MONITORING RESULTS OF ROUND WOOD UTILIZATION AND WOOD PROCESSING SUSTAINABILITY IN LATVIA

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Abstract
In society, discussions occasionally raise whether current level of wood cutting in Latvia is not too high to maintain sustainable forest industry and biodiversity. Cutting volumes for the state owned forests are calculated based on the model whose aim is to even the timber stock of each tree species in a long term period. The wood resource extraction in the private forests takes place according to free market conditions and depending on market prices. Therefore amount of round wood delivered from private forests can shift in a large range. The research had two main tasks. First task was to survey primary wood processing companies in Latvia and gather information about their round wood processing volumes, how their processing volumes divides between softwoods and hardwoods, dimensions of roundwood companies demand for production and assortment of produced materials. Second task was to evaluate round wood utilization balance in the territory of Latvia and estimate if current use of timber resources in Latvia corresponds to amounts that are sustainable. Research results showed that consumption of softwood timber in Latvia is close to maximum to perform sustainable forestry, but consumption of hardwoods is possible to increase at least by 20–25%. Survey of primary wood processing companies showed that round wood processing volumes in Latvia vary from 6 to 7 million m^3 annually and that large enterprises, which count only for 4% from total number of primary wood processing entities, process two thirds from annual round wood volume in country.
Key words: primary wood processing, timber resources, timber cutting volumes.

Introduction

In Latvia, timber resources have a significant economical, social and ecological value as forests cover 54% of territory and timber stocks are slightly increasing year by year. During last ten years, annual cutting volume of timber resources has been 10 to 12 million m^3 (State Forest Service, 2011). In society, discussions occasionally raise whether current level of cutting is not too high to maintain sustainable forest industry and biodiversity.

Forest industry consists of two important sectors – forestry and wood processing industry both working closely together. Together with connected sectors (transport, building, power industries, science, etc.), forest industry employs around 14% of employable population, from which most are employed in rural areas of Latvia. Total export value of goods produced by wood processing industry in 2011 reached 1.2 billion LVL. The base of wood processing industry is primary wood processing enterprises where round wood supplied from forests is converted to further processed products – sawn timber, veneer sheets, construction timber, timber particles in different size and other products, which are used in further downstream sector for creation of additional value. Central Statistical Bureau of Latvia gathers general data about the wood processing industry, but specific information about primary wood processing companies like geographical distribution, round wood processing volumes, division of processing volumes between softwoods and hardwoods, dimensions of roundwood companies' demand for production and assortment of produced materials is not being collected. This specific information is an important prerequisite for analysis of timber resource flow in Latvia and evaluation of round wood utilization sustainability.

According to Tunkele (2010), the economic activity in the state forest is carried out according to sustainable forest management principles. The wood resource extraction in the state forests is performed systematically and regularly with appropriate afforestation of felled areas. As a result, the wood resource availability planning and forecasting process is easier. The wood resource extraction in the private forests takes place according to free market conditions, where the final products are sold by the market prices when the price of supply matches the demand price. For example, during the period of 2007 – 2009, the wood resource extraction in the private forests decreased while wood supply from state forests was stable and even increased as a reaction to the low activity in private forests. But wood processing industry, which is a direct consumer of timber resources, is eager to find the answer about the kind and amount of round wood they can count on in a long term period (Robinson, 1987).

Every five years the State Forest Service calculates the cutting volumes for state-owned forests for the next five-year period. Five-year cutting volumes for state forests are calculated by using tree growth models (Ozolins, 2002) and models of forest operation management simulation (Dagis et al., 2006). The aim of these models is to even the timber stock of each tree species in a long-term period. Drawback of the method used by the State Forest Service is that it does not take into account the net present value of forests and does not try to increase this value for a long-term period. Thus, it is not guaranteed that the owner (state)

will get maximum long-term income. Anyway, if the state forest cutting volumes are determined by some kind of sustainable model, then sustainable timber cutting volumes of privately owned forests have not been analyzed very deeply.

Our research had two main tasks. First task was to survey primary wood processing companies in Latvia and gather information about their round wood processing volumes, how their processing volumes are divided between softwoods and hardwoods, dimensions of roundwood companies' demand for production and assortment of produced materials. Second task was to evaluate the round wood utilization balance in the territory of Latvia and estimate if current use of timber resources in Latvia corresponds to amounts that are sustainable.

Materials and Methods

The research work was carried out in the autumn 2011 within the frame of the project „Substantiation of deciduous trees cultivation and rational utilisation, new products and technologies" in Forest faculty of Latvia University of Agriculture. To reach the aim of the research, a questionnaire of primary woodworking companies was carried out. Information about enterprises was taken from the database of surveys made in years 2007 and 2009 when similar research by the Latvia University of Agriculture and the Latvian Forest Industry Federation was carried out. Additionally, contact information from public data bases available on the internet (www.1188.lv, www.zl.lv, www.viss.lv, www.lursoft.lv) was used. Survey was carried out over the phone call to every potential primary wood processing enterprise. In total, 453 enterprises were questioned and answers were received from 425 enterprises. From all respondents, 357 enterprises acknowledged themselves as primary wood processing enterprises on the market. Others were wood subsequent processing enterprises or recently had changed their activities to other industries. Data obtained during the questionnaire were analyzed in dynamics for years 2006 to 2010. For deeper analysis of primary wood processing companies, they were divided into groups according to their round wood processing volumes:

- large - above 50'001 m^3 annually;
- middle - 10'001-50'000 m^3 annually;
- small - 1'001-10'000 m^3 annually;
- micro - below 1'000 m^3 annually.

Additionally, companies were divided by tree species they process – softwood, hardwood or both.

For evaluation of the round wood utilization balance in the territory of Latvia, on the one hand, data form the questionnaire of primary woodworking companies were supplemented with data form analysis of external trade of forest industry (Latvian Ministry of Agriculture, 2010) and data of firewood usage in Latvia according to Central Statistical Bureau of Latvia. On the other hand sustainable timber cutting volumes in the territory of Latvia (Krumins et al., 2011) were taken. Both data sets were compared with each, other and conclusions of sustainable usage of timber were made.

Results and Discussion

Monitoring results of primary wood processing companies

During the time period of 2006 to 2008, because of global economic crisis and decrease in the demand for wood products, round wood processing volumes in Latvia decreased from 6.7 million m^3 in year 2006 to 5.7 million m^3 in 2008 (Figure 1).

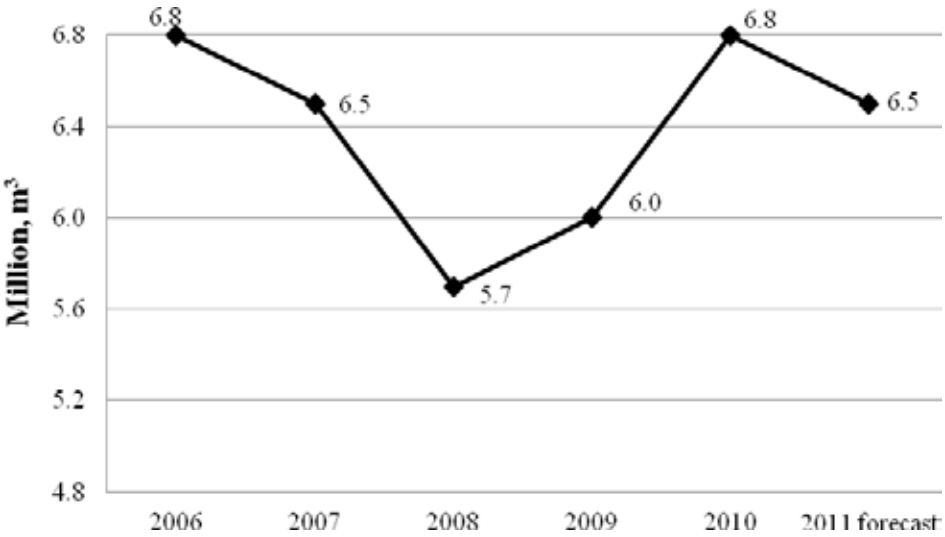

Figure 1. Total round wood processing volumes of surveyed enterprises during years 2006 to 2011, mill. m^3.

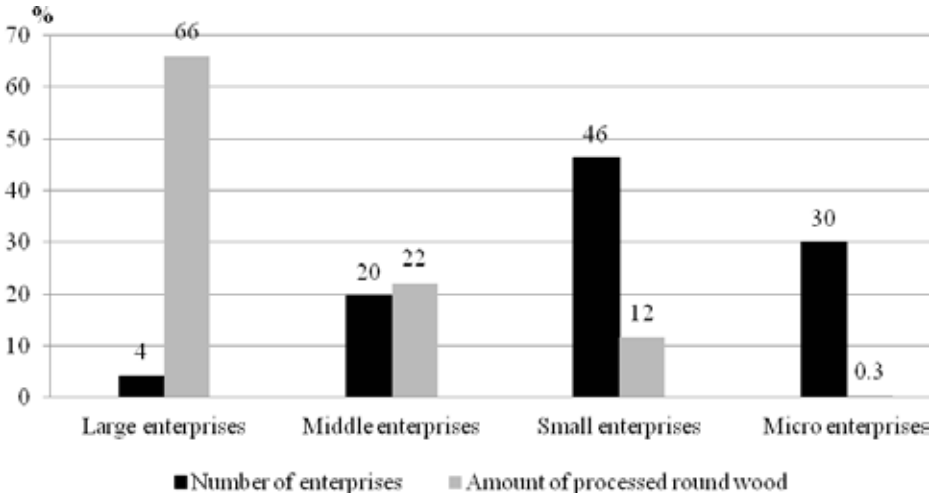

Figure 2. Proportional division of surveyed primary wood processing enterprises according to number of enterprises and amount of processed round wood in 2010, %.

After recovery of the demand for wood products in global markets in 2009 and 2010 and thanks to additional volumes of supplied round wood timber from state forest during periods of economic crisis, when private forest owners had significantly reduced their timber supply to wood processing industry, total round wood processing volumes in 2010 returned to the level they were before crisis and reached 6.8 million m^3. Experts of wood processing industry (members of Latvian Forest Industry Federation) forecasted that in 2011 round wood processing volumes will be a little lower than in 2010 – around 6.5 million m^3.

Large enterprises in 2010 counted only for 4% from the total number of primary wood processing enterprises, but processed two thirds from annual round wood volume in the country (Figure 2). Comparing with year 2008, large enterprises had increased their share in round wood processing volumes by 3%, which means that during past years they had become even more dominant on the timber market. Middle enterprises in 2010 counted for 20% from total number of enterprises, but processed 22% from annual round wood volume. In 2008, the share of middle enterprises in total number of enterprises was 15% and they consumed 20% from total round wood. Small enterprises in 2010 counted for 46% from total number of enterprises and processed only 12% from annual round wood volume. Compared with 2008, when these shares respectively were 56% and 16%, small enterprises had lost their market position in round wood processing. Almost one third (30%) from total number of enterprises were small primary wood processing companies, but they processed less than 1% from annual round wood volume in country.

After the questionnaire was finished, it turned out that compared with years 2007 and 2009, when previous questionnaires were held, in 2011 many wood primary processing companies had gone bankrupt or had switched their activities to other industries. Largest reduction in the number of enterprises was observed in the small and medium wood processing enterprise groups. Apparently for them it was more difficult to overcome global economic crisis than for flexible micro enterprises or stable large wood processing enterprises.

Processing volumes of primary wood processing companies in Latvia are mainly focused on the use of softwood timber. In 2010, softwoods made 75% from all processed round wood, and this proportion has been stable during last five years (Figure 3).

Deeper analysis of processed tree species according to the size of enterprises shows that 80% of large enterprises, 43% of middle enterprises and 47% of micro enterprises work only with softwoods (Figure 4). Small wood processing companies are most elastic in terms of tree species they process as 47% of them can work with both tree species - softwoods and hardwoods.

Survey results showed that in primary wood processing industry biggest demand is for middle and large dimension timber. Small dimension timber is demanded only in one third of wood processing enterprises specialized in softwood processing and in one tenth of enterprises specialized in hardwood processing. Therefore small - dimension round wood is not processed in sufficient amounts in local primary wood processing enterprises and is being exported. But - large dimension saw timber is welcomed in 85% of softwood and in 89% of hardwood primary wood processing companies.

Primary wood processing enterprises were asked to identify what is their production end-product – does their production process finish with wood pre-treatment products like sawn wood, packaging boards, log-house logs, veneer, plywood, plate materials,

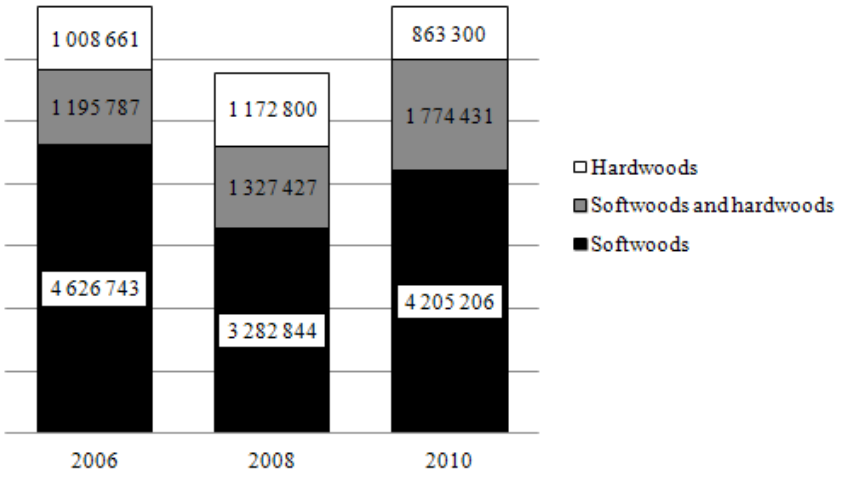

Figure 3. Division of round wood primary processing volumes by processed tree species in years 2006, 2008 and 2010, m^3.

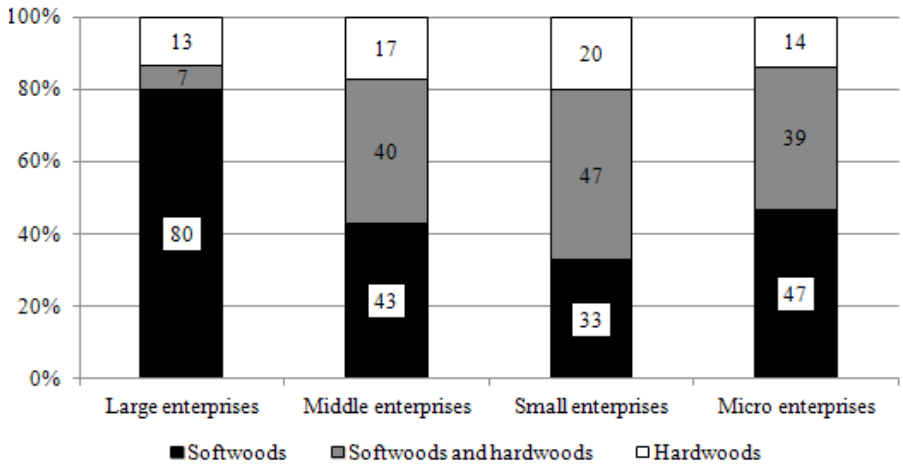

Figure 4. Division of processed tree species according to the size of enterprises in 2010, % from the number of enterprises.

firewood or do they manufacture also subsequent processing products like furniture, glued beams, wood pallets, doors and windows, carpentry and joinery production. Only 33% of large enterprises admitted that they do also subsequent production (Figure 5). Largest proportion of subsequent processing product producers were observed in the middle and small enterprise group where every second enterprise preformed deeper processing of timber, thus making larger added value to every round wood cubic meter processed. In the micro enterprise group, 41% of companies were producing subsequent timber products.

Analysis of usage of products produced by primary wood processing enterprises reveals that 61% of enterprises process round wood in products used afterwards in building and construction (Figure 6), 47% of enterprises produce source material for packaging, but only 28% of enterprises produce half-finished materials for furniture industry.

Deeper usage analysis of products produced by primary wood processing enterprises according to the size of enterprises showed that all large enterprises are producing products for building and construction, but 73% of large enterprises produce materials for furniture industry and packaging production. Middle and small enterprises mainly are focused on producing of building and construction materials (middle - 57%, small - 53%) as well as for production of packaging materials (middle 49%, small 52%). In smaller amounts are produced materials for furniture industry 17% of middle enterprises and 24% of small enterprises. Main focus of primary wood processing micro enterprises is on production of building and construction products. That is done by 76% of micro enterprises. One fifth (22%) of micro enterprises is producing packaging materials and 15% of micro enterprises are producing materials for furniture industry.

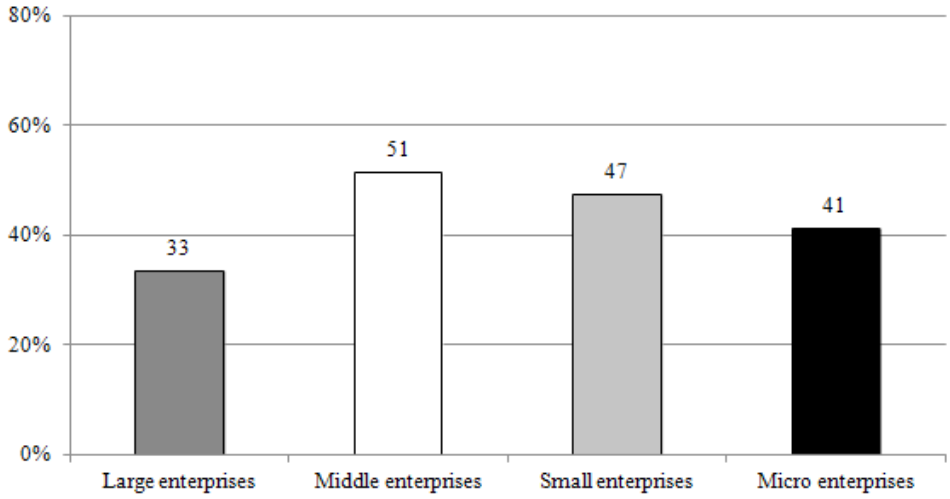

Figure 5. Share of primary processing enterprises performing also subsequent processing of timber, %.

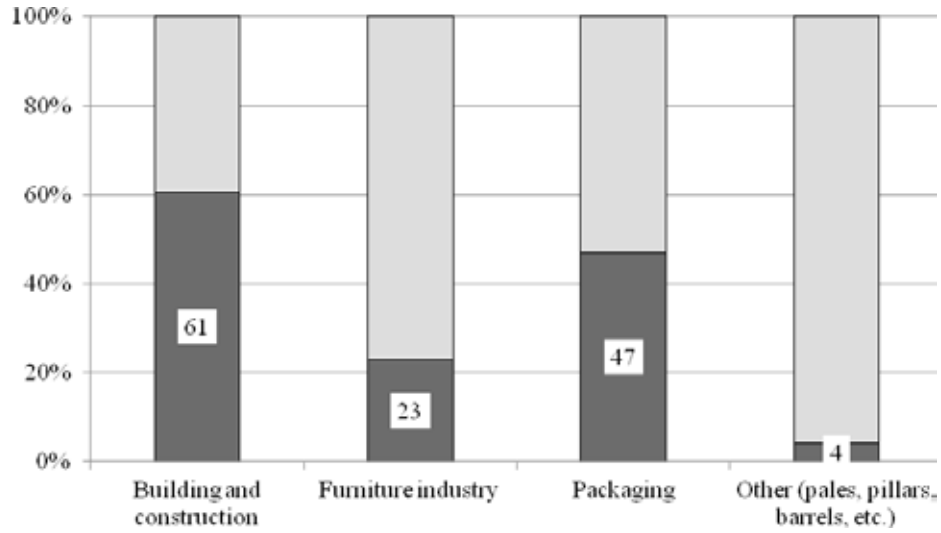

Figure 6. Usage of products produced by primary wood processing enterprises, %.

Round wood utilization balance in the territory of Latvia

Net export balance of round wood in Latvia in 2010 was 3.7 million m^3. Mostly small - dimension and low - quality round wood was exported. In external markets this timber is being used for pulp industry and bio energy production. However, around 0.7 million m^3 of unprocessed saw logs were sent to foreign wood processing companies.

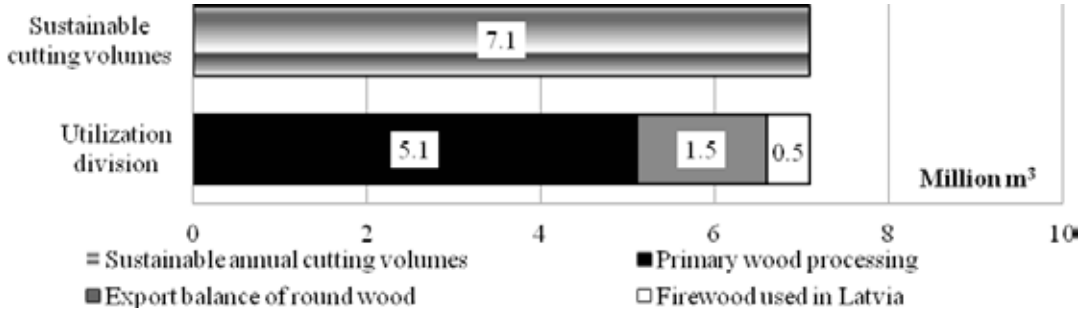

Figure 7. Softwood round wood utilization balance in Latvia in 2010, million m^3.

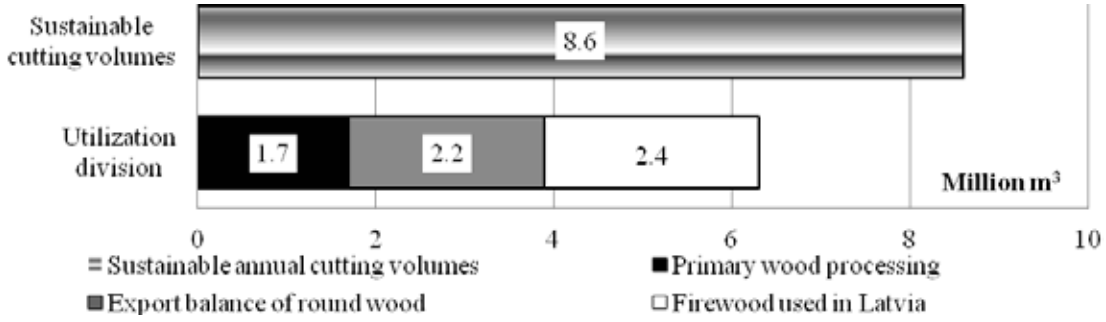

Figure 8. Hardwood round wood utilization balance in Latvia in 2010, million m^3.

Round wood utilization balance shows that softwoods (Figure 7) are being used more intensively than hardwoods (Figure 8). If hardwoods are used in amount of 73% from sustainable cutting volumes, then softwoods are used at maximum intensity. It means that consumption of softwood timber in Latvia should not be increased if we want to maintain sustainable forestry, but consumption of hardwoods is possible to increase at least by 20–25%.

However, to implement larger cutting volumes of hardwood than current ones, more detailed research should be done about availability of each single forest stand – how far it is from forest road, time of year the stand could be felled, interaction with proximal mature or young forest stands, intensity of surrounding clear cuttings, etc.

Hardwood consumption balance also shows that at the moment the wood processing industry, from calculated 8.6 million m^3 of round wood available for sustainable utilization every year, uses only 1.7 million m^3 of round wood, but at the same time 2.2 million m^3 of hardwoods annually are being exported.

Conclusions

1. In 2010 total round wood processing volumes in Latvia reached 6.8 million m^3, which is the level they were before the global economic crisis. Experts of wood processing industry forecasted that in 2011 the round wood processing volumes will be a little lower than in 2010 – around 6.5 million m^3.
2. Processing volumes of primary wood processing companies in Latvia are mainly focused on use of softwood timber. In 2010, softwoods made 75% from all processed round wood, and this proportion has been stable during last five years.
3. Survey results showed that in primary wood processing industry the biggest demand is for middle- and large - dimension timber. Small - dimension timber is demanded only in one third of wood processing enterprises specialized in softwood processing and in one tenth of enterprises specialized in hardwood processing. Therefore small - dimension round wood is not processed in sufficient amounts in local primary wood processing enterprises and is being exported.
4. Little more than half of primary wood processing enterprises process round wood for products used in building and construction, 47% of enterprises produce source material for packaging industry, but only 28% of enterprises produce half-finished materials for furniture industry.
5. Round wood utilization balance shows that softwoods are being used more intensively than hardwoods. Hardwoods are used in amount of 73% from sustainable cutting volumes, but softwoods are used at maximum intensity. Consumption of softwood timber in Latvia should not be increased if we want to maintain sustainable forestry, but consumption of hardwoods is possible to increase at least by 20–25%.
6. Hardwood consumption balance shows that at the moment the wood processing industry, from calculated 8.6 million m^3 of round wood available for sustainable utilization every year, uses only 1.7 million m^3 of round wood, but at the same time 2.2 million m^3 of hardwoods annually are being exported.

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