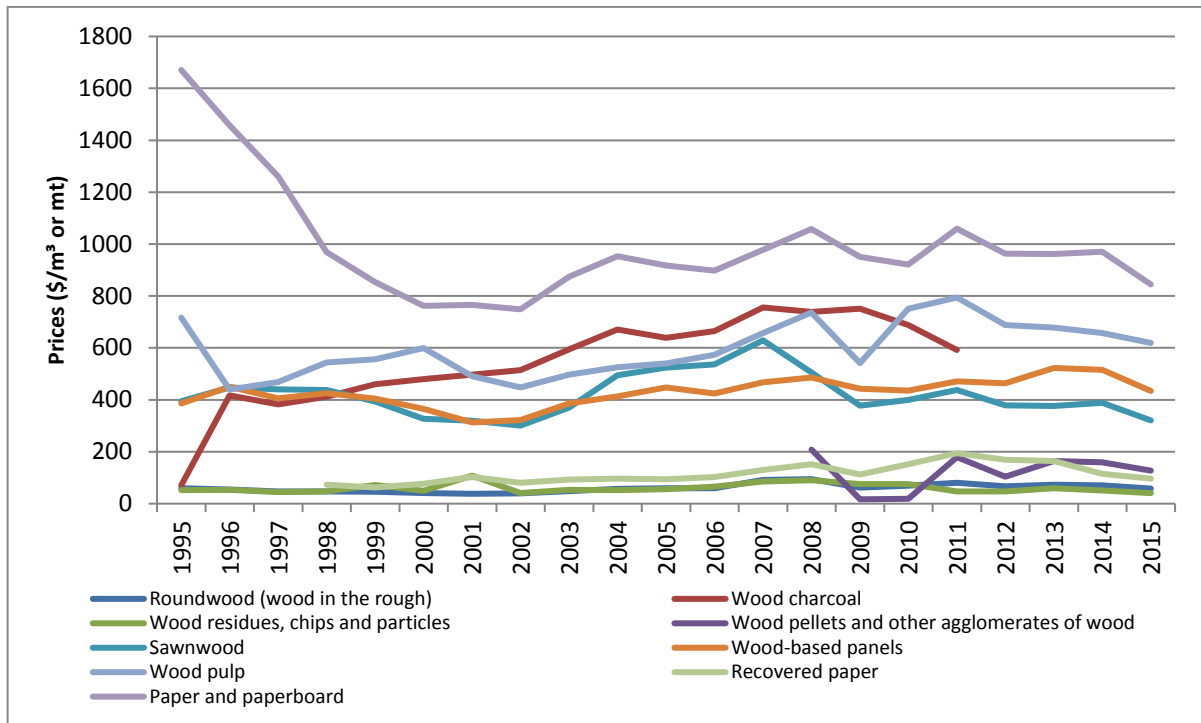
Considering the export prices, paper and paperboard, wood pulp and wood-based panels coarsely follow the same trend. From 2000 to approximately 2011, prices went up and seem to be on a declining trend since that year. Prices for the other wood products are lower than the first three and seem to be more constant in time. Wood pellets and other agglomerates of wood prices underwent a

decline in 2008 followed by a small stagnation and an increase, in order to stagnate again and finally, decrease in 2015.



**Figure 6 : Export unit price (in \$ per m³ or mt)**  
(source : <http://www.unece.org/forests/output/prices.html>)

Considering the import prices of different wood products, except for a drop of paper and paperboard prices between 1995 and 2000, prices are rather stable. All faced a decline from 2008 to 2009 except for wood charcoal.



**Figure 7 : Import unit price (in \$ per m³ or mt)**  
(source : <http://www.unece.org/forests/output/prices.html>)

## 5. Import and export of wood resources

In this section, imports and exports are taken into account to assess the availability of the different kind of materials.

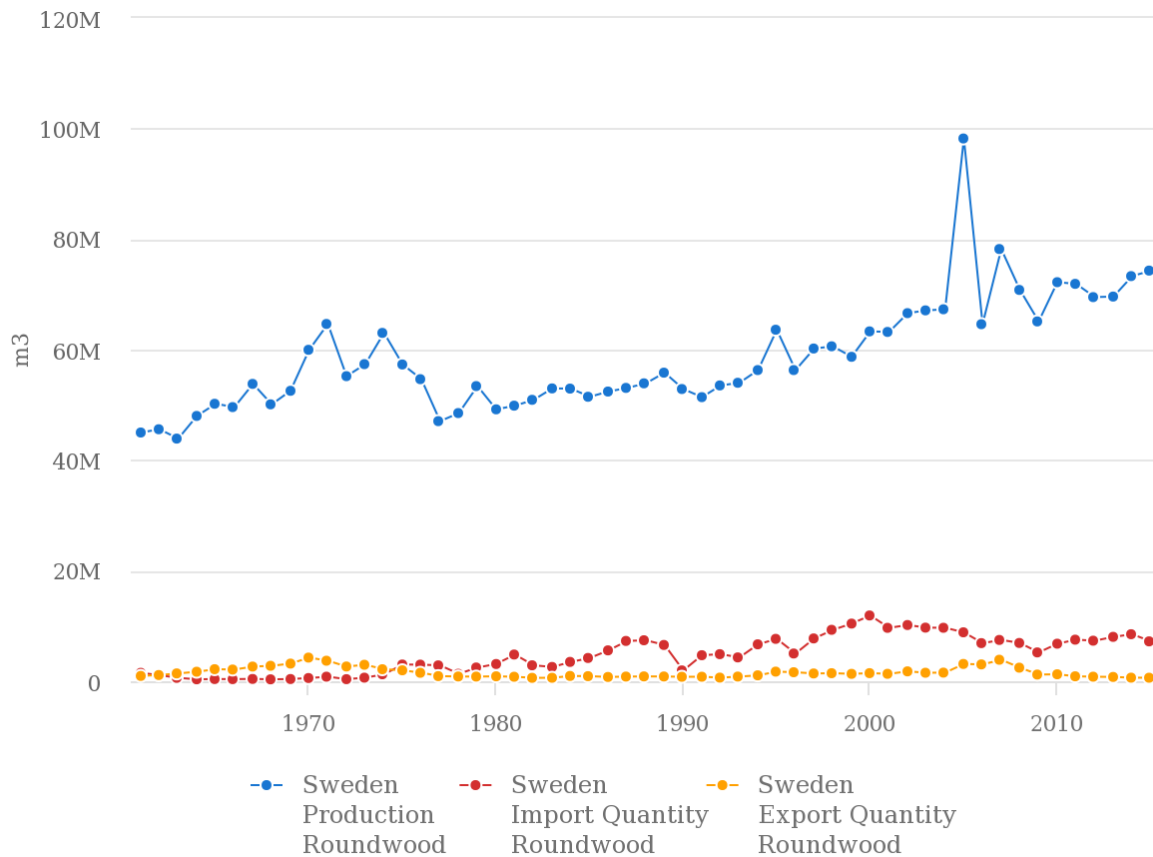
The exported quantities according to the Swedish Statistical Yearbook of Forestry are presented in Table 2. Considering all quantities in tons, paper and paperboard products such as newsprint, printing and writing paper, and others are the biggest quantities of exported products in 2013. The two other big quantities are sawn and planed wood products as well as wood pulp and waste paper.

	Quantity (1000)	Unit
Fuel wood and charcoal	15	tons
Wood chips, pellets, sawdust, particles and wood residues	517	m <sup>3</sup>
Industrial wood in rough	915	m <sup>3</sup>
Sawn and planed wood products	5,961	tons
Wood pulp and waste paper	3,985	tons
Wood-based panels	450	tons
Other wood products	42	tons
Paper and paperboard	246	tons
<i>Newsprint</i>	10,183	tons
<i>Printing and writing paper</i>	1,193	tons
<i>Other paper and paperboard</i>	5,879	tons
Products of woodpulp, paper and paperboard	379	tons

**Table 2: Structure of Swedish forest sector exports ( in 2013)**

(source : <http://epp.eurostat.ec.europa.eu>)

Imports and exports of roundwood according to the FAO are both very low compared to the production. After 1974, importation surpasses exportation. The final volumes of imports and exports respectively are 7.2 million m<sup>3</sup> and 632 thousand m<sup>3</sup>. Roundwood production is clearly oriented towards domestic consumption. Even though imports and export volumes are big, it is far inferior compared to the production, 74 million m<sup>3</sup> in 2015.

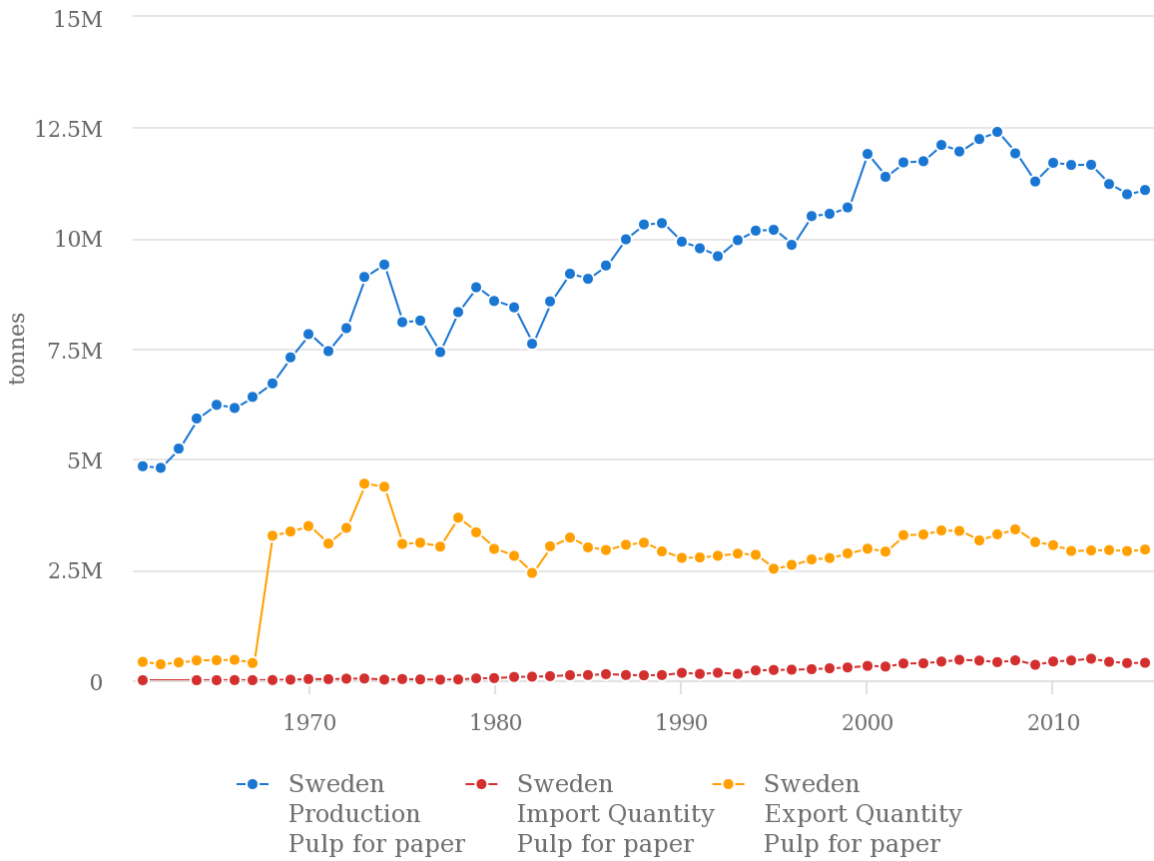


Source: FAOSTAT (Jun 22, 2017)

**Figure 8 : Imports, exports and production of roundwood in Sweden (1961-2015)**

(source : FAOstat)

Figure 9 presents the pulp for paper production, imports and exports according to the FAO. The export volumes stayed very low until 1967. After a steep growth, volumes followed a stagnating trend around 3 million tons. Between 1961 and 2015, the import quantity ranged from 400 t and 400 thousand t. The vast majority of the produced pulp is used within Sweden; the rest is dedicated to exportation.

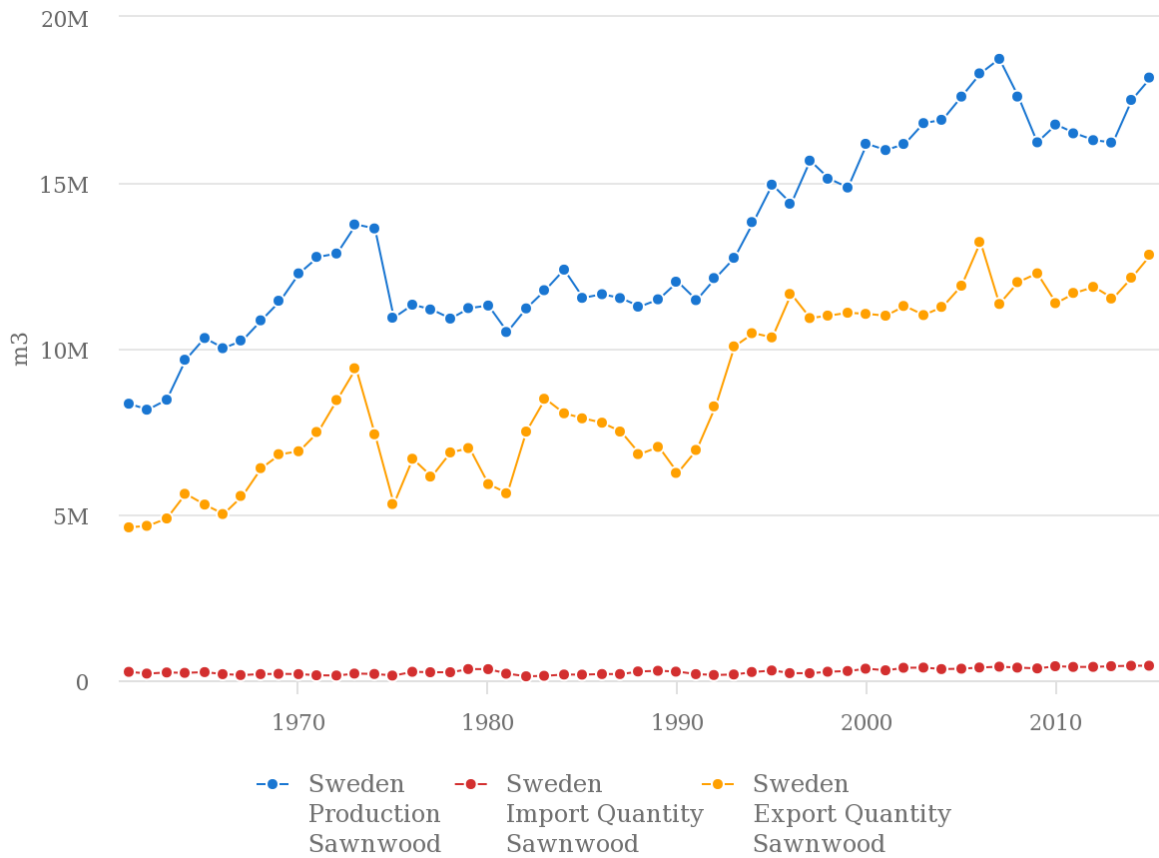


Source: FAOSTAT (Jun 22, 2017)

**Figure 9 : Production, imports and exports of pulp for paper in Sweden (1961-2015)**

(source : FAOstat)

As presented in Figure 10, the trend of exported sawnwood production volumes coarsely follows the same trend as the production quantities. Starting from a volume of 4.6 million m<sup>3</sup>, in 2015, the volumes equal 12.8 million m<sup>3</sup>. As the export quantities correspond to 70.6% of the production in 2015. Import volumes oscillate between 100 thousand m<sup>3</sup> and 450 thousand m<sup>3</sup> for the period. The sector is clearly oriented towards exportation.

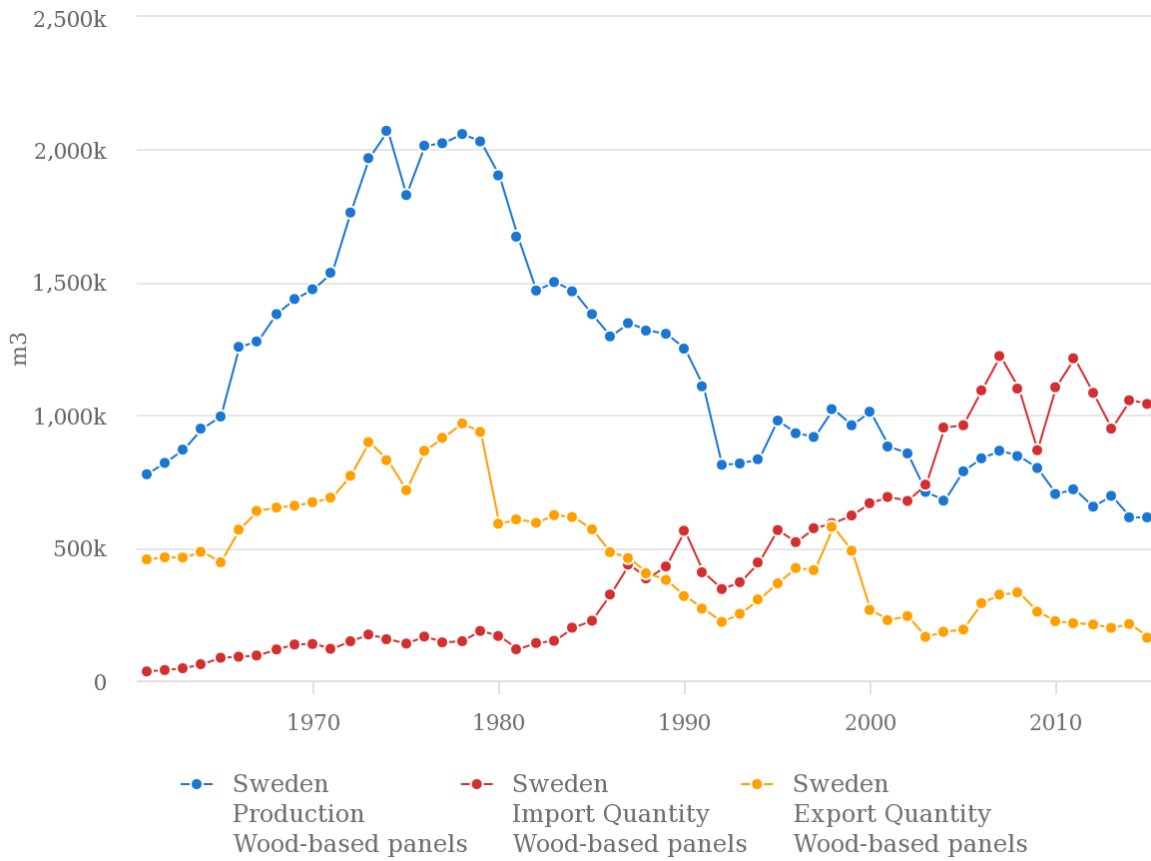


Source: FAOSTAT (Jun 22, 2017)

**Figure 10 : Production, imports and exports of sawnwood in Sweden (1961-2015)**

(source : FAOstat)

The wood-based panels' production, import and export volumes are shown in Figure 11. The volumes are lower than in the other sectors. Imports follow a slow growing trend that accelerates after 1984. It begins in 1961 with a volume of 33 thousand m<sup>3</sup> and ends with a volume of 1 million m<sup>3</sup> in 2015. It suffered from the economic crisis of 1990 in Sweden and the global economic crisis of 2008. The last few years, the trend seems to slow down again. In 2003, imports exceed production, meaning this last cannot fulfill domestic demand. Export volumes follow the same trend as production volumes on a smaller scale. The recent years see this trend going downward. In 2015, export volumes are 160 thousand m<sup>3</sup>.



Source: FAOSTAT (Jun 22, 2017)

**Figure 11 : Production, imports and exports of wood-based panels in Sweden (1961-2015)**  
(source : FAOstat)

The wood pellet production is very developed as Sweden is the 2<sup>nd</sup> country in terms of production volume in the EU28 in 2014. The volumes produced exceed 1,700,000 tons the same year<sup>2</sup>. The sector is oriented towards domestic demand as in 2010; it produced 1.7 million tons, imported 700 thousand tons and consumed 2.3 million tons<sup>3</sup>. After few year of falling demand, it stabilized in 2016 and the production increased for the fourth consecutive year attaining 1,738,580 tons<sup>4</sup>.

<sup>2</sup> Dale A., 2015. WPAC conference : Production and Consumption of Wood Pellets in the European Union

<sup>3</sup> Mörner H., 2011, Sweden Pellet Report.

<sup>4</sup> <https://bioenergyinternational.com/pellets-solid-fuels/swedish-pellet-production-continued-increase-2016>



## 6. Conclusion

Sweden has a forest industry oriented towards exportation. The exported products are mostly pulp, paper and paperboard, and sawnwood. The main export destinations were within the European Union in 2013 (75%)<sup>5</sup>.

The analysis of the wood market in Sweden shows a heterogeneous trend of production, imports and exports depending on the forest industry subsector. Each sector followed production, import and export trends. Most of these trends did not seem to undergo a major decline from economic crises.

The paper industry is particularly well developed in Sweden. All the derived products from paper represent the major exported products.

For the last two or three years, the productions of roundwood and sawnwood are on the rise, meaning a large availability of residues for bioenergy, pulp for paper production stagnating and wood-based panels production undergoing a decrease. The wood pellet industry is well developed in Sweden as it is the 2<sup>nd</sup> country in terms of production in Europe with a volume of more than 1,7 million tons in 2016. The sector is oriented towards domestic consumption with domestic production and importation.

Concerning the growing stock, according to the FAO, growing stock available for wood supply seem to start a decrease in 2010 and from 1990 to 2010, felling began to exceed increment. However the total growing stock in forests and other wooded lands continues to grow and almost reaches 3 billion m<sup>3</sup>.

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<sup>5</sup> Swedish Statistical Yearbook of Forestry 2014