Policy Drivers Behind Forest Utilisation in Lithuania in 1986-2007

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Abstract

After regaining the independence, Lithuania was in the process of making transition to the market economy, yet radical societal shifts only moderately affected Lithuanian forestry. This study evaluates the main drivers that stimulated or decreased forest utilisation. Review of numerous sources reveals that the major drivers towards increased utilisation were the economic transition and changes in the resource base. These have been counterbalanced primarily by deeply-rooted normativism, increasing environmental restrictions, economic model of State forestry and sluggish land reform. The study shows that seeking to understand the dynamics of forest utilisation, it is insufficient to focus solely on the available forest inventory as is typically done in forecasts of timber removals. Instead, a holistic analysis is needed, taking into account, *inter alia*, institutional norms and developments outside the forest sector.

Key words: Forestry, timber removals, policy drivers

Introduction

The key source of income from forestry activities typically comes from timber harvesting and the level of forest utilisation is one of key forest policy questions in any European country. Utilisation policy involves a search for a trade-off between contradictory objectives of economic development and owner freedom versus the augmenting societal interests for non-timber forest values. The Nordic tradition supposes that the supply of timber is primarily driven by market forces. In the Central and particularly in the Eastern European countries, the impacts of markets can be questioned as forest use has been historically subjected to rigid regulation. Here, the level of harvesting is likely to be heavily affected by established institutional tissues and management traditions. These are, however, taken as granted and the estimated "optimal" level of forest utilisation technically becomes a function of forest resource inventory, ensuing strictly observed prescriptions for allowable cutting.

The regaining of Lithuania's independence in the early 1990s brought about immense social changes that could not bypass the forest sector. The transition from planned to market economy should have put a pressure to increase the level of utilisation. Free market on forest products emerged boosting development of forest industries after an initial slump; and a large-scale restitution of forest ownership to pre-war owners was commenced. On the other hand, one could also expect inhibiting agents, such as environmental restrictions. Some of the drivers or agents behind the utilisation may be generated internally within forestry, such changes in the state of forests; others come in form of exogenous forces, such as the aforementioned economic transition.

This study scrutinises forest utilisation dynamics in Lithuania during the last two decades, aiming to provide a holistic understanding of the involved factors that push or inhibit timber harvesting. The scope of analysis is not confined to the natural resource base, but, on the contrary, a conscious effort is made to unveil pertinent factors within the interface between forest and society that are frequently omitted in forest utilisation analyses.

Materials and methods

The study carries out a retrospective analysis covering the period from 1986 to 2007 *i.e.* spanning the last years of Lithuania being a part of the Soviet empire, extending over the years of independent State under economic and social transition, and reaching the new historic milestone, the EU membership as of 2004.

As the point of departure, the estimates of utilisation during the analysed period as well as utilisation forecasts by various authors are scrutinised. The official data on forest removals are based on detailed evaluations of standing timber on cutting sides that are by law reported to State authorities from State as well as private forests. Since the turn of millennium, the estimates of removals are also available from the national forest inventory based on permanent sampling plots throughout the country. According to the inventory findings, the official data on timber removals are underestimated, as are the official estimates for standing timber stock as well as timber growth (Kuliešis 2004). Despite the discrepancy, our study primarily relies on the official data (Verbyla 1992, MUM 1994–1996, ZMUM 1996-1998, VMT 2000-2007). The reason is that, concerning forest removals, only these data are available for the whole analysed period. Although the removals are underestimated, the direction of change (increase, decrease or a steady use) is approximated quite reliably due to comparable methods of data collection throughout the period.

The analysis is then focused on identifying the main driving forces promoting or inhibiting the utilisation. When doing so, the study employs numerous sources of information. First, various written materials are comprehensively analysed, covering data from so-called standwise Forest inventory and national sample-based forest inventories, legislative acts, timber market statistics, economic data on the forest sector, reports by forest inventory experts, relevant contributions to scientific and mass media, *etc*. Second, the study takes into account the findings of a survey of key stakeholders with regard to forest utilisation in Lithuania (Linkevičius 2007). The survey included numerous questions pertaining to forest utilisation, such as perceived main drivers behind the utilisation, desired level of forest removals, *etc.* It involved 35 respondents including, *inter alia*, experts from forest inventory bodies, scientists, representatives of highest forestry administration authorities, environmental organisations and forest industries. The scope of this study does not enable to address the survey results in detail, however, the expert opinions revealed during the survey helped to get insights from multiple-perspectives.

It must be noted that, although relying on manifold sources, such holistic analyses inevitably involves some degree of inferred judgement when eliciting the most relevant factors. This though should not necessarily be seen as a disadvantage in a study that seeks out a deep understanding of a phenomenon (Miles and Huberman 1994), entailing the complex interactions between social and biological agents. While the delineation of a certain factor might be subjected to dispute, the authors' reasoning is underpinned by their long-standing interest in forest utilisation policies in Lithuania as well as neighbouring countries in the Baltic Sea region (*e.g.* Brukas *et al.* 2001, Linkevičius 2007, Brukas 2007, Brukas *et al.* 2008).

Results

Harvesting level

From 1986 to 2007, the annual harvesting level in Lithuania more than doubled, from around three to more than six million m^3 (Figure 1). The first significant peak was observed in 1995 at 6.0 million m^3. Then, cuttings were decreasing, making up 4.9 million m^3 at their lowest in 1998. In 2003 the harvest reached the second peak with 6.5 million m^3, subsequently slightly declining and making 6.0 in 2006 but increasing to 6.4 million m^3 in 2007. Of this, 25% came from intermediate cuttings (thinnings, intermediate sanitary cuttings) and remaining 75% from the final fellings (VMT 2007). It must be noted that, even according to modest estimates of the standwise forest inventory, the annual gross increment made up 13.1 million m^3 in 2006. Adjusting the estimated removals by including non-merchantable timber, the harvest/increment ratio makes up around 55%. Looking at the data of statistical forest inventory for comparison, the gross removals in 2006 made up 9.7 million m^3, while gross increment amounted to 16.1 million m^3 (Brukas *et al.* 2008). The harvesting/increment ratio in this case ends up at 60%. Any of these ratios indicates a rather low intensity of utilisation and significant accumulation of standing volume in Lithuanian forests.

Looking at State forests that occupy one-half of forestland, the clear peak is observed in 1995, when cuttings made up 5.3 million m^3. Subsequently they

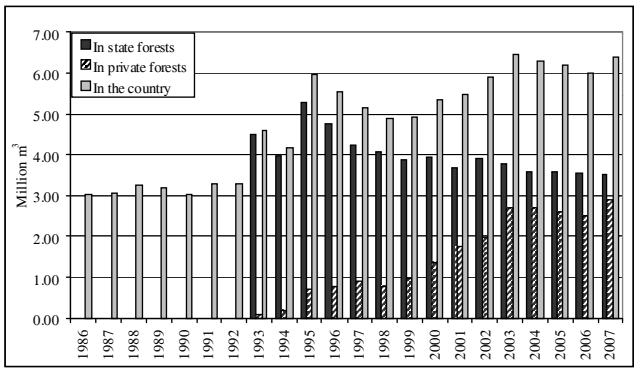
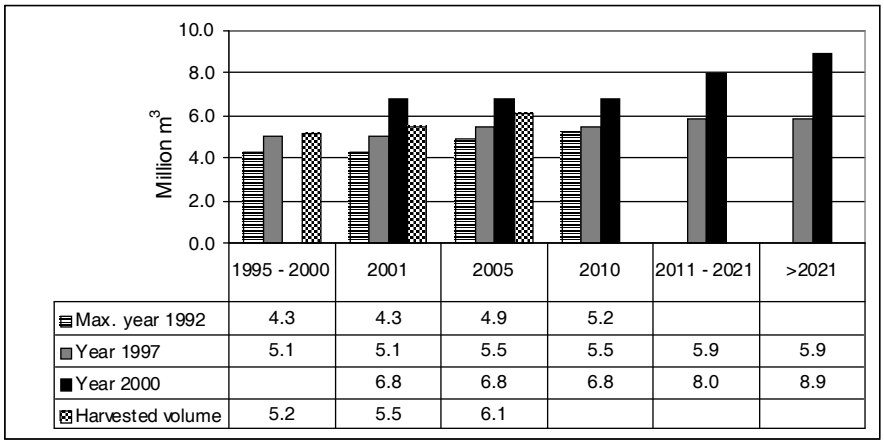


Figure 1. Timber removals in Lithuania in 1986–2006. Sources: for years 1986–1992: (LSD 1990–1992), 1993–1995: (MUM 1994–1996), 1996–1998: (ZMUM 1996–1998), 1999–2007: (VMT 2000-2008)

steadily declined, instabilised at around 3.5 million m^3 annually in 2004-2007. The graph reveals the emergence of private forestry, where cuttings rapidly increased, from 0.1 million m^3 in 1993 to 2.7 million m^3 in 2003. After slight decline in 2004-2006, they again increased in 2007 (2.9 million m^3) presumably as a response to higher timber demand on the market.

The estimates of actual harvests are interesting to juxtapose to forecasts of forest utilisation. During 1988-2005, three different prognoses for potential forest usage were made by forest inventory experts: in 1992 (Brukas and Kenstavičius 1992), 1997 (Rutkauskas 1997) and 2000 (Kuliešis and Petrauskas 2000, Petrauskas and Kuliešis 2004).



	1995 - 2000	2001	2005	2010	2011 - 2021	>2021
Max. year 1992	4.3	4.3	4.9	5.2		
Year 1997	5.1	5.1	5.5	5.5	5.9	5.9
Year 2000		6.8	6.8	6.8	8.0	8.9
Harvested volume	5.2	5.5	6.1			

Figure 2. The comparison of different prognoses and the harvested volume

Forecasted volumes for the same time period were the higher; the later forecast was made (Figure 2). Taking 2005 as an example, forecasts from 1992, 1997 and 2000 predicted harvesting of 4.9, 5.5 and 6.8 million m^3, respectively, while the actual harvesting level turned out to be 6.1 million m^3. The humble forecasts from 1992 and 1997 relied more heavily on methodologies of estimating the allowable annual cut as inherited from the Soviet period. The forecast from 2000 was based on improved inventory system and reflected changes in forest resources but was too optimistic, failing to foresee, *inter alia*, the difficulties with completing the land reform. Despite the fact the forest restitution was commenced in the early 1990s, still 15% of the forest area is reserved for restitution as of beginning of 2008 (VMT 2008). Kuliešis and Petrauskas (2000) point out that predicted harvests of 8.94 million m^3 after 2021 will be only reached in case of adopting more intensive forest management technologies, improved forest regeneration, and better tending of young stands.

Drivers towards increased utilisation

Reorientation to domestic resources

Very low harvesting level during Soviet times could be maintained due to vast forest resource base in the Soviet Union. Being considerably degraded during the periods around the two world wars, Lithuanian forests could be spared thanks to substantial imports from the Russian Federation. In 1990, 3.1 million m^3 were harvested, while the domestic use in the Lithuanian Soviet Republic was around 5 million m^3 (Kenstavičius 1993). Some 1-2 million m^3 were shipped from Russia annually (Mizaras and Lebedys 2000).

Brukas and Kenstavičius (1992, p. 523) note:

After reestablishment of the independence of Lithuania in 1990, Russia almost stopped exports of wood to our republic. As a consequence, deficit for wood emerged and, by the order of the Ministry of Forestry, a new optimally maximal cutting norm was established and approbated for State forests for the period 1991 - 1995. The Ministry of Forestry also allowed the level of thinnings to increase to optimally maximal level. [Authors' translation]

Even though facing lack of wood for domestic needs, the minister of forestry gave order in 1991 to increase exports to 300,000 m^3 for creating a viable financial base for State forest enterprises (Brukas and Kičas 2003). In subsequent years, restrictions of roundwood exports were gradually slackened. They were fully removed in 2000, during the period of negotiations for membership at the World Trade Organisation (entered 2001) and the European Union (2004).

Economic transition

The shift from planned to market economy affected forestry in numerous ways, first of all by abandoning the price regulation and subjecting timber prices to supply-demand interactions on the market. Forestry, in turn, became to a higher degree dependent on development of timber industries, nationally as well as internationally.

The Lithuanian timber industry faced a major crisis in the end of the 1980s and beginning of the 1990s. The emerging slump due to overall weakening of the

Soviet economy throughout the 1980s (Stankevičius 2006) was deeply worsened in the early 1990s, the times of broken economic ties with the USSR, and hasty restructuring and privatisation of industries. For instance, production of paper and card board decreased 8 times, output of doors and windows plummeted fivefold from 1989 to 1993 (Morkevičius *et al.* 2003). The rebirth of the industry in 1994-1996 was facilitated by increased domestic supply of raw material. In current prices, investments into tangible fixed assets within timber industry grew from LTL 60.1 million in 1995 to 447.3 million in 2007 (VMT 2008). The annual sales of industrial production quadrupled during 1998-2006. In 2004 wood industry created 21.1% of added value of all manufacturing industry, and was its leading branch (Švetkauskas 2006).

The value added of the forest sector made up 3.8% of the national gross value added in 2007 (VMT 2008). Forestry alone contributed with 0.6%, while shares of timber manufacturing and furniture industries comprised 1.46 and 1.51%, respectively. The years of independence reversed the ratio of imports and exports. Setting aside pulp and paper, exports of the Lithuanian timber industry grossly exceed imports (by 34% in the 1st half of 2007); making a sound contribution to the economy (Rudzkis and Kvedaras 2003) that suffers from a negative foreign trade balance (minus 43% for the same period).

Because of a turbulent introduction of the Lithuanian currency and hyperinflation in the early 1990s, as well as lacking price data, reasonable analysis of timber price series can be started from 1995. The mid 1990s are recalled as the "golden age" by State forest enterprises as, due to freed markets and soaring pulpwood prices, sizeable proceeds could be made from exports to the Nordic countries. In real terms, timber prices subsequently had tendency to decrease (Figure 3). Price recovery is observed in 2003-2007, due to increasing timber demand domestically and in the whole Baltic Sea region. A new slump of prices commenced in the second half of 2007 and continued in 2008 due to shrinking global economic development that severely affected forest industries also in the Baltic Sea region.

To sum up, the economic transition has brought forward growth of domestic forest industries and was a motivating factor for increased utilisation. The observed alterations in timber prices reveal a heavy dependency of the Lithuanian timber market on developments in regional and global economy.

Changes of inventory methods

Forest inventory in Lithuania is carried out in two ways: (i) following the long-standing tradition to measure all forest stands, Standwise Forest Inventory (SWI), and (ii) based on sampling methods, National Forest Inventory (further NFI) introduced in 1995, with first results available since the turn of the millennium (LRAM 2001).

SWI data form the basis for management of each forest stand. In other words, SWI helps to set up appropriate forest management regimes. Annual allowable cut is estimated according to SWI.

Kuliešis (1999) outlines several aims of NFI, such as measuring of forest resources, structure and dynamics with required accuracy, validating other inventory methods, and controlling forest utilisation at the national level. According to Kuliešis (2004), NFI estimates are more precise and exceed estimates by SWI. For example, in 2002, the average volume in all forests differed by 33 m^3/ha, while in mature forests the difference was 53 m^3/ha. The gross annual increment in Lithuania according to SWI and NFI was 11.8 and 16 million m^3, respectively, *i.e.* differed by 36%. More modest estimates of SWI are still used in the official statistics. Discrepancies between SWI and NFI estimates instigated disputes between inventory experts

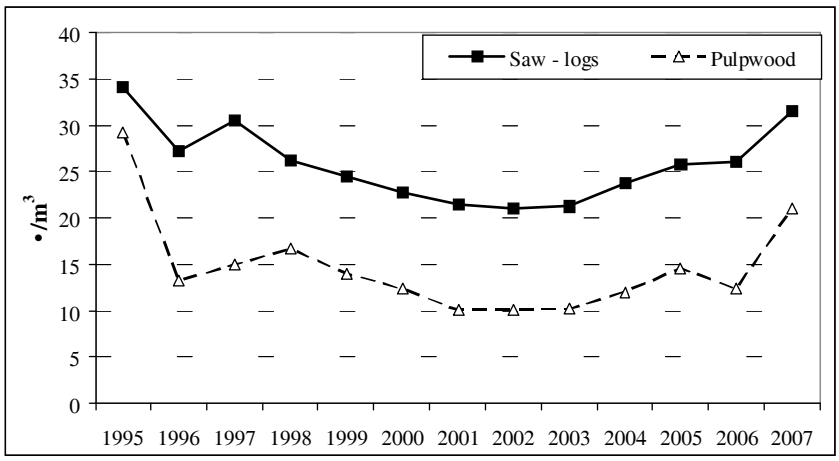


Figure 3. The average real (inflation-corrected) prices of round wood and pulpwood in Lithuania 1994 – 2007

and decision-makers in national forestry administration but this has not yet led to any substantial changes in methodologies for estimating the allowable cuts. Potentially, more accurate information by NFI could lead to adjustments of SWI methodologies and motivate increased forest utilisation in coming years.

The procedure of calculating the annual cutting norm has been modified several times during the years of independence. In 1995, the period for estimating accumulated harvest volumes in mature stands was decreased from 20 to 10 years. According to Kenstavičius (2004), the modified calculation method enabled to increase the annual cutting norm for final fellings by 33%.

The resource base

During the Soviet period, forest inventory experts used to intentionally underestimate the standing volumes in Lithuanian forests. Cuttings were much lower then long-term biologically feasible rates, and estimated 4 million m^3 of timber was accumulated in forests annually (Brukas and Kairiūkštis 2003). This enabled to fully restore forests degraded around the two world wars.

From 1988 to 2007 forestland increased from 1,878 to 2,136 thousand hectares corresponding to an increase in forest coverage from 29.0 to 32.7% (Brukas and Kenstavičius 1992, VMT 2007). In the same period, the standing volume increased from 309 to 404.7 million m^3, according to the official statistics (Brukas and Kenstavičius 1992, LVMI 1994, VMT 2007). The respective figures for the average growing stock are 174 m^3/ha and 199 m^3/ha. The volume of mature forests (according to the minimum allowable rotation age) rose from 32.3 to 82.1 million m^3. Notably the latter number for 2007 only covers commercial and protective forests or 85% of total forest area (Brukas and Kenstavičius 1992, VMT 2007). The main reason for such a dramatic increase in mature timber stock is aging of stands while maintaining rather low levels of utilisation. A contributing reason is the reduction of minimum allowable cutting ages for spruce from 85 to 75 years in 1997 and additionally to 71 year in 2000 (Kenstavičius 2000).

Gross annual increment doubled during 1988-2005, from 6.6 million m^3 to 13.1 million m^3 (Brukas and Kenstavičius 1992, VMT 2007). Brukas and Kairiūkštis (2003) claim that the current increment per hectare for 1988 was not 3.8 m^3/ha as presented by the official forest inventory but rather 6.8 m^3/ha. A look at age class distribution reveals too high share of middle-aged forests (42.3%) and insufficient amounts of young, 10-20 years old stands, especially of Scots pine, the most common tree species. A more even distribution of age classes could be achieved by adopting more flexible regulations and increasing the amount of final fellings (Brukas 2007).

Natural disasters

Natural disasters left a marked record during the analyzed period. Sanitary cuttings made up 2.8 million m^3 in 1993 (MUM 1994) and 2.6 million m^3 in 1995 (MUM 1996). The primary reason was a severe drought in 1992, followed up by wind throws and bark beetle *(Ips* spp.*)* attacks (Karazija and Kuliešis 1996). It is worth noting that sanitary cuttings after 1995 remained at about twice higher level (around 1 million m^3 annually) than before 1993 (Verbyla 1992, MUM 1994-1996, ZMUM 1996-1998, MSTD 2000, LRAM 2002, GMU 2003-2006, LRAM 2005b, VMT 2007). Sanitary cuttings today enable to maintain a bit higher harvesting levels, presumably serving as a "hidden" counteraction by forestry practitioners against the severity of silvicultural restrictions.

Drivers inhibiting or stabilizing the utilisation

Land reform and forest restitution

The restitution of private forests to the pre-war owners and their heirs was commenced in 1992, leading to small and fragmented family forestry (Brukas 2003). Presently the average size of the private holding is 3.3 hectares (VMT 2008). At first site, it might be presumed that restitution of property rights to private forest landowners should result in significantly increased utilisation due to profit-motivation and entrepreneurship by private owners. This has turned out not to be a case in Lithuania. First, the land reform proceeded quite slowly. In the beginning of 2008, still 15% of the total forest area was left for restitution without proper management, if any (VMT 2008). Second, the emerging owners often live far away of their properties, lack knowledge and skills in forest management, which is further aggravated by profoundly normative regulation of forest management. Pivoriūnas (2004) found that forest owners perceive a high level of bureaucracy as the biggest problem in managing their estates. To carry out forestry activities, estate of any size must have approved forest management plan (FMP) with the horizon of 10 years. A substantial share of new owners does not care about management of their properties or lack motivation for working themselves through various bureaucratic requirements, while forest owner cooperation still is very limited. If having FMP, a motivated owner would typically harvest available mature stands without long delays, cutting whole allowable amount that could be harvested according to FMP provisions. This presumably was one of the reasons, why the utilisation in private forests was increasing until 2003 and then started to decrease, following the pace of restitution.

Increasing restrictions of forestry activities

In 1989, commercial forests occupied 63.8 % of the total forest area, while the remaining 36.2% were as-

signed the status of the so-called special destination. Such a big share of non-commercial forests might create an impression of heavy environmental restrictions by the end of the Soviet period. In fact, severe restrictions applied to 6.0% of the State forests only. Brukas *et al.* (2008) found that, due to the aforementioned non-commercial status, the annual utilisation potentially might have decreased up to 0.6 million m^3. The actual effect was meagre, while forestland assignment to different jurisdictions played a much more significant role. The annual utilisation rate on average constituted 2.1 m^3/ha in forests managed by State forest enterprises; and only 0.6 m^3/ha in forests belonging to collective farms. This gap was primarily caused by poor stewardship of the latter forests (Kenstavičius and Brukas 1990), having nothing to do with environmental considerations.

Soon after regaining the independence, in 1992-1993, considerable forest areas were included into four newly established national parks and 30 regional parks. At the time, new functional zoning was under elaboration. Forest Law of 1994 enacted four functional forest groups (group I: forest reserves; group II: ecosystem protection and recreational forests; group III: protective forests; group IV: commercial forests). According to this new division, severe management restrictions were laid down at 13-14% of the forest area (forest groups I and II). In accordance with the data NMI inventory (Kasperavičius 2008), average timber utilization in 2006 was 2.3 m^3/ha in groups I and II, or more than twice lower as compared to groups III and IV (5.2 m^3/ha). The total decrease in timber harvests amounts to approximately 0.8 million m^3 annually. This estimate does not account for decreased utilization due to higher rotation ages in forests belonging to group III.

Further management restrictions emerged in the new millennium, in connection to the EU membership. The establishment of Natura 2000 areas and woodland key habitats was not properly harmonized with the existing system of functional forest groups (Batutis 2008). New environmental restrictions in some areas are overlapping with the previous management limitations in non-commercial forests. Therefore, it is difficult to reliably estimate the actual impact on forest utilization. A case study in Kėdainiai State forest enterprise (Batutis 2008) shows a decrease in annual timber production by around 1.0 m^3/ha in the newly established Natura 2000 areas.

To conclude, environmental regulation of forest use has definitely been a factor inhibiting the utilisation. Moreover, this analysis treats only restrictions in connection to changing of forest functional status, *e.g.* ir relation to establishment of new protected areas. There has also been a tendency to increase environmental considerations in commercial State forests, *e.g.* by promoting a greater share of mixed forest plantations instead to coniferous monocultures.

Normativism in forestry

Normativism refers to a strong adherence to regulation by laws and rules with ensuing stern control, which is a lasting phenomenon since the Soviet period. Normativism and increasing environmental restrictions are mutually reinforcing factors, however normativism is wider in scope and comprises not only certain legislative stipulations, *e.g.* for a particular set-aside area, but also the way of thinking and acting, a *modus operandi* built-in in the institutional norms, formally and informally. Normativism permeates practically all kinds of forestry activities in Lithuania; this section will address only those few that are considered to have the highest impact on forest utilisation.

Legally stipulated minimum allowable rotation ages define the lowest age when final forest harvest is allowed. They are defined according to so-called technical maturity (forest rotation when maximum volume increment of certain timber assortments is obtained) without consideration of cash flows and the value of timber and forestland. Besides, the same rotation is set for a species irrespective of the site productivity (Brukas 2000). This is a typical case, then market logic is ignored, the State by tradition relies mainly on normative policy tools, even if based on false assumptions. Brukas *et al.* (2001) estimated that the amount of forest mature for final harvesting could as much as triple if economically rational criteria were for defining minimum allowable rotations, instead of technical maturity.

Although certain changes in inventory methods enabled an increase of the allowable cut in mid 1990s, the procedure of estimating and approving the annual cut is remarkably conservative. The estimations are based on SWI which, as described above, tends to underestimate standing volume and increment. Calculations of the allowable cut are based on area control, analyzing the age-class structure and pursuing the centuries-old idea of normal forest. Importantly, allowable cut restrictions are applied at State enterprise or private estate level, irrespective of its size. Naturally, the effort to even out the age class structure is the more difficult fulfil, the smaller is the size of the analysed management unit. Taking State forests as the example, the estimated annual cut thus would become remarkably higher is the annual cut was calculated for the whole State forest area in Lithuania, rather than for each of 42 State forest enterprises separately, as is done today.

Another important aspect is that, in the lengthy procedure of approving the cutting norm for State

forests, the heaviest decision-making power is vested in the Ministry of Environment including the Department of Forests and the minister in person, also involving control by the State Environmental Inspection Directorate with no representation of forest industries (LRAM 2005a; Linkevičius 2007). Under such set-up, environmental aspects of forest utilisation gain a high weight with focus to regulatory approaches in the utilisation policy. Forest inventory experts (Kuliešis *et al.* 2007) point out that, due to current normative requirements and the mounting volume of mature forests, the final harvest occurs 20 years later than allowed according to the minimum allowable rotation age. Such delay leads to the loss of 40-45 m^3/ha, besides losses of time and timber quality.

The normativism is widespread also in relation to the private forestry (see Section Land reform and forest restitution), with a heavy emphasis on control and elaborate bureaucratic procedures, *e.g.* for obtaining FMPs and subsequently cutting permissions from environmental authorities (LRV 2004).

Overall, conservative forest management planning based on area control in combination with restrictive legislation and cumbersome bureaucratic procedures have at least two significant effects on forest utilisation:

(i) restricting the harvesting to levels that are much lower than the potential sustainable even flow on the national level, even if considering commercial forests only.

(ii) severely decreasing the flexibility of State forest managers and private forest owners to react to market signals, *e.g.* by increasing harvesting at times of high timber demand and *vice versa*.

Negative public opinion

As in most European countries, negative public opinion about forest harvesting prevails in Lithuania. A representative survey found that environmental and recreational forest functions were the most important for Lithuanian people (Tebėra 2004). Regarding future priorities, 63% of respondents gave preference to ecological functions and 19% to recreational forest functions. Just 8% claimed that forest should create more working places. Forest as a source of income receives very low priority (3%). Contrary to reality, 77% of respondents believe that the area of forests in Lithuania is decreasing. Generally, public voices do not have strong direct influence on the formulation of forest policy, while environmental NGOs are weak (Linkevičius 2007). However, prevailing public opinion seems to suit conservative forest policies as institutions of State forestry can resist criticisms for lacking efficiency by reference to societal preferences (Brukas 2008).

Economic model of State forestry

The principle of self-sufficiency was adopted for State-owned forest enterprises in 1993. The principle declared that incomes of enterprises should cover expenditures. In 2001, status of "State enterprise" was set to the forest enterprises, and compulsory profitability requirement (profit/expenditures ratio) was defined to be 7%.

Due to the land reform, the differences between State forest enterprises increased both in forest area (ranging from 11.8 to 38.6 thousand ha) and in terms of timber value (average timber price ranging from 89 to 127 LTL/m^3 in 2006). Furthermore, the former differential payment to the central "forest fund" was abolished. In 2002-2003, the average profitability of the State forest sector was lower than required. As the amount of final fellings from State forests is regulated strictly, some weaker forest enterprises were increasing intermediate forest use, *i.e.* thinnings and sanitary cuttings.

Since timber prices rose in 2004-2005, forest enterprises were able to reach the required profitability level. According to market logic, increased prices of roundwood should give incentives to raise the utilisation. Contrary to this, the roundwood sales were slightly decreasing (Figures 4 and 5).

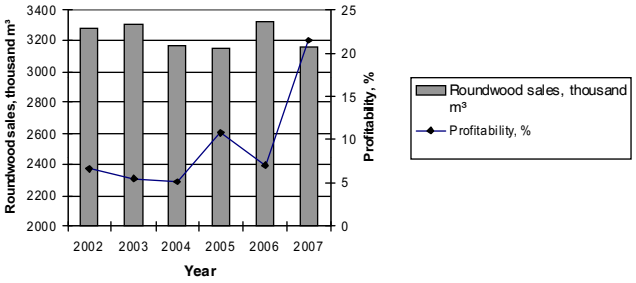


Figure 4. Roundwood sales by state forest enterprises versus profitability ratio

In 2006 timber prices remained at the level of 2005, but harvesting costs increased by 15% in real prices. Other costs rose as well, *e.g.* average salaries of employees at State forest enterprises increased from 1595 to 1924 LTL/month. Under such conditions, the required profitability (7%) was reached only by increase of roundwood sales by 168 thousand m^3 (Figure 4). In 2007, real roundwood prices soared, enabling to easily surpass the required profit margin. And again, a decrease in forest utilisation is observed.

Generally the fluctuations of harvesting in State forests are low, the annual harvests not deviating more than 10% from the average, in 1998-2007. The extent and direction of the observed fluctuations enable concluding that utilisation of State forests is not driven

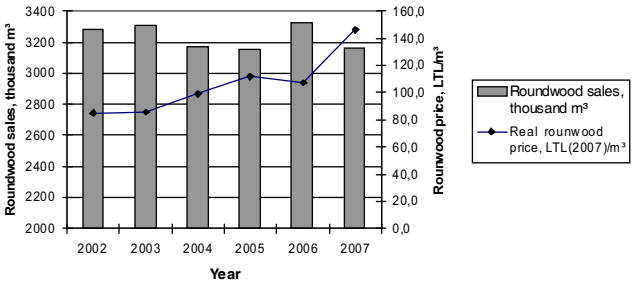


Figure 5. Roundwood sales from state forest enterprises versus real timber prices

by traditional market forces (timber demand), but mostly by normative requirements and a peculiar economic model. In principle, this model counteracts market logic as the enterprises need to increase fellings when roundwood prices are dropping and *vice versa*. Most importantly, the system lacks internal incentives for utilising forest resources efficiently.

Recapitulation of the main drivers

To summarize the retrospective analysis (Figure 6), the most important drivers for increased forest utilisation were: (i) Reorientation to domestic forest resource base after ceased imports from Russia; (ii) Economic transition that subjected timber prices to free fluctuations on the market and also sparked fast development of timber industries; (iii) Changes in resource base with rapidly accumulating standing volumes throughout the whole period; and (iv) Natural disasters that presumably facilitated a "mental shift" towards increased utilisation in the mid 1990s.

Increase of utilisation has been inhibited by several powerful agents of resistance: (i) Profound normativism that permeates forestry activities in many ways, *e.g.* by detailed silvicultural provisions without taking into account new economic realities. Examples are rigidly fixed minimum allowable rotation ages; ne-

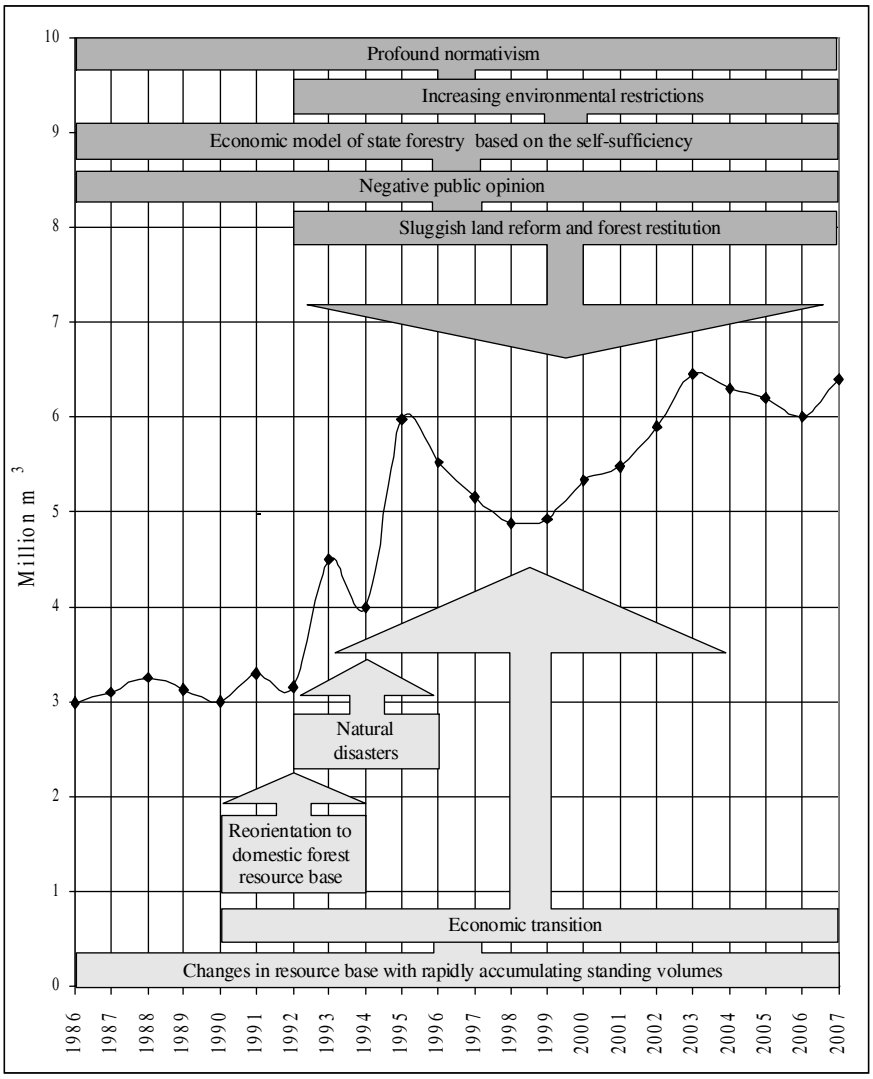


Figure 6. Total cuttings in Lithuania and the main drivers for increased or decreased utilisation

cessity to strictly follow forest management plans in State and private forests; and conservative calculation and approval of the allowable cut; (ii) Economic model of State forestry based on the principles of ostensible self-sufficiency, which, in combination with normativism, removes incentives for efficient forest use. Forest utilisation can be relatively low as long as labour costs are low enough to fulfil the normative requirements; (iii) Increasing environmental restrictions in form of both, shifting forestland from commercial forests to more restrictive management categories and setting more restrictions in commercial forests, (iv) Negative public opinion toward forest utilisation and ever increasing preferences for environmental and recreational forest values; and (v) Sluggish land reform and forest restitution that resulted in big forest areas left without any silvicultural activities; after getting forest back, many owners lack skills and motivation to manage their estates effectively, if at all.

Discussion and conclusion

The analysis has retroactively elicited a set of drivers that had the most significant impacts on the level of forest utilisation. Singling out of separate factors might create a deceiving impression that each driver effects the utilisation in isolation. In reality, the factors interact in various ways and the combined effects sometimes can be unexpected. For example, "Natural disasters" were identified as a significant biological agent toward increased utilisation in mid 1990s. "Normativism" is found as a powerful social agent suppressing the utilisation throughout the whole analysed period. Karazija and Kuliešis (1996) maintain that the damage of bark beetle could have been significantly lower if not inadequate normative regulations were in place. Foresters were allowed to remove dead trees, while having to leave already infected neighbouring trees. Thus, combating of the invasion was highly ineffective. We see an interaction between a biological agent and normativism the latter leading to contrary effects than intended, *i.e.* an increased utilisation at a higher cost. Thus, when interpreting the results, one should keep in mind that we only show the most powerful agents at an aggregated level and that these agents are not independent from each other.

The study scrutinises the drivers behind utilisation "from aside", without explicitly examining the involved stakeholders and their interests. It is obvious that various stakeholders, *e.g.* environmental organisations and forest industries, have very different interests with regard to utilisation. Their influences depend, *inter alia*, on power possessed in the relevant decision-making arenas. A detailed stakeholder analysis could be an important follow-up of this study.

As for practical policy-making, important questions are how big is the impact of various drivers and to which extent these drivers could be controlled by targeted policies. Accurate quantification of impacts by each driver is difficult, in part due to the aforementioned combined effects. Some of the drivers are almost completely outside the control of forestry institutions. Examples could be "Reorientation to the domestic resource base" and "Economic transition", as forestry institutions could neither prevent the cessation of Russian imports in the early 1990s, nor stop the development of unregulated market for timber products. Some other drivers, such as "Profound normativism" and "Economic model of State forestry" can be steered to a desired direction by national authorities; sometimes radical changes can be induced, as shown by reforms in the Baltic neighbours Latvia and Estonia.

The accumulating forest resource base offers good possibilities for increased utilisation. Increasing environmental restrictions might be perceived as a reasonable development that reflects changing societal preferences and the need to fulfil international obligations. The same cannot be said about the permeating normativism that is the most significant factor inhibiting forest utilisation. Normativism *per se* emerges a very complex amalgam of legislative settings and informal routines, management traditions, values by tone-setting stakeholders, their disposition on the policy arena, *etc.* Being a pervasive agent in most ex-socialist countries, normativism is very little studied in relation to forestry and deserves much more forest policy research.

To sum up, this study took up an interesting case of forest utilisation in a country that has well-established forestry traditions and, on the other hand, faced a period of rapid economic and social transition. The transition has been an important trigger for increasing the utilisation; but the increase was dampened by several factors, most notably by the profoundly bureaucratic routines in forest management and administration. The study reveals that, in order to explain the dynamics of forest utilisation, it is insufficient to focus solely on the available resource base or market mechanisms. Instead, such analysis should holistically examine numerous agents in social and biological realms.

References

Batutis, V. 2008. Natura 2000 miško biosferos poligonų steigimo ekonominė analizė [Economic analysis of establishing Nature 2000 forest biosphere poligones] MSc thesis in forest science. Lithuanian Agricultural University, Kaunas–Akademija.

Brukas, A. 2003 Miškų nuosavybė [Forest ownership]. In: Verbyla, V., Brukas, A. and Kairiūkštis, L. (Editors), Lietuvos miškų metraštis XX amžiuje. Kaunas, Aplinkos ministerija, Miškų departamentas, p. 121-125. (in Lithuanian, with English summary)

Brukas, A. and Kairiūkštis, L. 2003. Miško kirtimai ir bendras naudojimas. [Forest harvesting and general utilisation] In: Verbyla, V., Brukas, A. and Kairiūkštis, L. (Editors), Lietuvos miškų metraštis XX amžiuje. Kaunas, Aplinkos ministerija, Miškų departamentas, p. 181-187.

Brukas, A. and Kenstavičius, J. 1992. Lietuvos miškų pakartotinio tvarkymo augimviečių pagrindu rezultatai ir naudojimo perspektyvos [Results and utilisation perspectives of repeated site-based inventory]. Kaunas, Lietuvos miškų institutas (in Lithuanian)

Brukas, A. and Kičas, E. 2003. Medienos pramonė ir prekyba atkūrus nepriklausomybę. [Forest industry and trade after re-establishing independence] In: Verbyla, V., Brukas, A., Kairiūkštis, L. (Editors) Lietuvos miškų metraštis XX amžiuje. Kaunas, Aplinkos ministerija, Miškų departamentas, p. 377-382 (in Lithuanian, with English summary)

Brukas, V. 2000. Integrating environmental and socio-economic values into Lithuanian forestry. Ph. D. thesis. Copenhagen, The Royal Veterinary and Agricultural University.

Brukas, V. 2007. Miškanaudos didinimas: galima ar negalima? [Increasing forest utilisation: permissible or not?]. *Baltijos miškai ir mediena* 11: 24-29 (in Lithuanian)

Brukas, V. 2008 Miškanaudą didinti galima. Bet ar valstybiškas požiūris įveiks sustabarėjusias tradicijas? [Forest utilisation can be increased. But will a responsible attitude defeat the stiff traditions?] *Baltijos miškai ir mediena* 2: 13 – 17 (in Lithuanian)

Brukas, V., Linkevičius, E. and Činga, G. 2008. Atsakinga miškanauda valstybės gerovei. [Responsible forest utilisation for the State welfare.] Mokslinis taikomasis darbas Lietuvos Gamtos Fondo užsakymu. Alnarp, Swedish University of Agricultural Sciences; Kaunas, Lithuanian University of Agriculture. (unpubl.), 62 p., (in Lithuanian)

Brukas, V., Thorsen, B., J., Helles, F., and Tarp, P. 2001. Discount rate and harvest policy: implications for the Baltic forestry. *Journal of Forest Policy and Economics* 2: 143-156.

GMU (Generalinė Miškų Urėdija) 2003-2006. Miškų urėdijų 2002-2005 metų veiklos rodikliai. [Activity indicators of State forest enterprises in 2002-2005] Vilnius, GMU (in Lithuanian)

Karazija, S. and Kuliešis, A. 1996. Vėjavartų ir žievėgraužio tipografo 1992-1996 metais padaryti nuostoliai, išplitimo Lietuvos miškuose priežastys ir dėsningumai [Wind and *Ips typographus* damages in 1992-1996: losses, reasons and regularities] *Miškininkystė* 2(38): 66-80 (in Lithuanian)

Kasperavičius, A. 2008. Lithuanian forest resources, inventory, and Forest Kadastre. Presentation at Euroforester seminar, Lithuanian Agricultural University, 2008 March 28.

Kenstavičius, J. 1993. The forests of Lithuania, their utilisation – the demand for wood in the past, nowadays and in the future. Proceedings of Lithuanian Forest Institute 33, p. 69-79.

Kenstavičius, J. 2000. Historical review and assessment of cutting ages used in Lithuania. In: Brukas, V., F. Helles, P. Tarp and A. Tebera. (Editors). Potentials and perspectives for balanced development in Lithuanian forestry. Copenhagen, Royal Veterinary and Agricultural University. Forestry discussion paper, p. 25-29.

Kenstavičius, J. 2004. Metinė kirtimų norma grindžiama klaidingais skaičiavimais [Annual cutting norm is based on wrong calculations]. *Baltijos miškai ir mediena* 4: 8-10 (in Lithuanian)

Kenstavičius, J. and Brukas, A. 1990. Respublikos miškų ir miško ūkinės veiklos charakteristika. [Characteristics of forests and forest management activities in the Lithuanian Republic] Mališauskas, V (red.). Lietuvos miškų kadastras. Lietuvos MA Ekonomikos Institutas, Vilnius, p. 27-196 (In Lithuanian)

Kuliešis, A. 1999. Application of sampling method in Lithuanian national forest inventory. *Baltic Forestry* 5(1): 50-57

Kuliešis, A. 2004. Miškų inventorizacijos – skirtingos esme ir rezultatais [Forest inventories are different in essence and results] *Baltijos miškai ir medi*ena 2(4): 15-19, (in Lithuanian)

Kuliešis, A. and Petrauskas, E. 2000. Lietuvos miškų naudojimo XXI a. prognozė [Forecast of forest utilisation in Lithuania for the 21st century] Kaunas, Institute of Forest Management Planning, Lithuanian University of Agriculture (in Lithuanian)

Kuliešis, A., Kasperavičius, A. and Butkus, A. 2007. Dėl metinės pagrindinių miško kirtimų normos 2009-2013 metams III-IV grupės valstybiniuose miškuose [Concerning annual norm for final cuttings for 2009-2012 in State forests of groups III and IV]. Kaunas, Pranešimas miškotvarkos mokslinės-techninės tarybos posėdyje (unpubl.)

Linkevičius, E. 2007. Policy drivers behind the forest utilisation in Poland, Lithuania and Latvia. MSc Thesis, Alnarp-Kaunas, Swedish University of Agricultural Sciences - Lithuanian University of Agriculture.

LRAM (Lietuvos Respublikos Aplinkos Ministerija) 2001. Dėl valstybinės miškų inventorizacijos, valstybinės miškų apskaitos, miškotvarkos projektų rengimo, derinimo ir tvirtinimo, miškotvarkos duomenų centralizuoto kaupimo, tvarkymo ir pateikimo miškų savininkams bei valdytojams tvarkos patvirtinimo. [Concerning State forest inventory, preparation of forest management projects…].Vilnius: Aplinkos ministro įsakymas Nr. 352. *Valstybės žinios*, 2001 07 19, Nr. 63-2301 (in Lithuanian)

LRAM 2002. Miškų ūkio įmonių 2001 metų gamybinės veiklos rodikliai [Activity indicators of State forest enterprises in 2001]. Vilnius, LRAM, Miškų ekonomikos centras (in Lithuanian)

LRAM 2005a. Dėl valstybinės miškų inventorizacijos, valstybinės miškų apskaitos, miškotvarkos projektų rengimo, derinimo, ir tvirtinimo, miškotvarkos duomenų centralizuoto kaupimo, tvarkymo ir pateikimo miškų savininkams, bei valdytojams tvarkos patvirtinimo pakeitimo. [Concerning State forest inventory…]. Vilnius, Aplinkos ministro įsakymas Nr. D1-334. *Valstybės žinios* 2005 07 14, Nr. 85-3187.

LRAM 2005b Privatūs miškai Lietuvoje 2005 [Private forests in Lithuania 2005]. Vilnius, LRAM, (in Lithuanian).

LRV (Lietuvos Respublikos Vyriausybė). 2004. Dėl privačių miškų tvarkymo ir naudojimo nuostatų patvirtinimo [Concerning approval of regulations for management and use of private forests]. *Valstybės žinios*, 2004-05-28, Nr. 86-3117.

LSD (Lietuvos Statistikos Departamentas). 1991-1993. Lietuvos statistikos metraštis 1990-1992 metai. [Statistical Yearbook of Lithuania 1990-1992. Vilnius, Statistikos departamentas prie LR vyriausybės (in Lithuanian).

LVMI (Lietuvos Valstybinis Miškotvarkos institutas) 1994. Lietuvos miškų ištekliai [Lithuanian forest resources] Vilnius, Lietuvos Miškų Ūkio ministerija, LVMI (in Lithuanian)

Miles, M.B. and Huberman, A.M. 1994. Qualitative data analysis. Second edition, SAGE publications, London.

Mizaras, S. and Lebedys, A. 2000. Medienos eksportas ir importas: būklė, problemos, perspektyvos. [Wood export and import: state, problems and perspectives]. *Rinkotyra. Žemės ūkio ir maisto produktai* 2(8): 53-59. (in Lithuanian)

Morkevičius, A., Žuraulis, E. and Brukas, A. 2003. Medienos pramonė ir prekyba atkūrus nepriklausomybę [Forest Industry and Trade after re-establishing independence]. In: Verbyla, V., Brukas, A. and Kairiūkštis, L. (Editors), Lietuvos miškų metraštis XX amžiuje. Kaunas, Aplinkos ministerija, Miškų departamentas, p. 357-366 (in Lithuanian, with English summary)

MSTD (Miškų ir saugomų teritorijų departamentas) 2000. Miškų ūkio įmonių 2000 metų gamybinės veiklos rodikliai [Activity indicators of State forest enterprises in 2000]. Vilnius, MSTD prie Aplinkos ministerijos, Miškų ekonomikos centras (in Lithuanian)

MUM (Miškų Ūkio Ministerija). 1994-1996. Miškų ūkio įmonių 1993-1995 metų gamybinės veiklos rodikliai [Activity indicators of State forest enterprises in 1993-1995]. Vilnius, MUM (in Lithuanian)

Petrauskas, E. and Kuliešis, A. 2004. Scenario-based analysis of possible management alternatives for Lithuanian forests in the 21st century. *Baltic Forestry* 10 (2): 72-82.

Pivoriūnas, A. 2004. Need assessment of non-industrial private forest owners in Lithuania. In: Baumgartner D. M. (Editor), Human dimensions of family, farm and community forestry. Proceedings of IUFRO Int. Symposium, Pullman, USA, March 29 – April 1, 2004, p. 127-131.

Rudzkis, R. and Kvedaras, V. 2003. Lietuvos eksporto tendencijos ir ekonometriniai modeliai [Tendencies of Lithuanian exports and econometric models]. *Pinigų Studijos* 4: 29-51 (in Lithuanian, with English summary)

Rutkauskas, A. 1997. Lietuvos miškų ištekliai ir naudojimas [Lithuanian forest resources and their utilisation]. *Lietuvos Mokslas* 5(13-14): 33-39 (in Lithuanian)

Stankevičius, J.P. 2006. Lietuvos ūkio pokyčiai XX amžiuje [The Structure of Lithuania's Economy in the 20th Century]. Istorija. *Lietuvos Aukštujų Mokyklų Mokslo Darbai*: 63: 66-75. available on. www.ceeol.com (in Lithuanian, with English summary)

Švetkauskas, Č. 2006. Lietuvos medienos pramonės plėtros perspektyvos [Perspectives of Lithuanian timber industry]. *Baltijos miškai ir mediena* 2: 50-54 (in Lithuanian)

Tebėra, T. 2004. "Baltijos tyrimai" – apie šalies miškus [Baltijos Tyrimai about country's forests], *Mūsų Girios* 1: 25 (in Lithuanian)

Verbyla, V. 1992. Lietuvos miškų ūkis [Lithuanian forestry]. Vilnius, Miškų Ūkio ministerija (in Lithuanian).

VMT (Valstybinė Miškotvarkos tarnyba). 2000-2008 Lietuvos miškų ūkio statistika 2000-2008 [Lithuanian forestry statistics 2000-2008]. Kaunas, VMT, Aplinkos ministerija.

ZMUM (Žemės ir Miškų Ūkio ministerija). 1996-1998. Miškų ūkio įmonių 1996-1998 metų gamybinės veiklos rodikliai [Activity indicators of State forest enterprises in 1996-1998]. Vilnius, ZMUM (in Lithuanian)

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АНАЛИЗ ФАКТОРОВ ЛЕСОПОЛЬЗОВАНИЯ В ЛИТВЕ В 1986-2007 Г.

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Резюме

После восстановления независимости, Литва испытывала переход к рыночной экономике, но радикальные социальные изменения имели только умеренное воздействие на литовское лесное хозяйство. Это исследование оценивает самые важные факторы, которые стимулировали или уменьшали лесопользование. Анализ многочисленных источников раскрывает, что главными силами, повышающими лесопользование, являлись экономические перемены и увеличение лесных ресурсов. Они были уравновешены другими факторами, прежде всего укоренившимся нормативизмом, увеличением экологических ограничений, экономической моделью государственного лесного хозяйства и вялой земельной реформой. Исследование показывает, что, стремясь понять динамику лесопользования, недостаточно сосредотачиваться исключительно на имеющихся лесных ресурсах, как обычно принято в прогнозах рубок древесины. Необходим целостный анализ, принимая во внимание, среди прочего, традиции лесного хозяйства, организационные-правовые рамки и развитие других секторов.

Ключевые слова: лесное хозяйство, лесные рубки, политические факторы