MANAGEMENT OF PRIVATE FORESTS AND ALTERNATIVES FOR ITS IMPROVEMENT IN LATVIA

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Abstract. Forest resources as the main source of employment and income in rural areas and in the entire country have historically always been important in Latvia's socio-economic development**.** Previous studies have not contributed to finding a positive solution to the problems of owners of private forests. The research aim is to examine the management of private forests in Latvia, to identify the most important factors affecting the management of forests and to define the key alternatives for improving the situation. According to experts, the most important factors affecting the management of private forests by their owners are the sufficiency of resources, the availability of consultancy services for forest owners, the use of technologies, the availability of education and the quality of education. The experts rated the following factors as insufficient: availability of the EU financial assistance, sufficiency of the EU co-funding, availability of non-timber products, and performance and activities of nongovernmental organisations (NGOs). The most effective alternatives for more productive management of private forests are the multi-industrial and concentric diversification of business activity of forest owners as well as cooperation. The present research employed the monographic and descriptive methods as well as analysis and synthesis, the graphic method, document analysis, data grouping and a sociological research method – a survey of experts. The SPSS program, Kendall's W (concordance) test and the analytic hierarchy process were employed to process the survey data.

Key words: private forests, management, affecting factors, diversification, cooperation

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Introduction

Forests are a significant income source for many residents of Latvia and considerably contribute to the national economy, as Latvia is ranked fourth, in terms of forest cover, in the

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European Union behind Finland (77%), Sweden (76%), and Slovenia (63%). On average, 41% of the European Union Member States' territory is covered by forests. Latvia's forest cover was only 27% in 1923; since then it has almost doubled, reaching 52% (Summary on the Forest Management..., 2014a).

In recent years, several Latvia's scientists and forestry professionals have researched the forest economy (Zalitis P., 2001; Iesalnieks J., 2002; Klauss K., 2014; Dubrovskis D., et al., 2007 and 2011; and others), while foreign scientists have researched this field since the middle of the 19th century until present (Faustmans M. 1849; Markus, R. 1967; Klemperer, W. D. 1996; Gilles, J. K. 2003; and others). Previous studies have not contributed to finding a positive solution to the problems of owners of private forests; for this reason, it is still urgent to identify the problems in the management of private forests and the affecting factors in order to come up with proposals for improving the situation.

The research aim is to examine the management of private forests in Latvia, to identify the most important factors affecting the management of forests and to define the key alternatives for improving the situation.

To achieve the aim, the following research tasks were set:
- to examine the trends in the management of private forests in Latvia;
- to identify the most significant factors affecting the management of private forests by their owners in Latvia;
- to define the key alternatives for improving the situation in the management of private forests in Latvia.

The present research employed the monographic and descriptive methods as well as analysis and synthesis, the graphic method, document analysis, data grouping and a sociological research method – a survey of experts. The SPSS program, Kendall's W (concordance) test and the analytic hierarchy process were employed to process the survey data.

Research results and discussion

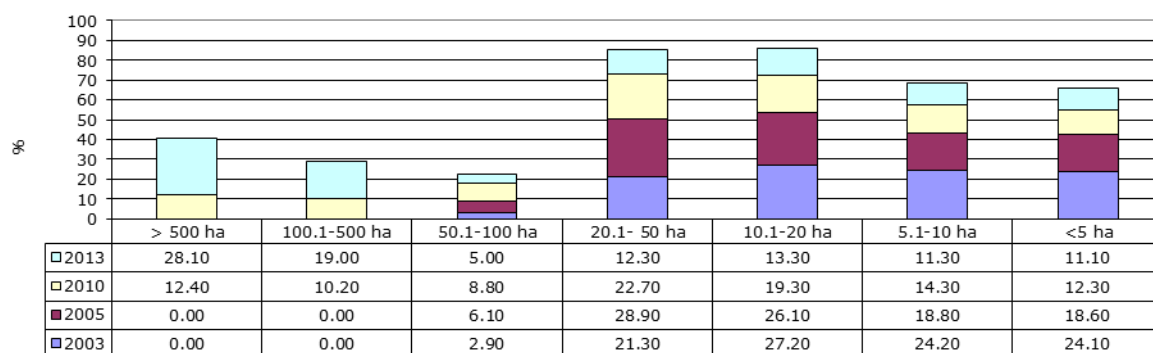### 1. Trends in the management of private forests in Latvia

The distribution of forest area by type of ownership changed every year in the period 2008-2014, as the area of state-owned forests decreased by 17.7 thousand ha in 2014 compared with 2008, while the area of forests of other ownership types increased by 285.9 thousand ha (Summary on the Forest…, 2014b).

In 2014 in Latvia, almost half of forests were owned by the state, while the other half, more than 1.7 million ha or 53.7% of their total area, were owned by private forest owners, enterprises, municipalities, and other persons (Forest by Ownership…, 2014).

In Latvia, the largest forest owners, in terms of size of forest area, are the JSC Latvijas Valsts mezi (JSC LVM) (1.51 million hectares), which manages the forests owned by Latvia's government, i.e. almost half of the total forest area in Latvia; the second largest group is natural persons that own a 15 percentage point smaller forest area than the JSC LVM or

Latvia's government. Legal persons own 13% and municipalities 2% of the total forest area. The largest management companies of private forests are Bergvik Skog Ltd (0.1 million hectares), Rigas mezi (0.067 million hectares), Skogssallskapet Ltd (0.06 million hectares), Foran Real Estate Ltd (0.056 million hectares) and others. The Reserve Land Fund holds 0.1% of the total forest area of Latvia. This is the forest area having no owner after the land reform. The number of private forest owners is one of the largest in Europe, accounting for about 7.5% of the total population. The average size of forest holdings in Latvia is 8.4 ha. The most fragmented forest holdings are reported in Latgale region.

In Latvia, private forest holdings are fragmented, which decreases the efficiency of forestry. Most private forest owners (90%) own less than 20 ha of forest, and such forest holdings make up more than 40% of the total area of private forests. According to information available in the State Forest Register, this category of forest holdings has the largest growing stock being mature or overgrown. According to the 2010 survey of forest owners "Assessment of the Potential Contribution of Private Forests to the Timber Industry in Latvia in 2011-2015", 15% of the forest owners were not interested in managing their forest holdings; consequently, these forest areas were not engaged in the industry's business. Over the past 10 years, forest holdings with a size of 5-20 ha had not performed any economic activity in a 20-30% area of their forest property. The proportion of such area was less than 12% for the forest holdings of greater size, while the proportion for the forest holdings sized more than 100 ha did not exceed 1%. Even though the extent of management of young forest stands gradually increases, yet, these activities in private forests are not performed at sufficient extent and quality. A measure of the Rural Development Programme 2007-2013 has considerably increased the extent of management of private young forest stands. Since 2005 it has risen 3.5 times. Nevertheless, part of the private forests is still managed inefficiently. An increase in the efficiency of management of small and medium forest holdings may be achieved by expanding cooperation among forest owners as well as by informing and educating them. Cooperation among forest owners is one of the most effective solutions to the responsible and productive management of private forests. The need for cooperation among forest owners is indicated by the percentage distribution of forest owners in Latvia (Figure 1).

	> 500 ha	100.1-500 ha	50.1-100 ha	20.1- 50 ha	10.1-20 ha	5.1-10 ha	<5 ha
☐2013	28.10	19.00	5.00	12.30	13.30	11.30	11.10
☐2010	12.40	10.20	8.80	22.70	19.30	14.30	12.30
■2005	0.00	0.00	6.10	28.90	26.10	18.80	18.60
☐2003	0.00	0.00	2.90	21.30	27.20	24.20	24.10

Fig.1. **Percentage distribution of private forest holdings by size in Latvia in the period 2003-2013**

In Latvia, the year 2013 was the first year of establishment of forestry services cooperative societies (FSCS) – six cooperatives were established and started their operation. Two FSCSs were founded in 2012 and four in 2013. The year 2012 may be regarded as the year of revival of cooperation among forest owners when the first FSCS, named "Mezsaimnieks", was founded in Alsunga. Grigorijs Rozentals – the generator of the idea and the founder – mentioned the fact that many private forests need responsible owners as one of the reasons for his initiative. This was evidenced both by many instances of sales of forest holdings and by the lack of any management activity in forests.

Forestry services cooperative societies in Latvia (in the period 2012-2013):

• FSCS "Mezsaimnieks" (Alsunga, 2012);

• FSCS "Vidzeme"(Madona, 2012);

• FSCS "L.V. Mezs" (Incukalns, 2013);

• FSCS "Vidzemes ekomezs" (Ligatne, 2013);

• FSCS "Beverinas zeme" (Trikata, 2013);

• FSCS "Tukuma mezipasnieki" (Tukums, 2013);

• FSCS "Usins" (Ogre, 2014) (Development of Private Forestry…, 2014).

Joining forestry cooperatives, private forest owners enhance their competitiveness and acquire additional knowledge on forest management and business. If the activity of forestry cooperatives increases, the amount of logging in private forests could rise. In the period 2009-2013 in Latvia, the total amount of logging in Latvia was volatile, but it tended to increase.

An analysis of the amounts of logging by type of ownership reveals that the logging in state-owned forests decreased by 27.9%, while in other forests it increased by 102.7%, which indicates that economic activity in private forests has increased (Harvest Volume…, 2014).

Further, the research identifies the most significant factors affecting the management of private forests by their owners in Latvia.

2. Most important factors affecting the management of private forests by owners in Latvia

The state JSC LVM implements national interests in maintaining, restoring, and managing state-owned forests. It holds and finances scientific research on increasing the value of forest capital. The JSC LVM performs its economic activity in accordance with a long-term development plan, using its available funds. The JSC LVM has examined the factors affecting the management of forests in Latvia; therefore, a study on the factors affecting the management of private forests by their owners is needed as well (Annual Accounts…, 2010).

A survey of experts was carried out to identify the key affecting factors of private forest management in Latvia.

In total, 37 factors, the importance of which was determined by five experts (Table 1), were suggested by the authors.

Table 1

Characteristics of the experts

Experts	Status	Length of service	Association with the field to be expert evaluated
A	Department manager at an institution associated with forestry	4 years	Direct association with forest management
B	Professional in logging and planning	More than 10 years	Direct association with forest management
C	Professional regarding forest resources	9 years	Direct association with forest management
D	Doctor of silviculture	More than 10 years	Direct association with forest management
E	Private forest owner	More than 10 years	Direct association with forest management

Source: authors' construction

To identify the key factors affecting the situation in the management of private forests by their owners, the factor ratings of the experts were evaluated according to the concordance of expert opinions. In case of direct assessment of parameters, the degree of concordance of expert opinions is evaluated by means of Kendall's W or the coefficient of concordance W according to Equation 1 (Kendall, 1955, Diakov and Krug, 1966):

$$W = \frac{12\sum_{i=1}^{n}\left\{\sum_{j=1}^{m} r_{ij} - \frac{1}{2}m(n+1)\right\}^2}{m^2(n^3-n)} \quad (1)$$

where:

W – coefficient of concordance;

n – number of factors to be rated;

m – number of experts;

r_{ij} – rank for the i-th object based on the j-th expert's opinion.

The values of the concordance coefficients Wt and Wp vary within a range of 0≤W≤1, besides, W=0 if there are no causal relationships between the ranks and W=1 if all the experts have ranked the objects equally. A concordance coefficient of W≥0.5 is assumed to be sufficient because experts' unanimity is sufficiently high (Kendall, 1955; Diakov and Krug, 1966).

After evaluating the criteria, the data were processed by the SPSS program. Factor ratings were ranked and average ranks were computed to perform a Kendall's W test; the most important and most fully developed factor was identified based on the average ranks.

According to the experts, the factors with the highest ranks are as follows: sufficiency of resources (average rank-30.40), availability of consultancy services for forest owners (average rank-33.60), use of technologies (average rank-30.40), availability of education (average rank-33.60), and quality of education (average rank-33.60).

The experts rated the significance of each factor on a scale from 1 to 3:

    1- insignificant for the industry;

    2- quite significant for the industry;

    3- very significant for the industry.

The experts also rated each factor on a scale from 1 to 5:

    1- insufficient/nonexistent/unprovided in the industry;

    2- sufficient/existent/provided in the industry to a small extent;

    3- partially sufficient/existent/provided in the industry;

    4- almost fully sufficient/existent/provided in the industry;

    5- fully sufficient/existent/provided in the industry.

The experts rated the following factors as insufficient: availability of the EU financial assistance, sufficiency of the EU co-funding, availability of non-timber products, and NGO performance and activities. The activities that depend on the performance of national or local governments should be carried out to improve the management performance of private forest owners, for instance, the availability of the EU financial assistance for forestry has to be improved.

Using various support mechanisms, the national government has to stimulate the activity of NGOs and the foundation of new private forest owner cooperatives, which would contribute to the development of an economically sustainable forest industry.

The following hypotheses were set to identify the experts' unanimity:

H_0:W=0 experts' opinions are unanimous

H_1:W≠0 experts' opinions are different

The Kendall's concordance (unanimity) coefficient W=0.816; $p=0.000 > α=0.05$.

The null hypothesis (H_0) may not be rejected ($α=0.05$). The experts' unanimity is statistically significant. In accordance with the Kendall's W test: 0 means no agreement at all, and 1 means full unanimity. A coefficient of 0.816 indicates that the experts' unanimity is high.

3. Improvement of the situation in the management of private forests by their owners

The analysis performed in the research leads to a conclusion that strategies for improving the management of private forests have to be designed in Latvia. During the course of the research, the experts defined several alternatives for improving the situation in the management of forests. In order to understand how to tackle the problems of forest management, the authors employed the analytic hierarchy process (Saaty, T. L., 1996).

A hierarchy consists of four levels:

Level 1 – the overall problem – how to improve the situation in the management of private forests – is defined.

Level 2 – criteria groups. The criteria groups were identified according to the stakeholder groups that could be interested in the defined criteria. The stakeholders were as follows: the state, forest owners, the public and municipalities. At this level, the authors defined four groups of interests: national interests, owner interests, public interests, and municipal interests.

Level 3 – evaluation criteria. At this level, the authors defined evaluation criteria for each stakeholder group.

Level 4 – scenarios. The research suggests four scenarios for improving the situation in the management of private forests by their owners.

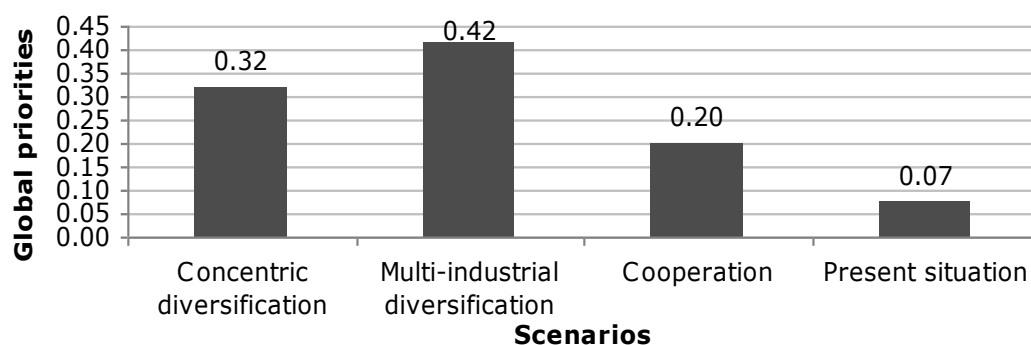The hierarchy of evaluation criteria is presented in Figure 2.
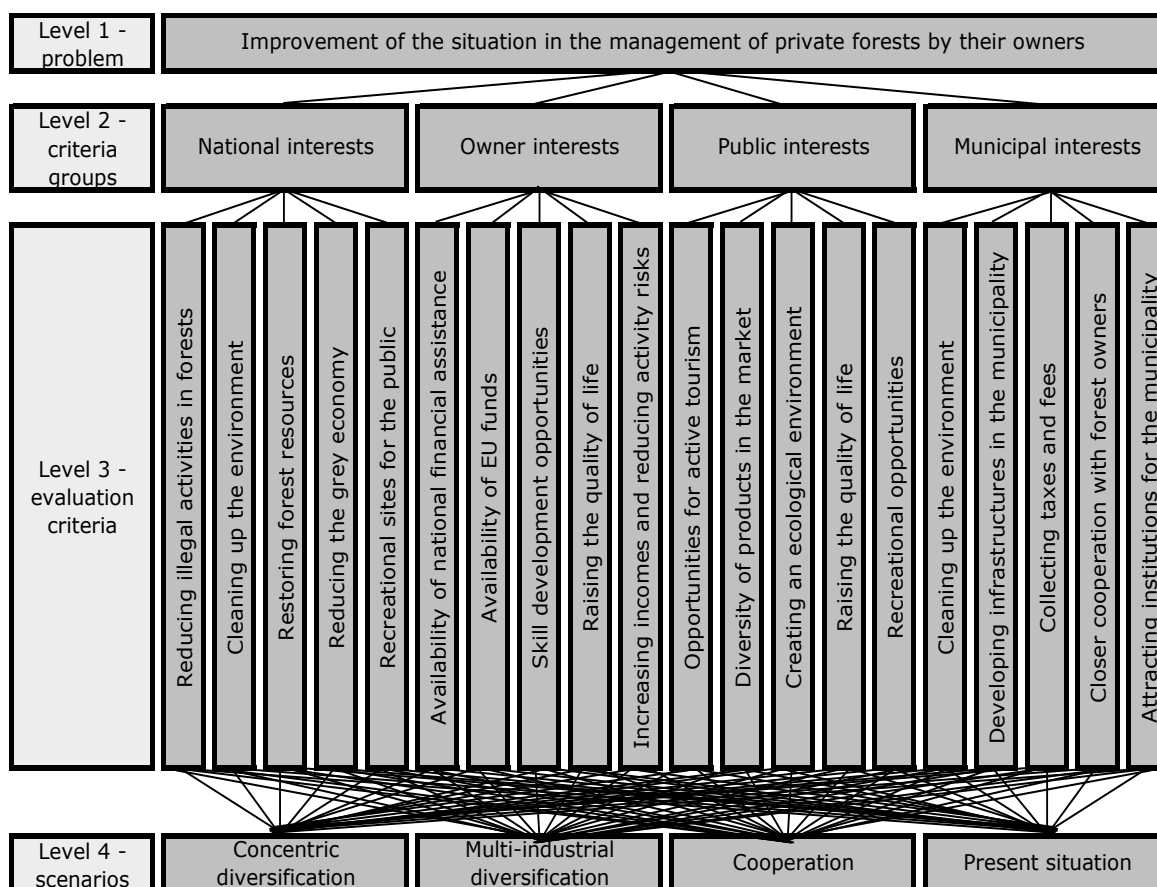
Source: authors' construction based on the survey of experts and an analytic hierarchy process

Fig.2. **Hierarchy of evaluation criteria for improving the situation in the management of private forests by their owners**

The five experts (Table 1) associated with the related industry and representing all the stakeholder groups performed an evaluation of the scenarios.

A summary of the results by all the experts is shown in Figure 3.

Source: authors' construction based on the survey of experts and an analytic hierarchy process

Fig.3. **Global priority vectors**

The expert evaluation shows that the most effective solutions to the problems of business of private forest owners and of ensuring the sustainable development of rural territories are the multi-industrial (the global priority reaches 0.43) and the concentric diversification of business of private forest owners (the global priority is 0.32) as well as cooperation (0.20). In a long-term, the multi-industrial and the concentric diversification of business of private forest owners

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have opportunities to expand more efficiently and to exploit the available forest resources at a higher return. The diversification of business of private forest owners will provide various opportunities to:

- fully exploit forest resources in order to increase the total revenue of private forest owners by expanding economic activity in another industry, for instance, tourism;
- exploit the available forest resources more efficiently, at a higher return, in producing other (non-wood) products, for example, linden blossom honey, wine from birch-tree juice, facial creams from lichens and other products from resources to be collected in forests;
- reduce the risks of economic failure for private forest owners that are created by intermittent and often unfavourable climatic conditions in Latvia (storms etc.) as well as volatile prices and other external threats.

Cooperation among private forest owners will contribute to stabilising the timber market and establish a stable and predictable timber flow from private forests, which, in its turn, will provide regular and greater revenues for the forest owners. The cooperatives of private forest owners will be able to hire professionals to work for them and the owners will participate both in managing their cooperatives and in distributing their revenues.

Conclusions, proposals, recommendations

1. According to the expert evaluation, the factors affecting the management of private forests by their owners with the highest average rank (the most developed ones) are as follows: sufficiency of resources, availability of consultancy services for forest owners, use of technologies, availability of education and quality of education. The Kendall's W coefficient of concordance is equal to 0.816.

2. The experts rated the following factors as insufficient: availability of the EU financial assistance, sufficiency of the EU co-funding, availability of non-timber products and NGO performance and activities. The production of innovative non-wood products is one of the fields where private forest owners could expand their business by attracting investors and using the EU funds.

3. The activities that depend on the performance of national and local governments have to be carried out to improve the management performance of private forest owners, for instance, the availability of the EU funds has to be facilitated.

4. Using various support mechanisms, the national government has to stimulate the activity of NGOs and the foundation of new private forest owner cooperatives, which would contribute to the development of an economically sustainable forest industry.

5. The most effective alternatives, according to the experts, for the productive management of private forests by their owners and for ensuring the sustainable development of rural territories are the multi-industrial and the concentric diversification of business of private forest owners as well as cooperation.

Bibliography

1. *Annual Accounts for the Year 2010*. JSC "Latvijas valsts mezi". Retrieved: http://www.lvm.lv/lat/lvm/finansu_informacija/?doc=13785 Access: 12.11.2014.

2. *Assessment of the Development of the Forest Industry in 1990-2013 (in Latvian).* Ministry of Agriculture of the Republic of Latvia. Retrieved: https://www.zm.gov.lv/public/ck/files/ZM/mezhi/politikas_doki/1_Pielikums_MSNP%2020 20_061214.pdf (Annex to the Framework for Developing the Forest and Related Industries) Access: 06.12.2014.

3. Development of Private Forestry. Proposals for the Rural Development Plan 2014-2020 (in Latvian). Retrieved: http://www.laukutikls.lv/sites/laukutikls.lv/files/ article_attachments/privatas_mezsaimniecibas_attistiba_zinojums_2014.pdf. Access: 10.12.2014.

4. Diakov, N., Krug, G. (1966). Use of Rank Correlation Methods in Processing Qualitative Information (in Russian): *Research papers of the Moscow Power Engineering Institute of the Order of Lenin*, Volume 69, Moscow, pp. 7-28.

5. Dubrovksis, D. (2007). *Theoretical and Practical Foundation and Models of Value Balance Method in Forest Management*: doctoral dissertation for a scientific degree of doctor of silviculture, subdivision of forest ecology and forestry. Jelgava: LLU, p. 138.

6. Dubrovskis, D., Dagis, S., Smits, I. (2012). Determination of the Value of Forest Resources (in Latvian). Retrieved: http://www.mf.llu.lv/uploads/File/lapas/409/Latvijas %20meza %20resursu %20vertibas %20noteiksana.pdf Access: 15.09.2014.

7. *Forest by Ownership Form in Latvia in 2008-2014.* Central Statistical Bureau of Latvia. Retrieved: *http://data.csb.gov.lv/pxweb/lv/lauks/lauks__ikgad__mezsaimn/MS150.px/ ?rxid=cdcb978c-22b0-416a-aacc-aa650d3e2ce0* Access: 06.12.2014.

8. Gilless, K. J. (2003). *Decision Methods for Forest Resource Management*. Academic Press, p. 111.-112.

9. *Harvest Volume of Felling By Form of Ownership in Latvia in 2009-2013.* Central Statistical Bureau of Latvia. Retrieved: http://data.csb.gov.lv/pxweb/lv/lauks/lauks __ikgad__mezsaimn/?tablelist=true&rxid=cdcb978c-22b0-416a-aacc-aa650d3e2ce0 Access: 10.12.2014.

10. Iesalnieks, J. (2002). *Basics of forest Economics*. Riga: Et cetera, p. 92.

11. Kendall, M. G. (1955). *Rank Correlation Methods.* New York: Hafner Publishing Co.

12. Klauss, K. (2014). *Latvian Forest Development Strategy (in Latvian).* Retrieved: http://ilga.cs.llu.lv/uploads/File/MF%20Konference%202014/Kristaps_Klauss.pdf Access: 10.12.2014.

13. Klemperer, W. D. (1996). *Forest Resource Economics and Finance.* Economics of Forestland Use and Even-age Rotations. New York: McGraw-Hill, Inc., p. 202.

14. Markus, R. O. (1967). *Relative Forest Rent Theory*. BLV Baierischer Landwirtshaftsvelrlag Gmbh, München Basel Wien, p. 128.

15. Saaty, T. L. (1996). *Decision Making with Dependence and Feedback*: The Analytic Network Process (Second ed.). Pittsburgh, USA: RWS Publications, p. 356.

16. *Summary on the Forest Management Plan for North Kurzeme Forest Territory in 2015-2019 (in Latvian).* (2014a). JSC "Latvijas Valsts Mezi": LVM Mezsaimnieciba, p. 12.

17. *Summary on the Forest Management Plan for North Kurzeme Forest Territory in 2015-2019 (in Latvian).* (2014b). JSC "Latvijas Valsts Mezi": LVM Mezsaimnieciba, p. 14.

18. The Faustmann Model. *Introduction to Forestry, Forest Policy and Economics.* Retrieved: http://foper.unu.edu/course/?page_id=167 Access: 16.09.2014.

19. Zalitis, P. (2001). Economic, Ecological and Social Values of Forests as an Irreplaceable Element of Biosphere in Latvia (in Latvian). *Journal Mezzinatne*, Volume 11, Salaspils. pp. 125-151.