

**IUFRO Unit 9.05.03 – Cross-sectoral policy impacts on forest and environment
IUFRO Unit 4.05.00 - Managerial Economics and Accounting**



Proceedings of extended Abstracts

International IUFRO Symposium Cross-sectoral policy impacts on managerial economics and accounting in forestry

Sarajevo, 4th – 6th May, 2015

Editors

**Bruno Marić, Mersudin Avdibegović, Špela Pezdevšek Malovrh, Lidija
Zadnik-Stirn, Donald Hodges and Dženan Bećirović**



**Faculty of Forestry University of Sarajevo
Sarajevo 2015**

**IUFRO Unit 9.05.03 – Cross-sectoral policy impacts on forest and environment
IUFRO Unit 4.05.00 - Managerial Economics and Accounting**



Proceedings of extended Abstracts

International IUFRO Symposium Cross-sectoral policy impacts on managerial economics and accounting in forestry

Sarajevo, 4th – 6th May, 2015

Editors

**Bruno Marić, Mersudin Avdibegović, Špela Pezdevšek Malovrh, Lidija
Zadnik-Stirn, Donald Hodges and Dženan Bećirović**



Faculty of Forestry University of Sarajevo
Sarajevo 2015

Bruno Marić, Mersudin Avdibegović, Špela Pezdevšek Malovrh, Lidija Zadnik-Stirn, Donald Hodges and Dženan Bećirović (Editors)

Cross-sectoral policy impacts on managerial economics and accounting in forestry
Proceedings of extended Abstracts from the International IUFRO Symposium: Cross-sectoral policy impacts on managerial economics and accounting in forestry, Sarajevo, Bosnia and Herzegovina

The authors are fully responsible for the content of their articles included in these Proceedings published by the Faculty of Forestry University of Sarajevo

Publisher: University of Sarajevo, Faculty of Forestry

For Publisher: Prof. dr. Mirza Dautbašić

Layout: Bruno Marić

Copy right: Editors and the Faculty of Forestry University of Sarajevo

Circulation: 100

Print: "Amos Graf d.o.o. Sarajevo "

CIP - Katalogizacija u publikaciji
Nacionalna i univerzitetska biblioteka
Bosne i Hercegovine, Sarajevo

630*6(063)(082)(048.3)

INTERNATIONAL IUFRO Symposium
Cross-sectoral policy on managerial
economics and accounting in
forestry (2015 ; Sarajevo)
Proceedings of extended abstracts /
International IUFRO Symposium Cross-sectoral
policy impacts on managerial economics and
accounting in forestry, Sarajevo, 4th-6th May 2015
; editors Bruno Marić ... [et al.]. - Sarajevo :
Faculty of Forestry, 2015. - 84 str. : graf.
prikazi ; 30 cm

Bibliografija i bilješke uz tekst.

ISBN 978-9958-616-27-3
I. Marić, Bruno. - I. International Union
Forestry Research Organization Symposium
Cross-sectoral policy impact on managerial
economics and accounting in forestry (2015 ;
Sarajevo) vidi International IUFRO Symposium
Cross-sectoral policy on managerial economics and
accounting in forestry (2015 ; Sarajevo)
COBISS.BH-ID 22079750

Preface

Forest ecosystems contribute to the needs of modern societies in multiple ways which include cultural, economic, environmental, institutional and social dimensions. Due to emerging cross-sectoral policy impacts on forests and environment, the forestry sector alone cannot achieve sustainable forest management. Policies in related areas such as agriculture, energy, climate changes, biodiversity, water and tourism heavily affect framework conditions for forests and the environment. At the same time, global trends such as increased demand for energy and raw materials, trade liberalization, and the diversification of demand for forest goods and services, have enhanced reciprocal reflections - goods and services from trees and forests become increasingly important and demanded by other sectors. Appropriate economic analyses in forestry set up the fundamentals of decision-making but also help to better understand how to engage with other sectors so as to coordinate and harmonize policies, especially in areas of conflicting priorities.

With the aim to capture a broad analysis of the issues related to sustainable forest management in the context of cross-sectoral policy impacts on economic returns to forest management as well to assess how forest managerial economics and accounting can provide information for policy deliberations, the international IUFRO Symposium "Cross-sectoral policy impacts on managerial economics and accounting in forestry" was jointly organized by two IUFRO Units (9.05.03 – Cross-sectoral Policy Impacts on Forests and Environment and 4.05.00 – Managerial Economics and Accounting) in Sarajevo (Bosnia-Herzegovina), May 4 – 6, 2015.

We believe that 25 papers delivered at the Symposium and their extended abstracts presented in the Proceedings reflect some actual issues in political and economical aspects of sustainable forest management but also encourage cross-disciplinary research in forestry and environmental sciences.

Bruno Marić, Mersudin Avdibegović, Špela Pezdevšek Malovrh, Lidija Zadnik-Stirn, Donald Hodges and Dženan Bećirović (Editors)

TABLE OF CONTENTS

Financial incentives and economic instruments for sustainable forest management and assurance of equitable benefit sharing: Perception of professionals from different sectors in Serbia

Aleksandar Radosavljevic, Dragan Nonic, Nenad Rankovic², Jelena Nedeljkovic² 1

Improving governance of cross-sectoral policy effects on forests by improving accounting systems. A proposal based on a preliminary analysis in some Northern Mediterranean countries

Anna Liubachyna, Mauro Masiero¹, Laura Secco¹, Paola Gatto¹ and Davide Pettenella¹ 4

Impact of the tax policy on the non-wood forest functions financing from forest enterprise's own resources

Blanka Giertliová and Zuzana Dobšinská 8

Factors Affecting Public Acceptance of Fire Prevention Practices:
The US Example

Donald G. Hodges, Pattarawan Watcharaanantapong¹, Binod Chapagain¹, A.E. Luloff, James Finley, Adam Willcox¹, and Jason Gordon..... 11

Concept of Model Forest as a tool for addressing emerging societal needs toward natural resources – case study Tešanj Municipality

Dženan Bećirović, Mersudin Avdibegović¹, Senka Mutabdžija Bećirović¹, Sabina Delić¹ and Bruno Marić¹ 14

Accounting beyond the forest margin

Elisabeth Kindler..... 18

How innovative timber production can reconcile forest policy and forest related policies. A case study at a local level

Francesko Carbone 20

The Bosnia and Herzegovina wood products exporters' strategic response and perception of the EU Timber Regulation

Kajsa Matsson22

Public forest service in Slovenia over the last decade-efficiency assessment

Lidija Zadnik Stirn, Vasja Leban¹, Petra Grošelj¹, Janez Krč¹, Špela Pezdevšek Malovrh¹25

The experience and best practices of Forestry Associations and Consortiums in Italy: feasibility analysis and economic evaluation of a case study in Veneto Region

Luca Cesaro, Sonia Marongiu¹, Federico Correale31

“New multifunctionality”: Opportunity cost analysis of a nature conservation-oriented silvicultural concept in Germany

Lydia Rosenkranz and Björn Seintsch¹34

Perspectives for economical valuation of urban forests – Case studies from Bulgaria and Macedonia

Makedonka Stojanovska, Vladimir Stojanovski, Miglena Zhiyanski36

Stakeholder evaluation of ecosystem services of trees to enhance the decision-making across scales

Maria Nijnik39

Strategic policies planning supported by a based IBGE 2005 input-output matrix simulator

Marcos Raymundo Loest and Vitor Afonso Hoeflich¹42

The 3L-model for multi-sector oriented evaluation of policy implementation by state forest institutions

Mirjana Stevanov and Max Krott46

Utilization aspects of private forests in Western Serbia relevant to the legal framework, socioeconomic influences and property rights

Nenad Petrović, Vladimir Nikolić, Todora Rogelja, Igor Golić¹49

Are forest harvesting decisions in compliance with theory? Evidence from an economic experiment <i>Philipp Sauter, Oliver Mußhoff¹, Bernhard Möhring, Stefan Wilhelm²</i>	52
What characteristics affect nonindustrial private forest (NIPF) landowner attitudes towards climate change and forest carbon sequestration in the United States South? <i>Puskar Khanal and Donald L. Grebner</i>	55
The role of forest certification systems in the EUTR <i>Roman Dudík, Luděk Šišák¹, Zhadra Zhorabekova</i>	57
Opportunities and challenges for forestry investments in Federation of Bosnia-Herzegovina <i>Sabina Delić, Dženan Bećirović,¹Mersudin Avdibegović¹, Senka Mutabdžija¹, Bruno Marić¹</i>	60
Cross-sectoral perception of financing and economic instruments of forest governance in the Federation of Bosnia-Herzegovina <i>Senka Mutabdžija Bećirović, Mersudin Avdibegović¹, Dženan Bećirović¹, Bruno Marić¹, Sabina Delić¹, Dragan Čomić and Špela Pezdevšek Malovrh</i>	64
Croatian forestry production as potential for wood industry growth <i>Stjepan Posavec, Darko Motik¹, Karlo Beljan¹, Andreja Pirc Barčič¹, Aida Kopljar</i>	68
Cross-sectoral perceptions of the operational environment of forest bioenergy production and use in Slovenia <i>Špela Pezdevšek Malovrh, Vasja Leban¹, Lidija Zadnik Stirn¹, Janez Krč¹</i> ..	70
DACH 2.0: Towards international compatibility of forest accountancy data networks <i>Walter Sekot, Philipp Toscani¹, Patric Bürgi, Nils Ermisch</i>	77
Impact assessment of the institutional environment on business of selected public enterprises in forestry and nature protection in Serbia <i>Zoran Poduška, Jelena Nedeljković, Nenad Ranković², Dragan Nonić²</i>	82

Financial incentives and economic instruments for sustainable forest management and assurance of equitable benefit sharing: Perception of professionals from different sectors in Serbia

Aleksandar Radosavljevic¹, Dragan Nonic², Nenad Rankovic², Jelena Nedeljkovic²

The global concept of forest resources management, shifting from government to governance in policy formulation and decision-making, has been introduced in professional and scientific discussions.

Traditionally, the state forest administration in Serbia has a key role in forest resources management, while forest policies are designed by using a hierarchical, top-down approach. Such a concept results in poor forest governance with numerous negative impacts on environment, social development and economic growth. Poor governance harms forest-dependent communities through inequitable distribution of forest benefits and non-providing the platform for prior and informed consultations with legitimate stakeholders. Doubtless, poor governance is a major impediment to achieving development outcomes of the forest sector in countries where forests are important resource.

In moving toward sustainable forest management, the new modes of international forest governance have to be clearly recognized, understood and adapted by all parties, properly integrated into the national forest policies and consistently implemented in practice. These are crucial preconditions to prevent all negative impacts caused by poor forest governance, but also to secure further development of forest sector.

Forest governance has meant different things to different people. This explains why the different actors approached the issue from the perspective of their own motivations and professional skills, be it economic, environmental, social or any others. The need for a comprehensive and systematic analytical framework (core set of principles and criteria) to diagnose, assess and monitor forest governance is widely recognized among forest stakeholders. With the purpose to facilitate description, monitoring and assessment the state of governance in countries' forest sectors, the Framework for Assessing and Monitoring Forest Governance was developed in 2011 by FAO and the World Bank's Program on Forests. The Framework builds on the understanding that governance is both, the context and the product of the interaction of a range of actors and stakeholders with diverse

¹ Ministry of Agriculture and Environmental Protection, Belgrade.
aleksandar.radosavljevic@minpolj.gov.rs

² University of Belgrade – Faculty of Forestry, Kneza Višeslava 1, 11000 Belgrade, Serbia.

interests. The base upon which the Framework stands consists of generally accepted pillars and principles of “good” forest governance.

For proper regulation of policy, legal, institutional and regulatory framework of any sector, the issues of financing and economic instruments are indispensable. The fact is that economic and financial results of implementation of the forest governance concept heavily depends upon economic policy, especially in segment of assuring different subsidies that should, together with other instrument of economic policy, be in concordance with general and specific strategic goals of forest sector.

The aim of this paper is to analyse the perceptions of professionals from different sectors (forestry, nature protection and wood-processing) in Serbia towards financial incentives and economic instruments for sustainable forest management and assurance of equitable benefit sharing (one of the Framework component of “good governance”).

This component is focused on the analysis of the existence of legal provisions and mechanisms for equitable sharing of forest revenue, equity in distribution of access to forest resources, rights and rents. Onward, the component is focused on the existence of economic incentives and policies to promote increased value-addition and sustainable utilization of timber and non-timber forest products as well as the existence of incentives for sustainable management of forests and measures to correct inappropriate subsidies and distortions in forest products prices. Openness and competitiveness of procedures, such as auctions, for allocation of forest resources are also in the focus of this component. Finally, the component try to investigate mechanisms for the internalization of social and environmental externalities from forest resource use, including payments for forest-derived environmental services as well as the existence and adequacy of safeguards against social and environmental harm from forest-related policies and activities.

For the data collection questionnaire for cross-sectoral survey of the representatives of forestry, nature protection and wood-processing sector has been used.

The questionnaire was consisted out of three groups of questions. The first one was referring to basic socio-economic characteristics of the respondents such as gender, age, year of working experience and type of institution where they are currently employed. The second group of questions was created in order to enable assessment of the way how respondents from all three sectors perceive the level of importance and implementation of all 13 forest governance components. The respondents were asked to rate (on a scale from 1 to 10, where 1 means “*unimportant/bad implementation*” and 10 means “*important/good implementation*”) importance and implementation of each component in national forest sectors. The third group of questions was

designed in order to assess the respondents' perception of the current situation in Serbian forest sector.

Relevant samples for all three sectors were calculated. The input parameters for calculation of the sample size were confidence level of 95% and confidence interval of the $\pm 5\%$. Respondents were selected randomly by Random Number Generator Web application.

For the statistical analysis of the gathered data in cross-sectoral surveys, SPSS 21.0, statistical program package for sociological research was used.

In this paper are presented results related to Component: *Financial incentives and economic instruments for sustainable forest management and assurance of equitable benefit sharing*.

Respondents from forestry, nature protection and wood-processing sector rated the importance of this component with the highest rates (89% of the respondents from forest, 94% of the respondents from the wood-processing sector and 90%).

On contrary, 38% of the respondents from forestry, 81% of the respondents from wood-processing and 66% of the respondents from nature protection sector rated the implementation of this component as "unimplemented" and "slightly implemented". Furthermore, 4% of the respondents from wood-processing sector are not familiar with the implementation of this component. Average rates for component's importance are equal for all three sectors while average rates for its implementation vary. This all had caused differences in the sectoral average differences between component's importance and implementation.

Key forest policy actors at the national level in Serbia have an inconsistent perception of forest governance concept in general. Representatives of different sectors have different perception towards forest governance. National forest political system in Serbia is purely adapted to new modes of international forest governance. But, there is a gap between formal commitment to forest governance principles (reflected in forest strategies, policies, legislation etc.) developed by key national forest policy actors in Serbia and practical implementation of this principles. Due to this, further forest policy development towards forest governance in Serbia is uncertain.

Key words: forest governance, good governance, Serbia, perception, forest professionals, forest policy

Improving governance of cross-sectoral policy effects on forests by improving accounting systems. A proposal based on a preliminary analysis in some Northern Mediterranean countries

Anna Liubachyna¹, Mauro Masiero¹, Laura Secco¹, Paola Gatto¹ and Davide Pettenella¹

Introduction

It is well known that cross-sectoral policy impacts issue is a critical one for forest managers and policy makers, as external sectors' policies, such as agriculture, energy, water, tourism, urban and rural development, are directly or indirectly influencing the way forest resources are managed and vice versa (Janse, 2007).

Cross-sectoral partnership is an essential mechanism by which international and local organizations, corporations and communities can maximize their goals. The advantages of cross-sectoral coordination have been widely documented in the scientific literature, including benefits of knowledge and expertise exchange, networking and the opening up of new contacts, the share of available resources, added credibility, the incorporation of a complex definition of the issue into the agenda, and ownership of the assessment as a result of sharing work and responsibilities (Hay & Kitcher, 2004). Many of these aspects are connected with the key elements of improved governance in terms of collaboration, networking, transparency, accountability, effectiveness and efficiency (Secco *et al.* 2015). Cross-sectoral policy effects can represent supporting or impeding factors to policy effectiveness, in some cases determining policy failures, conflicts among institutions and/or stakeholders. To increase the complexity, it is worthwhile mentioning that political decisions and impacts from one policy to forest and vice versa are dynamic elements. Thus, cross-sectoral analysis – as an instrument for detecting possible effects from different sectors and their further consequences on the forest sector - might help to prevent policy failures and governance problems. There is a clear need for providing an appropriate combination of policy linkages that can effectively regulate the multiple uses of the natural resources based in a sustainable manner (Dubé, Lange, & Schmithüsen, 2007).

Cross-sectoral coordination in forest-related domains is not widely used in practice and explored by scientists. However, there is an information and decision-support instrument that can significantly help to implement

¹ Department of Land, Environment, Agriculture and Forestry (TESAF), University of Padova, Italy, liubachynaanna@gmail.com

coordination among sectors, which is forest accounting. If properly designed, implemented and maintained, we can assume that forest accounting makes possible more effective analysis of consequences of different policies on the forest sector and vice versa. Forest accounts can provide data to forecast impacts of external policies and consequently to build strategies integrating solutions to overcome possible threats or develop better shaped objectives and aims (Lange, 2004), thus increasing the level of coordination and the overall governance of the sector at different scales.

The paper has therefore two main goals: i) to provide an update state-of-the-art about knowledge on cross-sectoral forest policy issues and ii) to identify key issues (type of data, at which scale, etc.) that can be improved in forest accounting in order to increase cross-sectoral forest policy impacts analysis and governance. The focus is on one of the most vulnerable ecosystems on the earth, Mediterranean forests (EFI, 2010). There are at least two reasons for focusing on this area. First of all, it is characterized by a high level of multifunctionality (FAO, 2013) but also by significant disparities in forest cover between countries, which partially explains differences in national/local forest policies (FAO, 2013). A similar situation of disparities exists with forest accounting as well: in the European part of the region (Northern Mediterranean) there are quite massive databases of forest accounts, not always fully comparable, while Southern and Eastern parts are barely covered with forest accounting systems. Secondly, in many cases forest policies for Mediterranean countries are included in cross-cutting programs such as those addressing multifunctionality of forests, biodiversity and public participation. In South-Eastern Mediterranean countries, especially where forests cover a marginal proportion of national areas, forests may be addressed only in intersectoral public policies (Pettenella, 1994; FAO, 2013).

Research methodology

The research approach was mainly a qualitative-based. First of all, a detailed literature review has been carried out. The first phase of the research was aimed to understand how the topic is currently presented in the scientific world, specifically in the forest sector. A particular survey of scientific articles was carried out based on Arts' approach (2012) to Scopus database analysis. Three searches with 3 groups of key words in the titles, key words and abstracts of papers from 2000 to 2014 have been carried out. As scientific disciplines for the search, the Life, Physical sciences and Social Sciences and Humanities were identified.

After, the most relevant sectors that affect forest sector were identified on the bases of surveys of combination of key-words for each of selected sector from 1994 to 2014 (e.g. "biodiversity AND forest", "biodiversity AND

forestry”). Only four out of six the sectors in terms of effects on forest were selected as the most important ones for a more accurate analysis. The main aim was therefore to identify the key impacts of other sectoral policies on forest sector as reported by the literature. Moreover, a direct survey on experts’ perception of the topic of cross-sectorality in the Mediterranean area was done through a questionnaire with open and close-ended questions. Introductory and explanatory messages were sent by e-mail accompanied with the link to the online questionnaire based on the Qualtrics platform. The experts were selected on the basis of their involvement in the forest policy research agenda. In total, 34 experts were selected; response rate was 32%. Content analysis was used for the interpretation of questionnaires. Finally, the identification of possible data and indicators for improving forest accounting and related cross-sectoral policy and governance issues in the Mediterranean area was based on document and databases analysis, being inspired by existing initiatives like for example the framework of WAVES project (EFIMED) on accounting for ecosystem services provided by forests and the platform developed by the CLIMSAVE project (7th EU FP) for trying to set up a climate change integrated assessment methodology for cross-sectoral adaptation and vulnerability in Europe (Harrison et al. 2013).

Discussion and conclusions

It was found that, in the last years, the idea of cross-sectorality becomes widely mentioned in scientific articles and, which is even more important, cross-sectorality is required as a tool for faster and better policy implementation in almost all umbrella documents. However, there is still not enough attention to the topic. Through Scopus database only 48 articles were found particularly about this topic and 5 books/work papers. From these papers we can say that in order to study cross-sectoral approach mainly a network policy analysis is applied. Mostly all studies work with qualitative data but there is a lack of quantitative data based researches. Only few articles focus their attention on measuring real impacts that sectoral policies have on each other (e.g. Krott & Hasanagas, 2006). Quantitative data (i.e. measures of policy impacts) is needed in order to provide more knowledge about the nature, structure and functioning of different policies and cross-sector linkages.

Four sectors were found to be more relevant with respect to their impacts on forest sector, and thus selected for a deeper analysis: biodiversity protection, climate change, energy, agriculture and rural development. The experts gave their opinions; whether presented effects are important in the area with a respect to geographical scale (all Mediterranean, regional, local). For all Mediterranean area three effects were determined as important and character: (i) a promotion of sustainable forest management; (ii) an integrated fire

management; (iii) an increased amount of protected units in the forest area. Other three are considered to have a strong importance in the regional scale: (i) effects of enhancement of carbon stocks, (ii) afforestation and a reforestation processes; (iii) an increase of biomass usage and use of wood biomass to substitute fossil fuels. It is very interesting to mention that negative effects were mostly evaluated as weak and have a regional or local nature. As the main obstacles for cross-sectoral implementation by experts' opinion were selected: (i) an overlapping and unclear distributions of competences among institutional organizations; (ii) different authorities are responsible for different sectors; (iii) a complex legislation system. Among ideas how to improve cross-sectorality, two were emerging: (i) to develop communication on each level and among all actors and different sectors; (ii) to increase an awareness of policy makers about the approach in general as well as about specificities of particular sectors and their connections with others. But for going in these directions, more, comparable and systematic data are needed.

A potential contribution for a better understanding of cross-sectoral policy impacts could derive from their monitoring and measuring through an approach inspired by Systems of Environmental- Economic Accounting (SEEA). This could provide a framework for linking information on forestry and the use of other resources and to the broader policy and economy (Lange, 2003). Our preliminary analysis of existing accounting systems in selected Mediterranean countries help identifying the main information gaps with reference to the abovementioned key cross-sectoral issues. Based on the identified gaps and building on existing experiences (e.g. EC, 2002, Lange, 2004) guidelines and checklists for the collection of relevant data are developed, in order to allow starting a more systematic analysis of cross sectoral policy impacts between forestry and other sectors.

The need for a cross-sectoral coordination is strongly perceived in the field of policy development and implementation, including forest policy, however, coordination tends to remain more at a theoretical level rather than being systematically implemented. Further research is needed on measuring the cross-sectoral impacts in order to really understand the relevance of other sectors for forestry and vice versa. This would help informing future policies as well as better integrating existing ones, providing useful inputs for a more effective and efficient policy-making approach, functional to governance improvement.

Keywords: cross-sectoral approach, policy impacts, forest policy, forest accounting, Mediterranean forestry

Impact of the tax policy on the non-wood forest functions financing from forest enterprise's own resources

Blanka Giertliová¹ and Zuzana Dobšínská

The aim of this article is to analyse the impact of tax policy on non-wood forest products and services from the forest enterprise own resources. Slovak forest economy is based on the sustainable provision of all forest functions. Forests provide production, ecological and social functions and services. Non-wood forest products and services belong to the non-market goods and services of the forest economy. Slovak legislation does not use the term ecosystem services. The Act on Forests no. 326/2005 of the Coll. defines forest functions as benefits, effects and impacts provided by forests as a component of the natural environment and the object of economic activity. They are divided into non-productive functions and production functions. Non-productive forest functions are ecological functions such as conservation, water management and climate functions and social functions as health, cultural, recreational, nature protection and water protection function. International experience shows that strategies on integrating non-wood forest functions in the market require substantial intervention from the state. A key characteristic is the acceptance of such a strategy by the society, particularly through public communication as well as adapting the structure of the enterprise.

At the level of the forest enterprise, the ensuring of these forest functions is associated with high cost that need to be covered and for that reason, the forest enterprises has to generate sufficient resources. The main sources of coverage are the own resources of the company. They consist of:

- own capital,
- retained earnings,
- profit from the fiscal year,
- funds created from profit
- depreciation.

The most important source for covering the costs associated with ensuring non-wood forest functions is the net profit of the enterprise which is to a great extent influenced by the tax policy. The tax system in Slovakia consists of direct and indirect taxes groups. Indirect taxes burden the final consumer; they do not the impact the enterprise's net profit only the cash flow.

¹ Department of Forest Economics and Management, Faculty of Forestry, Technical University in Zvolen, T. G. Masaryka 24, SK-96053 Zvolen, Slovak Republic, email: blanka.giertliova@tuzvo.sk

Therefore, when analysing the impact of the tax policy on the available financial resources of the enterprise, only direct taxes are significant, which are:

- income tax of natural and legal persons
- local taxes and levies
- property tax
- dog tax
- tax on the use of public space
- lodging tax
- tax on vending machines and non-winning gaming machines
- tax on the entry and staying of motor vehicles in the historic city centre
- tax on nuclear facilities
- tax on motor vehicles

We analysed the financial statements of the State enterprise Forests of the Slovak Republic from 2008 till 2013. The methodological approach for the analysis of the tax policy impact is based on following steps: first we identified specific taxes which influence the amount of disposable resources the most; second we assessed the tax burden based on the development of the tax rate (statutory rate). The disadvantage of this method is the low informative value; it gives only the information how many cents the enterprise has to pay from one euro of its assets. To overcome these shortcomings we further analysed the tax burden using evaluative ratios – based on the share of paid taxes to the comparative base. The comparative base consisted of gross earnings before interest and taxes (EBIT) and in the second case total sales. The EBIT ratio can be identified with the enterprise's profit or loss (the income statement - profit from operations, line 29).

The analysis show that the total amount of taxes paid was decreasing in 2008 and 2009 and then begun to rise due to the increase of property tax rates. Given the fact that the state enterprise manages over 940 thousand hectares of forest land, even a small tax rate increase causes costs increase. The results further showed the high proportion of property taxes in the total tax burden. In 2009 it was at the maximum when over 82% of the result obtained from economic activity left the company in the form of property taxes. The total tax burden of the analysed forest enterprise was 92% in the same year. In subsequent years, the value of the proportional indicator (taxes and fees / EBIT) gradually decreases and stabilizes at 30%. The decline was positively affected by increased profit, as well as by increasing the profitability of sales. The overall tax burden of the forest enterprise has stabilized at around 40%. When assessing the extent of the overall tax burden on the sales, the value is around 3%. The significant difference between the share of taxes paid on

profits and revenues is caused by the low profitability of sales, which is characteristic for most forest enterprises. High costs lower the profit and increase the share of taxes on it. The main disadvantage of property taxes is that the forest enterprise has to pay them even when it does not generate profit. Given the fact that these taxes relate to the use of the property and not on the value produced out of it, the low overall profitability of capital will result in a high tax burden.

As confirmed by the results of the analysis, the overall tax burden of forest enterprises is high. The analysed company has paid in the form of direct taxes up to 40% of its profits from operations. A significant proportion of the taxes withheld are property taxes. It is for consideration whether the reduction of the forest enterprises tax burden consisting of property taxes could not be done in the form of compensations for ensuring non-wood forest functions.

Acknowledgments

The paper originated in terms of the research KEGA 016TU Z-4/2013: Implementation of Progressive Education based on ICT in the Taxes and Taxation Field

Key words: tax, non-wood forest functions, forest enterprise, financing

Factors Affecting Public Acceptance of Fire Prevention Practices: The US Example

*Donald G. Hodges¹, Pattarawan Watcharaanantapong¹, Binod Chapagain¹,
A.E. Luloff², James Finley³, Adam Willcox¹, and Jason Gordon⁴*

For generations, the US public was told that fire destroys forests and many of its associated values. Recently, support for fire prevention techniques has increased, particularly as resource managers have learned more about ecosystems and their functions. In many cases, however, the general public has not accepted this new role of and for fire. This is especially true of the forests within the Wildland Urban Interface (WUI), where fire protection is directed not only at the forests but also the homes and structures that are becoming much more prevalent in the WUI. The USDA Forest Service, for example, has estimated that more than 17 million hectares of private forests in the U.S., 11 % of the total area, is at risk of conversion to development within the next two decades, which will exacerbate this problem (Stein et al. 2005).

Coupled with public uncertainty of fire's role in the ecosystem, resistance to many recommended fuel treatments within and in close proximity to the WUI further complicates fire managers' roles. This resistance in the US arises from two primary factors: (1) many of the prescribed fuel treatments do not reflect forest owners' understanding of vegetation management; and (2) treatments are developed with little recognition of the multiple values owners and the general public place on the forests and the WUI (Finney 2005; Stein et al. 2013; Toman et al. 2013). A wide range of diverse values has been attributed to the WUI. This includes a variety of ecosystem services such as climate regulation, enhanced air quality, habitat for a variety of species, noise abatement, enhanced property values, and numerous human and community health benefits.

To date, however, much of the fire prevention/fuel treatment efforts have been concentrated on protecting homes and other structures with little regard for the effects on other values. Moreover, little information is available regarding the extent to which the various fire prevention/fuel treatment efforts have been adopted by individual homeowners or communities and

¹ University of Tennessee; Department of Forestry, Wildlife and Fisheries; Knoxville, TN 37996-4563; dhodges2@utk.edu

² Pennsylvania State University; Department of Agricultural Economics, Sociology, and Education; University Park, PA 16802

³ Pennsylvania State University; Department of Ecosystem Science and Management; University Park, PA 16802

⁴ Mississippi State University; Department of Forestry; Mississippi State, MS 39762-9322

what factors affect the adoption decisions. A national phone survey was conducted in the US in 2014 to address these issues. Specifically, 1200 households were surveyed in fire prone counties (half metropolitan, half nonmetropolitan) to assess perceptions of fire prevention, what practices have been adopted, and what environmental and demographic factors affected the decisions. Four hundred respondents were drawn from counties identified as being 1) very high, 2) high, and 3) moderate risk for wildfire for the total survey population of 1200 (http://silvis.forest.wisc.edu/projects/WUI_Main.asp). Logit models were developed to assess the factors related to adoption of fire prevention/fuel treatment efforts at the individual and community level.

An examination of the responses reveal that approximately one-half of the respondents live in communities in which some activities occurred (Table 1), while less than 40 percent had implemented any fire prevention/fuel treatment practices at their residence (Table 2). Not surprisingly, those in very high risk counties were much more likely to reside in communities in which actions had been taken (63 percent vs. 44 percent) or adopt practices themselves (54 percent vs. 31 or 32 percent).

Table 1. Community Involvement in Wildfire Planning or Preparedness Activities¹

					Total
		Very High Risk	High Risk	Moderate Risk	
Yes	Count	251 _a	176 _b	178 _b	605
		62.7%	44.0%	44.5%	50.4%
No	Count	100 _a	164 _b	156 _b	420
		25.0%	41.0%	39.0%	35.0%
Total		Count	400	400	400
			100.0%	100.0%	100.0%

¹Each subscript letter in the subsequent tables denotes a subset of quota categories whose column proportions do not differ significantly from each other at the .05 level.

Table 2. Respondent Involvement in Wildfire Planning or Preparedness Activities¹

					Total
		Very High Risk	High Risk	Moderate Risk	
Yes	Count	215 _a	124 _b	128 _b	467
		53.8%	31.0%	32.0%	38.9%
No	Count	185 _a	276 _b	272 _b	733
		46.3%	69.0%	68.0%	61.1%
Total		Count	400	400	400
			100.0%	100.0%	100.0%

¹Each subscript letter in the subsequent tables denotes a subset of quota categories whose column proportions do not differ significantly from each other at the .05 level.

The models reveal that a number of environmental and geographic variables were significantly related to the likelihood of adopting fire prevention at the community and individual level. Within the community model, the respondent's perception of the threat of wildfire in their community significantly affected the likelihood of fire prevention/fuel treatment efforts being implemented, as was prior experience with wildfires. Communities in which homeowner associations or subdivisions have rules about landscaping or building materials to help protect against fires also were more likely to adopt efforts. Finally, proximity to wildland areas was closely related to the likelihood of adopting fire prevention/fuel treatment efforts

For the individual model, the length of time that an individual had resided in their home was negatively related to the likelihood of adoption. Conversely and not unexpectedly, the risk category of the community (very high, high, moderate) – as well as the risk perception of the respondent -were significantly related to the likelihood of adopting fire prevention/fuel treatment efforts at the home. That is, individuals were aware of the relative risk of fire and acted accordingly. As in the community model, individuals who had experienced wildfire in the past and lived closer to wildland areas were more likely to adopt preventive practices. Interestingly, individuals residing in isolated homes were more likely to adopt fire prevention/fuel treatment efforts.

Keywords: Wildfire Prevention, Wildland Urban Interface, Logit Regression

Literature

Finney MA (2005) The challenge of quantitative risk analysis for wildland fire. *Forest Ecology Mgmt* **21**:97-108.

Stein, S. M., R. E. McRoberts, and R. J. Alig (2005) Forests on the edge: Housing development in

America's private forests. General Technical Report PNW-GTR-636. USDA Forest Service, Pacific Northwest Research Station. Portland, OR.

Stein SM, Menakis J, Carr MA, Comas SJ, Stewart SI, Cleveland H, Bramwell L, Radeloff VC

(2013) Wildfire, wildlands, and people: understanding and preparing for wildfire in the wildland-urban interface—a Forests on the Edge report. General Technical Report RMRS-GTR-299. USDA Forest Service, Rocky Mountain Research Station. Fort Collins, CO.

Toman E, Stidham M, McCaffrey S, Shindler B (2013) Social science at the wildland-urban interface:

a compendium of research results to create fire-adapted communities. General Technical Report RMRS- NRS-111. USDA Forest Service, Northern Research Station. Newtown Square, PA.

Concept of Model Forest as a tool for addressing emerging societal needs toward natural resources – case study Tešanj Municipality

*Dženan Bećirović¹, Mersudin Avdibegović¹, Senka Mutabdžija Bećirović¹,
Sabina Delić¹ and Bruno Marić¹*

For the last few decades, economic development of Bosnia and Herzegovina (hereinafter B-H) has been based on utilization of natural resources causing an increased pressure over them. At the same time, emerging needs of the B-H society toward natural resources demand for a more resolute implementation of innovative, participatory and adaptive approaches in natural resource management.

Concept that enables joint effort and active participation of all stakeholders, establishes rules for responsibility-sharing and strives to make efficient and effective procedures for addressing issues over specific forest ecosystem is known as forest governance. Generally, forest governance is related to the new modes of forest management that extend beyond the functions and powers of the State such as: political networks, forest certification, corporate social responsibility, national forest programs, Model Forest, public-private partnership, community forestry, community-based forest management, collaborative forest management, joint forest management etc. The Model Forest concept is inclusive, participative and transparent process that promotes collaborative work among all stakeholders with diverse interests over specific landscape. Based on such principles, creation of joint vision of sustainable management of landscape and its natural resources is developed in close cooperation of all stakeholders. The term “Model Forest” was adopted in 1991 in Canada for the purpose of implementing the program for supporting voluntary partnerships within large forested landscapes (IMFN, 2008a). This term was chosen since each site was intended to be a model that others could learn from to advance their sustainability goals (IMFN, 2008a). Each Model Forest is respecting following set of principles: Landscape; Partnership; Commitment to sustainability; Governance; Program of activities and Knowledge sharing, capacity building and networking. The International Model Forest Network (hereinafter IMFN) is an umbrella organization that gathers all Model Forests established around the globe.

Research on attitudes toward implementation of Model Forest concept in Tešanj has been conducted for the purpose of implementing the IPA Adriatic

¹ University of Sarajevo, Faculty of Forestry, Zagrebačka 20 71000 Sarajevo Bosnia and Herzegovina, e-mail: becirovic.dzenan@gmail.com

“Adriatic model forest” (AMF) project. Tešanj Municipality was chosen as a pilot site for practicing methodology of Model Forest establishment. This municipality is located in the northern part of B-H. Although Tešanj is relatively small town, it is well-known by proactive and diligent residents that want to keep up with time. Tešanj is declared as: „Municipality with European quality of living, economic power and ecological awareness“.

After the site selection, identification of stakeholders that have interests for Model Forest concept represents the next step in Model Forest methodology. Therefore, meeting with potential stakeholders (such as: local administration, education institutions, NGOs, entrepreneurs etc.) was organized. Participants were introduced with Model Forest concept after which they were asked to express their interests for participation in implementation of Model Forest concept in this area. Their attitudes were evaluated by survey. The research question on which it was intended to answer by this survey is: What are the attitudes of stakeholders for implementing the Model Forest concept in Tešanj? Respondents were asked to describe institutions they are representing as well as their interests toward natural resource and their management in Tešanj Municipality. Those questions were asked in order to assess diversity of potential stakeholders and their interests related to natural resources in Tešanj. Furthermore, respondents were asked to express attitudes of the institutions they represented for involvement in implementation of Model Forest concept in Tešanj Municipality. They could express their interests on a 5-level scale where “1” meant “not support at all” and 5 meant “support completely”. All potential stakeholders (23) that attended the meeting had completed the questionnaire.

Results revealed that associations were the most numerous and most diverse group of potential stakeholders since 12 different associations attended the meeting (cycling club, motorcycle club, hiking clubs, hunting association, environmental NGOs, associations of farmers and entrepreneurs, scout association, women association for handicraft production, beekeepers association etc.). Onward, representatives of 5 private companies attended the meeting. Two of them are wood-processing companies, one is bottling mineral water, one is doing wholesale and catering while one is engaged in trading of oil products. Representatives of Municipality of Tešanj, as local administration unit, and public forest administration together with representatives of cantonal forest enterprise as well as local-level utility enterprise, as those responsible for managing forests and water resources at the territory of Tešanj Municipality, attended the meeting also. As concerns educational institutions, representatives of Gymnasium and Secondary school for vocational studies, attended this meeting as well.

According to the Model Forest methodology, during the identification of initial group of stakeholders it is recommended to consider following factors:

influence, responsibility and representation (IMFN, 2008b). As concerns Tešanj Model Forest, results revealed that despite of the biggest representativeness of various interests provided by associations, these stakeholders have not enough influence or responsibilities over natural resources in Tešanj Municipality. Therefore, one of the most important results that Model Forest concept can bring to the associations is increasing of their legitimacy and responsibilities in order to fulfil their needs and expectations from natural resources in Tešanj. Developed and active private business represents one of the well-known specificities of this municipality. Such characteristics increase influence of private sector while their portfolio of activities leads to increased responsibility over natural resources. These facts lead to conclusion that private sector could have important role in involvement of new stakeholders in process of establishment of Model Forest. Public administration has both strong influence as well as various types of responsibilities over general public in Tešanj municipality. By being a stakeholder in Model Forest, public administration could increase inner capacities to represent various interests of local population toward natural resources and their management. Same also holds for public forest enterprise and utility enterprise. Furthermore, influences and responsibilities of public administration and public enterprises have undeniable importance for assuring acceptance of Model Forest concept in Tešanj. Legitimate and ethical responsibility for education of young generation makes educational institutions a valuable potential stakeholder of Tešanj Model Forest. Nevertheless, these institutions have low influence on management of natural resources in Tešanj. Therefore, similar as associations, these institutions could benefit from Model Forest concept by fulfilling their interests and expectations toward natural resources.

By analysing the interests of potential stakeholders over natural resources in Tešanj Municipality, following pillars of interests arose:

- Protection of health and stable natural resources as precondition for: production of organic agricultural products, tourism development and educational purposes;
- Specific interests toward forest ecosystems as precondition for: education on forest ecosystems and forest management practices; protection of all forests of Tešanj Municipality; prevention and combat with illegal activities in forestry and forest protection as precondition of constant supply of drinkable and mineral water;
- Economic interests toward forest ecosystems such as: purchasing of FSC certificated wood assortments and planting honey tree species like acacia, lime and chestnut;
- Involvement in transparent process of decision making over natural resources.

Based on the results, it can be concluded that most of the stakeholders have positive attitudes toward Model Forest concept. Withal, they expressed strong support toward the process of establishment of Model Forest at the territory of Tešanj Municipality. Positive attitudes toward implementation of this concept could lead to continuous improvement of natural resource management directed toward fulfilment of emerging societal needs. With respect to the essence of the Model Forest concept and current issues in forestry sector, there is a need for promotion and implementation of similar innovative participative concepts in B-H.

Keywords: societal needs, forest policy, Model Forest, cross-sectoral cooperation, Tešanj.

References:

- IMFN (International Model Forest Network), 2008a: Model Forest Development Guide, Available at: <http://goo.gl/VZTuWV>, Accessed at 28/03/2015
- IMFN (International Model Forest Network), 2008b: Guide to Model Forest Governance, Available at: <http://goo.gl/hdXImY>, Accessed at 28/03/2015

Accounting beyond the forest margin

Elisabeth Kindler¹

Accounting in German forest enterprises and public forest services is conducted according to the “Produktplan Forst” (Production plan forest) an accounting systems where revenues and expenditures are assigned to different categories as illustrated below in Table 1. Published in 1998 by the German Forestry Council it was intended to allow better comparability between different enterprises since especially private and public forest owners give different priorities to their activities e.g. regarding forest recreation or nature conservation.

Table 1: Accounting system „Produktplan Forst“ suggested by the German Forestry Council in 1998. (translated by the author)

	1	2	3	4	5
Product areas	Production of raw timber & other products	Conservation and restoration	Recreation and environmental education	Services for third parties	Administrational / Governmental tasks
Product groups	11 raw timber / wood 12 forest by-products 13 real estates (renting, tenancy, permissions) 14 hunt and fishery	21 legally protected areas 22 Species and biotope conservation beyond protected areas 23 assuring special forest functions 24 restoration of forest areas 24 liming	31 assuring recreation 32 Public relations 33 environmental education	41 technical administration 42 technical activities 43 human resources and machines 44 expert's reports for third parties 45 training, further education	51 forest supervision 52 statements, technical planning, large scale inventories 53 administrative assistance 54 occupational cooperation with agencies and other organizations 55 advisory service, processing of subsidies 56 research

The system that refers to the forest function concept is widely accepted and implemented by the public forest services. The forest function framework differentiates between the use, protective and social functions forests and forestry provide and they are reflected within the first three product areas of the production plan. Therefore it would also allow an accounting with regard

¹ Department of Forest Economics and Forest Management Göttingen University. ekindle@gwdgde

to forest ecosystems services that use similar statistics and indicators. Although the scheme has shown to be very useful for internal analysis and comparisons between different forest enterprises it is difficult to communicate these semi-products to non-foresters. E.g. the usage of the term *product*, the different product groups do not describe final products that can possibly be consumed by someone. But since a successful communication with the public and other stakeholders is especially important for public forest estates, it seems promising not only considering the production within the forest enterprise but regarding the whole production or value chain. The idea was to apply a process based approach to the “Produktplan Forst” and add final outcomes for the society/final consumer to it. Therefore it is also important to include the contribution of partners and co-producers along the value chain, as described by Moore (2003), who developed the public value scorecard as an alternative to the balanced scorecard for non-profit organizations.

In the end we will derive a scheme showing the input of the forest enterprise, its output/outcome, the partners who are processing these outputs and the final contribution to the welfare of society - which could be for example final wood products, employment or different social benefits that are in line with general societal needs. This scheme can support forest enterprises in their external communication and promote an integrated understanding for forestry and what it means to our society.

Key words: accounting, ecosystem services, society

How innovative timber production can reconcile forest policy and forest related policies. A case study at a local level

Francesko Carbone¹

In the “Castelli Romani” district most of the forest area is covered by chestnut coppice for timber production. Evidence of the long tradition in chestnut timber processing can be found in many historical buildings in Rome that were built using local chestnut products.

In recognition of the social value of this district, landscape and hydrological constraints are in place. Part of this area is also included in the “Castelli Romani” Regional Protected Area and three small sites also come under the Ecological European Network Natura 2000 protection program.

The current negative worldwide economic trend has had an impact on the local chestnut timber sector, which is the most important economic activity in the area. Private and public chestnut owners, local cutting companies and chestnut timber working industries have all registered negative effects.

Negative social and economic trends have led to cooperation between local institutions, entrepreneurs, NGOs and the University of Viterbo in order to find a feasible exit strategy for the sector. Informal governance process discussions have touched upon many aspects of timber production and forest and environmental policy.

The Lazio Region Rural Development Program 2007-2013 provided an opportunity to support a proposal for innovative timber production. Funds were obtained for these two main goals: qualification of chestnut roundwood and a prototype of chestnut glue lam. However, the project also involved other related issues, such as: i) improvement of local forest management; ii) promotion of forest planning and forest certification; iii) improvement of regional forest rules; iv) training for cutting company workers; v) updating timber working industry technology.

The University cooperated in defining local forest policy, taking into account the above issues. This process also analyzed coherence between local policy and related forest and environmental policies, proposed at European and International levels to contrast global regressive trends.

The aim of this study is twofold: a) to verify if timber innovation could be reconciled with local forest policy and related forest and environmental policies; b) to identify the necessary strategies in order to obtain the expected results.

¹ University of Tuscia Dipartimento fon Innovation of Biological, agro-food and Forestry sistem (DIBAF) Via S. Camillo de Lellis, snc - I-01100 Viterbo, Italy, fcarbone@unitus.it

Dedicated matrixes were submitted to local actors and forest experts. Their evaluations have been collected and elaborated.

The results show that timber innovation could be aligned with existing policies, if all actors were to operate according to a common strategy. In order to show their commitment, all those involved from the chestnut sector of the “Castelli Romani” district would have to sign a specific agreement.

Keywords: timber innovation; Rural Development Program 2007-2013; forest policy; forest-related policies

The Bosnia and Herzegovina wood products exporters' strategic response and perception of the EU Timber Regulation

Kajsa Matsson¹

Illegal logging and its related trade is a great concern around the world. It is one of the most important forest-related issues today. The European Union Timber Regulation (EUTR) is a regulatory approach by the EU to prevent illegal timber and timber products to be placed on the European Union inner market (The European Parliament and the Council of the EU, 2010). This means the regulation affects both the Member States as well as the actors exporting timber and timber products to EU member countries from other parts of the world.

The EUTR uses the term due diligence system to describe the obligations from the exporting operators. All operators placing timber for the first time on the European Union inner market must show due diligence through minimizing the risk of illegal timber harvest and trade. The due diligence system consists of three parts.

- Information access
- Making a risk assessment
- Reducing the established risk if such exists

For the control of compliance with the national regulation in the producing country, local authorities in member countries are given the responsibility to apply the regulation and oversee the handling of timber and timber products in order to prevent illegal timber and timber products to enter the EU market. An external surveillance organization within the union has the responsibility to control the due diligence system and if necessary take suitable actions if the system is not fully used. These actions include notifying the local authority about the deficiency.

Bosnia and Herzegovina (B-H) is a country with an economy in transition. The export of timber products from B-H is one of the largest trade products from the country, and therefore plays an important role in the B-H national economy. The country also suffers from illegal logging activities.

This paper conducts an exploration of perceptions as a way to investigate the potentials for successful implementation of the EUTR in B-H. The aim with this study is to investigate B-H wood product exporters' perception and awareness of the EUTR regarding illegal wood and wood products, when exporting to an EU member country. The aim is also to investigate their

¹ Swedish University of Agricultural Science, Dep. of Forest Products, kama0006@stud.slu.se

strategic response and ability to live up to the regulation two years after it was taken into force.

The research is based on two main theoretical perspectives, from two different schools of research. From a business economics point of view, institutional theory is used for understanding the behaviour and abilities of companies to live up to the EUTR. The dynamic of the institutional environment is what resembles an economy in transition, such as B-H. From the policy research area, Frame analysis is used for grouping and categorizing perceptions and awareness of the EUTR.

Institutional theory is often described as standing on three legs; the regulative, the normative and the cognitive external pressure on an organization. The EUTR belongs to the regulative approach of institutional theory. This study's theoretical framework concerns institutionalism explained by Oliver (1991). An organization can react to an institution, the EUTR for example, in different ways depending on when inquired and what type of organization it is. The institutional environment, although expected by the institution itself to be followed, is not always blindly done so. The institutional factors in a companies' environment may have different impact on different forms of companies. The way an organization reacts to its institutional environment depends also on the composition of internal dynamics.

Oliver (1991) proposes five different strategic responses to institutional pressure, situated on a scale of compliance. These strategic responses have each three different ways of acting out the strategies in tactics, see Table 2. The strategies range from following the institution, **acquiesce**, through four more ways of acting towards **manipulation** as the one furthest away from acquiescence. This table was used when interpreting the collected data into results, together with the use of frames.

Table 1. The strategic responses and tactics of institutional pressure according to Oliver, interpreted and revised by author. Source: (Oliver, 1991).

Strategies	Acquiesce	Compromise	Avoid	Defy	Manipulate
Passive:	Habit	Balance	Conceal	Dismiss	Co-opt
Tactics	Imitate	Pacify	Buffer	Challenge	Influence
Active:	Comply	Bargain	Escape	Attack	Control

Frames can have two functions (Perri 6, 2005). The first is to organize experience. The frames give boundaries on perception, what is relevant to know and what is not, and recognizes events and features relevant to the issue, here the EUTR. The second function is to bias for a decision or behavioural response, and the action made in a situation. Van Gorp (2010)

suggests four steps in the procedure of finding and analysing frames. These are:

1. Collect material
2. Open coding of data
3. Arranging the codes around “axes” of meaning
4. Selective coding

The collection of material was done through qualitative interviews with different stakeholders in the sector of exporting wood products. The coding is a way of interpreting the data, arranging it around common beliefs found, and display it together in frames. The procedure leads to the creation of a Frame Matrix, where the frames and its overall ideas are visualized.

Earlier research on the impacts of the EUTR, both in B-H and other countries suggest some key theories in the subject.

- When the EUTR was set into force, the awareness of it in B-H was far from spread among individuals working in the forest industry
- The EUTR can be seen as an obstacle and a barrier of trade with the EU on a short term basis, but can also promote the use of legal timber in the trade of wood products in the EU.
- Possible outcomes of the EUTR in EU member countries include making the EUTR part of the national regulation, and reducing the trade of foreign timber by promoting domestic wood.

Keywords: EU Timber Regulation, EUTR, Bosnia and Herzegovina, perception, strategic response, frames, institutions

Literature

Oliver, C., 1991. Strategic Responses to Institutional Change. *The Academy of Management Review*, 16(1), pp. 145-179.

P. 6., 2005. What's in a frame? Social organization, risk perception and the sociology of knowledge. *Journal of Risk Research*, 8(2), pp. 91-118.

The European Parliament and the Council of the EU, 2010. Regulation (EU) No 995/2010 of the European Parliament and the Council. *Official Journal of the European Union*, 20 October.pp. 23-34.

Van Gorp, B., 2010. Strategies to Take Subjectivity out of Framing analysis. In: P. D'Angelo & J. A. Kuypers, eds. *Doing News Framing Analysis: Empirical and Theoretical Perspectives*. New York: Routledge, pp. 84-109.

Public forest service in Slovenia over the last decade-efficiency assessment

Lidija Zadnik Stirn¹, Vasja Leban¹, Petra Grošelj¹, Janez Krč¹, Špela Pezdevšek Malovrh¹

Introduction

The Slovenia Forest Service (SFS) is a public forest service which fulfils several activities to meet the objectives and goals required according to the Slovenian Forest Act (Slovenian..., 2007). The main activities of the SFS encompass forest management planning, silviculture and forest protection, forest extension and public relations, forest engineering and rural development, and game management (Zavod za gozdove Slovenije, 2014). The SFS was established in 1993 and it consists of 14 Regional Units (RU) and the Central Unit. The SFS is mainly financed from the national budget, thus the need for efficient money consumption is of crucial importance and one of the main indicators of expedient use of public money (Andoljšek and Seljak, 2005). Moreover, Kao (2010, p. 484) established that “*as time progresses, better performance is expected*”, and inefficient units should be identified in order to make the necessary improvements.

Professional services of the SFS are the basis for efficient realization of its tasks. This goal could be achieved only by providing sufficient financial and human resources (Zavod za gozdove Slovenije, 2013). Thus, our assumption was that the financial resources (i.e. SFS Regional Units’ annual budget) as well as the staff (i.e. number of employees) are the most important indicators of the efficiency level of different SFS activities. The aim of the paper is to present the current and past efficiency of the SFS on the level of RU in terms of operational obligations, namely: i) forest management planning (FMP), ii) silviculture and protective works (SPW), and iii) forest extension and public relations (FEPR).

Methodology

Data Envelopment Analysis (DEA) was used to calculate efficiencies in a given time period 2004-2013. Advanced calculations have been performed to identify the Malmquist indexes for each RU. Three models were designed in order to indicate each of the most important obligations of the SFS – for each of the presented models we selected several inputs and outputs reflecting the most important activities comprised in each of the SFS obligation. The overview of models and corresponding inputs and outputs with additional descriptive statistics is presented in Table 1.

¹ Biotechnical Faculty, Department of Forestry and Renewable Forest Resources, Večna pot 83, SI-1000 Ljubljana, lidija.zadnik@bf.uni-lj.si

Table 2: Descriptive statistics of models inputs and outputs

Model	Variable		Min	Max	Average	Median	St. dev.
1 - FMP	Stand measurements and border (ha)	Output	0.0	29,350.0	10,688.7	9,952.5	5,310.7
	Length of routed skid trails (m)	Output	0.0	115,896.0	39,807.9	33,241.5	29,403.4
	Budget for FMP (€)	Input	90,000.9	347,492.7	206,340.8	209,255.8	57,107.8
	Nr. of employees (n)	Input	24.0	77.0	48.7	47.0	13.0
2 - SPW	Nr. of issued orders for tree cutting (n)	Output	1,377.0	12,427.0	4,163.2	3,708.0	1,876.3
	Area of designed silviculture plans (ha)	Output	734.0	17,453.0	5,636.2	5,474.0	2,849.8
	Budget for SPW (€)	Input	229,447.1	885,893.5	526,042.7	533,474.1	145,589.9
	Nr. of employees (n)	Input	24.0	77.0	48.7	47.0	13.0
3 - FEPR	Nr. of activities for forest owners (n)	Output	7.0	85.0	35.0	32.0	16.3
	Nr. of activities for the public (n)	Output	1.0	144.0	45.6	41.0	26.3
	Budget for FEPR (€)	Input	54,539.1	210,575.1	125,039.3	126,805.7	34,606.4
	Nr. of employees (n)	Input	24.0	77.0	48.7	47.0	13.0

The Constant Returns to Scale (CRS) efficiency scores and the Malmquist productivity change index were calculated by Win4DEAP[®] v1.1.4 while other calculations were carried out in MS Excel[®] 2010.

DEA is a nonparametric method based on linear programming which calculates the optimal value (i.e. minimum or maximum) of the objective function of Decision Making Units (DMUs) subject to linear equality and linear inequality constraints (Charnes et al., 1978; Huguenin, 2013). To calculate the efficiency (E) we used the output oriented CRS model which aims at maximizing outputs and measure the overall technical efficiency. Afterwards we calculated the output-oriented Malmquist productivity change index (MI) for each model and normalize the values by dividing it with the model's maximum MI value so that the maximum values be one (Hadad et al. 2015).

Finally, we calculated the weighted sum of $E_{j,m}$ and $MI_{j,m}$ ($j=1, \dots, n$; n = total number of DMUs; $m=1, \dots, M$; M = total number of models) values by adopting the methodology used by Hadad et al. (2015). The E and MI weights values were defined by expert group discussion and grounded on the assumption that the efficiency contributes more to the “global efficiency” (E) than the trend (MI). The weights amounted 0.667 and 0.333 for w_1 and w_2 , respectively. Additionally, we integrate the models weights u_m . These weights indicate the importance of each model within the “global efficiency” and were obtained from the SFS reports – a ten-year average percentage of time used for each of the three selected obligations in a corresponding year. The models weights were 0.241, 0.614 and 0.146 for FMP, SPW and FEPR models, respectively. The $DEA&MI_{global}$ values for each DMU and model are calculated as (1):

$$DEA&MI_{global\ j,m} = \sum_{m=1}^M u_m * ((w_1 * E_{j,m}) + (w_2 * MI_{j,m})) \quad \dots (1)$$

Results and Discussion

Figure 1 shows the average DEA efficiency for the last decade subject to different models. A slight efficiency decline is noted for FMP and FEPR models, while the SPW efficiencies slightly increased. On the other hand, the efficiency of performing FMP activities is the highest, followed by SPW and FEPR. This indicates a better average usage of the budget and staff to perform the FMP and SPW activities.

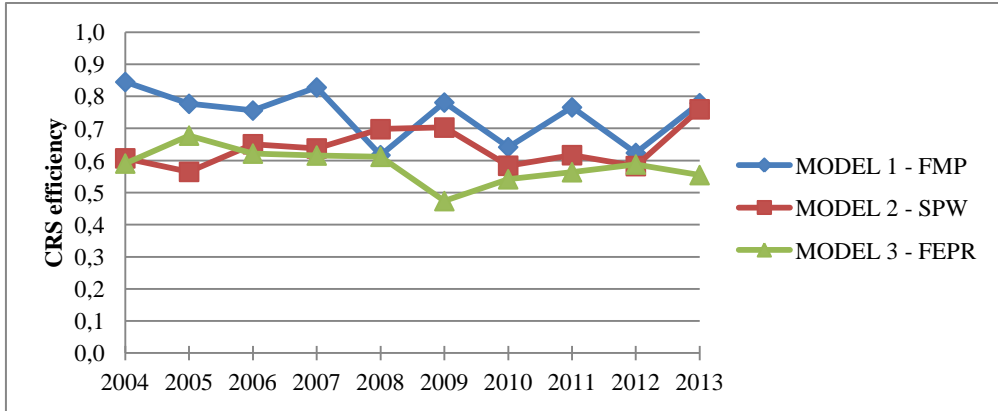


Figure 1: Relative average CRS values in time

The average MI change ($MI_{chg} = MI_{j,m} - 1$), as presented in Figure 2, vary also within different periods. The MI changes in 2008-2009 for FMP and FEPR models are negative, while the highest positive MI changes are noted in the period 2010-2011. The period 2007-2008 is the only period with all three positive MI changes and the period 2006-2007 the only with all three negative MI changes. This indicates a very dynamic operation of the SFS in the last decade, leading to very changeable efficiencies between years. In terms of operational improvement, the RUs should strive to increase the output values if they want to preserve the constant level of input values.

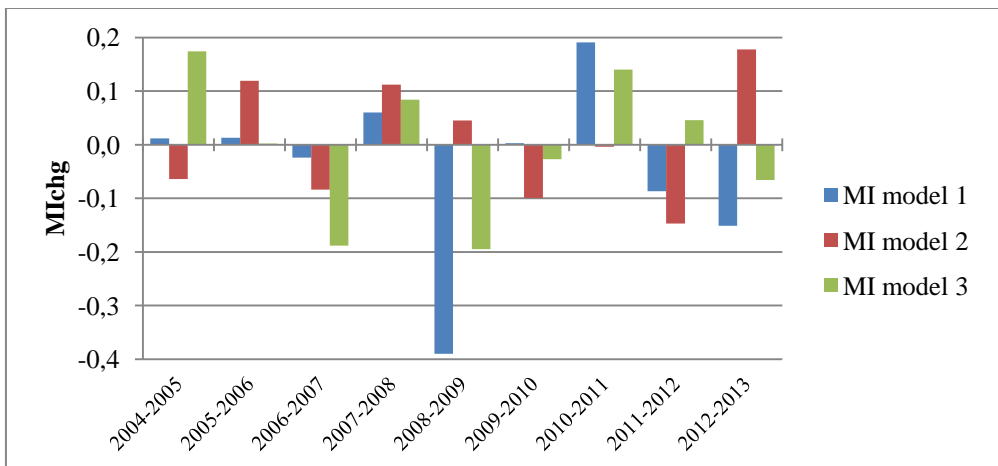


Figure 2: Relative average MI change values

Table 2 represent the models' $DEA&MI$ values (see Hadad et al. 2015) and corresponding ranks, as well as the weighted $DEA&MI_{global}$ values and ranks.

RU Murska Sobota was found the most efficient in the given period followed by RU Celje and RU Novo Mesto. On the other hand, the RU Tolmin, RU Bled and RU Maribor performance has been found least efficient. Further, the attention should be given to the RUs with lower rank because their score indicates they are low in CRS efficiency and/or did not improve it over time (see also Kao, 2010). The SFS is struggling to reorganize optimally the work and employees due to the decline of provided financial means since 2010. The load of work, especially the number of issued orders for tree cutting in private sector, has increased while the number of employees as well as the salaries decreased in the last decade (Zavod za gozdove Slovenije, 2014). Nevertheless, the relative efficiency scores indicate that the space for efficiency improvement of the inefficient DMUs still exists.

Table 3: Regional Unit efficiencies subject to different models

DMU (RU)	MODEL 1 - FMP		MODEL 2 - SPW		MODEL 3 - FEPR		Weighted DEA & <i>MI_{global}</i>	Rank
	DEA &MI	Rank	DEA &MI	Rank	DEA &MI	Rank		
Tolmin	0.879	3	0.781	14	0.733	12	0.797	14
Bled	0.827	10	0.816	12	0.749	11	0.809	13
Kranj	0.863	5	0.843	7	0.788	7	0.840	7
Ljubljana	0.863	4	0.889	3	0.725	13	0.859	3
Postojna	0.815	12	0.838	8	0.771	9	0.823	11
Kočevje	0.831	8	0.829	11	0.811	6	0.827	10
Novo mesto	0.933	2	0.853	4	0.759	10	0.859	4
Brežice	0.790	14	0.836	9	0.914	3	0.836	8
Celje	0.812	13	0.889	2	0.950	2	0.879	2
Nazarje	0.937	1	0.801	13	0.954	1	0.856	5
Slovenj gradec	0.829	9	0.846	6	0.781	8	0.833	9
Maribor	0.817	11	0.851	5	0.703	14	0.821	12
Murska sobota	0.834	7	0.948	1	0.832	5	0.903	1
Sežana	0.842	6	0.835	10	0.886	4	0.844	6
Average	0.848		0.847		0.811		0.842	

Conclusions

By means of DEA we assessed the efficiency of SFS in the last decade. We selected three areas of SFS's work and built three models expressing forest management planning, silviculture and protective works, and forest extension activities. We applied the methodology proposed by Hadad et al. (2015) and modified it in order to join the results of three different models. The results indicate a slight decline of efficiency in the last ten years. However, given the

input and output sets only the efficiency of silviculture and protective works increased, while the efficiency of forest management planning and extension activities decreased. Further analysis should be focused on assessing the environmental factors (e.g. natural and work conditions) in order to establish causes for inefficiencies and abolish it.

Acknowledgements

The paper was conducted as a part of the COOL project within WoodWisdom-Net2 and BioenergyNet. The project was co-financed by The Ministry of Education, Science and Sport of the Republic of Slovenia. Authors are thankful to the Slovenia Forest Service for providing the accounting data.

Keywords: Forest public service, Data Envelopment Analysis (DEA), efficiency, Malmquist index, panel data

References

- Andoljšek, Ž., Seljak, J., 2005. Merjenje učinkovitosti in uspešnosti javne uprave - PIPA : (the performance indicator(s) of the public administration). GV Izobraževanje; Fakulteta za upravo, Ljubljana.
- Charnes, A., Cooper, W.W., Rhodes, E., 1978. Measuring the efficiency of decision making units. *Eur. J. Oper. Res.* 2, 429–444.
- Hadad, Y., Keren, B., Hanani, M.Z., 2015. Combining data envelopment analysis and Malmquist Index for evaluating police station efficiency and effectiveness. *Police Pract. Res.* 16, 5–21.
- Huguenin, J.-M., 2013. Data Envelopment Analysis, in: *Multi-Criteria Decision Analysis*. John Wiley & Sons Ltd, pp. 235–274.
- Kao, C., 2010. Malmquist productivity index based on common-weights DEA: The case of Taiwan forests after reorganization. *Omega* 38, 484–491.
- Slovenian Forest Act. 2007. *Off. Gaz. of the Republic of Slovenia*, Nr. 110/07
- Zavod za gozdove Slovenije, 2014. Poročilo o doseženih ciljih in rezultatih Zavoda za gozdove Slovenije v letu 2013 = Report about fulfilled goals and results of SFS in 2013. Slovenia Forest Service, Ljubljana.
- Zavod za gozdove Slovenije, 2013. Poročilo o delu Zavoda za gozdove Slovenije za leto 2012 = Report about the work of SFS in 2012. Slovenia Forest Service, Ljubljana.

The experience and best practices of Forestry Associations and Consortiums in Italy: feasibility analysis and economic evaluation of a case study in Veneto Region.

Luca Cesaro¹, Sonia Marongiu¹, Federico Correale²

In Italy the national demand of wood is almost 25 million m³/year. The potential offer is 32 million m³/year but only 23% of wood is harvested every year. Only 30% of total demand is covered by national wood while the rest depends from foreign wood imported in the country. Almost 8-10 millions m³/year is used for energetic purposes. Following the results of the last Forest National Inventory (2005), 66% of Italian forests are private while 33% are public. Public forests are managed by Municipalities, Regions or State administration. There is a great difference among Regions: in Emilia Romagna, Tuscany and Liguria, 80% of total forests are private while in Trentino 70% is public. As a consequence, there are different situations and specific management problems in each of them. On average, the forest properties are very small (3 hectares) and the harvested surface is 1 hectares.

In this situation, is not always possible an efficient management of national and regional forest resources: the high fragmentation of private properties and the low level of harvesting make difficult the promotion and valorization of local resources, increasing the dependence of processing industry from foreign wood market. In some cases, forest Associations and Consortium are considered a good solution to improve the sectorial development at a local level, concentrate the wood offer and implement wood chains.

In Italy there are different kinds of forest associations at a national, regional and local level.

The first part of the work focuses on the associations that operate at a local level, describing different experiences coming from different regions (for instance Veneto, Trento, Piedmont Tuscany, Umbria, and Lombardy) and the best practices included in one of them. It has been selected the most interesting cases in terms of organizations, management, innovation, efficiency. Some of these associations have been founded by Rural Development Policies in the last programming periods while other ones have been created and funded by the Region as for instance the Consortiums.

In every case, the associations are funded by public resources and, as a consequence, it is important to draft a feasibility analysis in order to evaluate their convenience. One method used in this case is the Cost-Benefit Analysis

¹ Forest Observatory CRA-INEA - National Council for Agricultural Research and Economics, cesaro@inea.it

² Veneto Agricoltura

(CBA), an approach to estimate the convenience of alternatives options and solutions in terms of labor, costs, incomes, etc.. In this analysis, costs and benefits are expressed in monetary terms as flows of income and costs over the time.

The second part of the work presents a case study in Veneto, a Region located in the north-eastern part of Italy, regarding the feasibility analysis of some forestry Consortiums and their economic convenience based on CBA. The Consortiums are created as public-private partnership and involve all the different levels of productive chains (from harvesting to processing). One is located in Recoaro and one in Asiago (in Vicenza province).

The project has been developed following different steps:

1. Selection of case studies and technique-economic survey
2. Evaluation of the funding sources
3. Feasibility analysis and Cost-Benefits Analysis

In the first step, the case studies have been selected considering the kind of partnership, the stakeholders involvement, the horizontal and vertical organizations of the Consortiums, etc.. A technique-economic survey has supported the selection, focusing on different characteristics: the offer of wood coming from public and private subjects belonging to Consortium; the efficiency level of wood enterprises operating in the area; the structural dimension of the processing industries; the situation and future development of biomasses production and use; the involvement of stakeholders.

As concern the second point, in 2000-2006 rural programming period there were specific incentives for the constitution of forest owners associations and subsidies to covers the initial management costs. Thanks to this measure, in Veneto have been funded 9 forestry associations (among private owners) and most of them have continued to operate as local development agencies in more field and not in the only forest management. In the last programming period there were not subsidies to fund the start-up of the associations. In the next programming period (2014-2020) there is not a specific measure but is possible to fund cooperation activities in other ways (cooperation measure, innovation, investments, etc.). As a consequence, there is the need to analyze if another funding source is available at a local or regional level and how to combine them.

The third step concerns the feasibility analysis and the CBA. The definition of the most appropriate administration and organization scheme, in coherence with the regional laws and regulations, seems very important in the start-up phase. Also the definition of the optimal dimension is important because it is necessary to guarantee that the income will be sufficient to cover the management costs. CBA is made considering financial and economic flows of cost and benefits, the inputs and outputs directly linked to the Consortium activities. The convenience between the project and the alternative options

will be made on the basis of the Net Present Value and the Return on Investments.

Keywords: Associations, Consortium, Cost-Benefit Analysis

“New multifunctionality”: Opportunity cost analysis of a nature conservation-oriented silvicultural concept in Germany

Lydia Rosenkranz¹ and Björn Seintsch¹

In the past years, rising and partly competing demands in regard to forests management and wood utilisation could be observed in Germany. Next to wood utilization and the realisation of nature protection goals forests also gained importance for the ambitious policy aims of the Federal Republic of Germany in the fields of economics, energy policy, and climate protection. So far, the general principle of forest policy in Germany, concerning the allocation of different forest functions, was the integrative approach of “multifunctional forestry”. This approach aimed to provide protective, productive and recreational functions of forests mostly on one and the same area.

Yet, in the context of implementing a higher level of nature conservation in forests in the past years, tendencies of areal segregation can be increasingly perceived. As the satisfaction of all societal claims by conducting multifunctional forestry seems impossible, a segregation of forest functions, so called “new multifunctionality”, has been suggested recently by the German Federal Agency for Nature Conservation (Höltermann, 2013) This “new multifunctionality” suggests forest management in three separate management classes: (1) productive commercial forests, managed by the Codes of Good Practice in Forestry, (2) forests with specific protective purposes, e.g. Natura 2000 areas, and (3) forests with natural forest development (nature protection reserves).

As previous studies have shown, additional expenses and losses of income for forest owners, e.g. by an increase in harvesting and administrative costs or by restrictions in the choice of tree-species and maintenance of a sufficient share of dead wood, can be expected through the implementation of nature protection measures in forests. However, the Code of Good Practice in Forestry as well as nature protection measures in forests with specific protective purposes are, to date, not fully operationalized. As a result, the full natural and monetary effects of nature protection measures and the Code of Good Practice in Forestry have not been evaluated so far. Also, natural and monetary effects of nature protection measures have only been calculated for separate measures or separate protection areas.

Against this background, this study aims to estimate the opportunity costs for forestry that would be caused by an implementation of the nature

¹ Thünen Institute of International Forestry and Forest Economics, lydia.rosenkranz@ti.bund.de

conservation-oriented silvicultural concept „new multifunctionality” in Germany. With this study, an exploratory analysis of the loss of timber felling and contribution margins, due to the implementation of the “new multifunctionality” is given for the first time. As a new approach, all single nature protection measures were calculated together. Also, the study gives a first attempt to operationalise the policy requests of nature protection measures as well as the Code of Good Practice in Forestry in Germany.

The evaluation was conducted for a 200 year simulation period for the total German forest area by means of the Strugholtz-Englert-simulation model and compared to a modelling of the current silvicultural practices. The operationalization of forestry under the Code of Good practice and under restrictions due to nature protection measures was based on literature research, previous case studies and own assumptions.

Modelling results for the implementation of the “new multifunctionality” show losses of timber felling for the relinquishment of forest utilization of about 11 million m³ per year (for a more detailed presentation see Figure 1). Costs for the implementation of the “new multifunctionality” would amount roughly to one billion Euros per year. The implementation of the „new multifunctionality” would be a rational decision, if its additional benefit at least equalled the economically important opportunity costs of forest utilization.

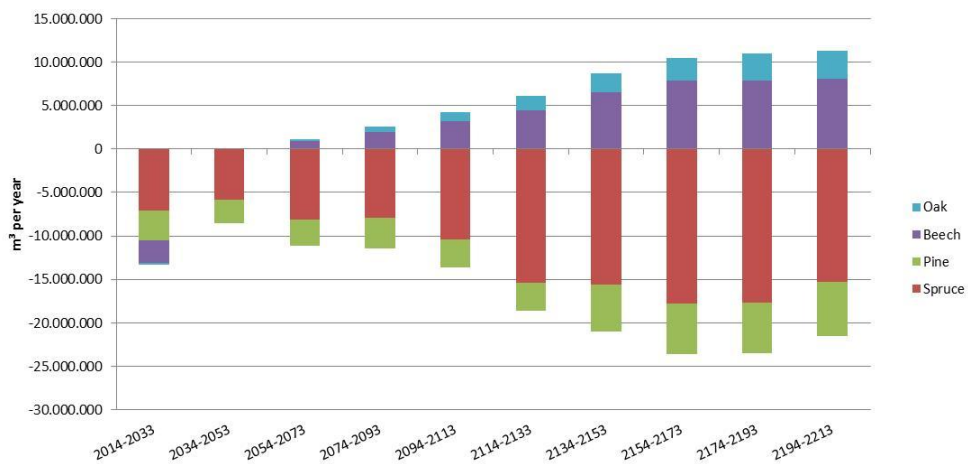


Figure 2: Deviations of raw timber availability for the silvicultural variants “status quo” and “new multifunctionality” in timber harvested per year

Keywords: *New multifunctionality, opportunity cost analysis, contribution margin, nature conservation, forestry*

Perspectives for economical valuation of urban forests – Case studies from Bulgaria and Macedonia

Makedonka Stojanovska¹, Vladimir Stojanovski², Miglena Zhiyanski³

Green infrastructure is defined as a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces and other physical features in terrestrial areas. Urban forests as well as single trees are elements of GI in urban settings. With the urbanization in already heavily urbanized European large cities people become more aware about the ecosystem services provided by green infrastructure in urban environments.

Green infrastructure and urban forestry play vital part of any large city in Europe, by providing a range of environmental, social, economic, cultural benefits. These benefits are still underestimated and neglected. In this regard the paper will discuss about the current trends for economical valuation of urban forest in the scope of Bulgarian and Macedonian national context.

All green infrastructure uses can be characterized in economic terms, but until recently there was no satisfactory way to compare the market and non-market benefits of alternative green infrastructure use options. Recent developments in environmental and resource economics have produced new methods to estimate non-market forest benefits, making more comprehensive assessment of land use options possible. In recent years, thinking on green infrastructure has moved from ecology to economics. Resources such as the countryside, coast, wetlands, urban parks, street trees and their ecosystems are seen as critical for sustainable economic growth and social goals, not just a way of supporting wildlife and 'the environment'.

The research design is descriptive and explanatory. It will describe the current situation related to introduction of new approaches (methods) in the evaluation of the green infrastructure and explore the implementation of these approaches (methods) in both countries.

The methods applied in this paper include content analysis of the recently published articles and books with relevant information about economical valuation of ecosystem services and role of green infrastructure in urban areas in both countries. In the same time the content analysis is conducted and enlarged with grey literature from respective countries Bulgaria and

¹ Makedonka Stojanovska, Forest Faculty in Skopje, Department for Forest Organization and Economics, makedonkastojanovska@gmail.com

² Stojanovski Vladimir, Forest Faculty in Skopje, PhD student BOKU University - Vienna

³ Miglena Zhiyanski, Forest Research Institute, BAS, Sofia

Macedonia. The data from the grey literature are later compared with the data gathered from previous analysis.

Then the focus is put on methods like cost benefit analysis, hedonic prices and contingent valuation method (CVM).

Cost-benefit analysis (CBA) is a standard tool for evaluating the economic merit of investment or development projects, and is widely used to assess forest land use options. When applied correctly, CBA results in a systematic listing of the advantages (benefits) and disadvantages (costs) of any project or land use option. Strength of CBA is the use of explicit and directly comparable decision criteria. The underlying logic of CBA is that, for any set of alternative activities (e.g. land use options), the net benefits of each should be compared, where the net benefits (NB) of a given option are simply the sum of benefits (B) less the total costs (C). These benefits and costs are identified for each time period - usually one year - over some time horizon chosen by the analyst.

Another valuation technique is the hedonic pricing method, which attempts to isolate the specific influence of an environmental amenity or risk on the market price of a good or service. The most common applications of this technique are the property value approach and the wage differential approach, which are used to value environmental amenities and dis-amenities. Hedonic pricing has been used in developed countries to estimate the negative impact of air and noise pollution, or the presence of waste disposal facilities, on the market prices of residential property and, conversely, the positive impact of proximity to water or public green space (Garrod and Willis 1992).

The use of contingent valuating method (CVM) for valuing environmental resources originated and was largely developed in North America. In forestry, CVM has been used to value wildlife and recreational benefits of protected areas. Several recent studies have demonstrated the feasibility of applying CVM to forest land use in the developing world (Bishop 1999).

The results present that although there is awareness about the urban environment, the value of the urban forests and green infrastructure in Bulgaria and Macedonia is still neglected and intangible and not all the environmental and social aspects are included in the economic evaluation. It can be summarized that still the value of the green infrastructure is based on the old and traditional method based on the price of the wood mass that is produced and the expenses for its production. That is the reason why in the both countries there was a lack of literature related to this new modern approach. Bulgaria, as a EU member has already started some projects, which are going to be analyzed and in Macedonia only grey literature is available for this research.

The content analysis of the grey literature in Macedonia indicates existence of valuating methods of a single tree: the Czech method where the value of

the tree is based on the oxygen production, location of the tree, wood mass, tree species and also some methods for valuating forest land which can be applied in valuating urban forest.

The Bulgarian case study which is about green infrastructure and emission of CO₂ is showing good example of tangible value of the urban forests and green infrastructure through the concept of carbon credit.

At the moment as a result of lack of research and support of the urban forest and green infrastructure issues the methods which are most often used and applied in other EU countries and USA as well like cost benefit analysis, hedonic prices and contingent valuation method (CVM) are not used at the moment.

A part of this conclusion can be supported by the fact that in Macedonia and Bulgaria still there is no regulative framework related to this issue and can be a good base for further development of this issue. Part of the results focuses on outlining economical valuation perspectives and practical recommendations for policy makers and other stakeholders.

A key challenge for policymakers and economic development practitioners has been how to shape a strong economic case for environmental improvements. 'Green' issues might be very attractive, it's argued, but where are the economic benefits? What difference will they make to jobs, health and the economic strength of areas struggling with deprivation and social problems?

This paper can provide a strong ground for seeing green infrastructure as adding real value to the economy of analyzed countries.

Keywords: green infrastructure, urban forestry, economic valuation

Stakeholder evaluation of ecosystem services of trees to enhance the decision-making across scales

Maria Nijnik¹

Ecosystem services are the benefits humans receive, directly or indirectly, from ecosystems. The Millennium Ecosystem Assessment (MEA, 2005) grouped ecosystem services into: *supporting*, such as nutrient cycling, oxygen production and soil formation; *provisioning services* of food, fibre, fuel and water; *regulating services*, including climate regulation, water purification and flood protection; and *cultural/social services*, such as education, recreation, and aesthetic value. However, if the demand and supply of *marketable forest commodities* (e.g. timber) could be analysed by economic models, with choices and resource allocation mediated by markets, social expectations, preferences and needs for *public goods* place demands on novel valuation methods, or their combination.²

The literature provides strong arguments that stakeholder preferences for the social states of public goods should be determined through non-market-oriented postulates, or revealed through mechanisms other than the market (Kant, 2003). Thus, action research (Argyris *et al.*, 1985), for example based on application of MCA or the Q-method, which avoids the challenge of questionable attributions of pseudo-market values, seeks to be particularly useful in identifying potential conflicts (e.g. between stakeholder interests) in order to avoid and manage them, or for assisting decision-makers with a proper incorporation of public perceptions into the policy design.

In this paper, largely focussed on Scotland, we analyse heterogeneity of stakeholder attitudes towards the services that forest ecosystems can provide and the trade-offs between these services. First, we explore public attitudes towards the role of woodlands and their expansion for the development of countryside. Phase 2 is on stakeholder evaluation of landscape changes and characteristics: a multi-national study; and finally, phase 3 is dedicated to stakeholder evaluation of ecosystem services and forest multi-functionality. Heterogeneity of attitudes and perspectives regarding the ecosystem services of trees are identified through characterization of attitudinal groups (by applying the PQ-Method) and a discursive analysis that follows. Key factors influencing the attitudinal diversity are examined.

¹ The James Hutton Institute, United Kingdom, maria.nijnik@hutton.ac.uk

² For example, analytical and participatory techniques (Nijnik and Mather, 2008); participatory techniques and visualization tools (Miller *et al.*, 2009), or Q-methodology with aggregated ecological indexes (Nijnik *et al.*, 2008).

Research provided an empirical evidence of end-user understanding that sustainable multi-functional forestry is the direction in which to go, so as to multiply benefits to society and the environment. Existing attitudes to forest ecosystem services identified appear to be diverse. For example, some people in Scotland (named as *Extreme Conservationists*) strongly support native woodlands regeneration. Others (in particular those, consequently called by us, as *Extreme Productivists*) consider above all the importance of maintaining forest as a source of wood. They would not mind a dominant place in rural landscapes of *Sitka spruce*. However, despite the uncovered heterogeneity of attitudes, public support of the priorities for action addressing proper integration of woodlands in Scottish countryside is noticeable. The thrust of multi-functional forestry is supported by our results, and forest multi-functionality in turn, is aligned with international trends and agreements relating to the role of forests in landscapes. The PQ-method has proved through this research to be a useful tool for stakeholder evaluation of ecosystem services to balance stakeholder interests; identify potential conflicts to assist in avoiding and/or managing them, and further, likely to assist decision-makers with the incorporation of existing perceptions into policy design.

The overall conclusion of this research is that although some people in Scotland are in favour of native woodlands conservation and their extensive regeneration, whilst others are more concerned with socio-economic aspects of forestry development, e.g. with new employment opportunities in remote rural areas, there is likely an agreement across various categories (attitudinal groups) on the necessity of multi-functional forestry development and sustainable forest management. The mix of attitudinal groups implies their recognition of forest multi-functionality and of ecosystem services types and the trade-offs between these.

Moreover, alongside with the pressures to manage Scottish woodlands multi-functionally and sustainably, there is a need to recognise the very considerable challenges posted by global warming and by the need to develop forestry strategies which confront these challenges. It seems highly probably that the creation of new forests, and particularly of *Sitka spruce*, will play a significant role in sequestering carbon (as shown by Nijnik *et al.*, 2012) and providing bio energy, and that the mix between native woodlands and exotic species may need to be reconsidered in the light of these compelling new demands on woodland resources (Slee *et al.*, 2012). Our findings provide additional evidence that in Scotland, the so-called *Productivist* position proves to be rather strong, and a new phase in forest multi-functionality could mean a further shift towards *commercialisation* of both productive and carbon forestry, as well as e.g. of ‘social forestry’ (e.g. of forest use for tourism and recreation).

Also, through the level of importance accorded by the people to the integration of woodlands in Scottish landscapes, the research has demonstrated comparability between public and expert preferences in support of the multi-functional future of forestry. This comparability between public and expert preferences is important for decision-making, and stakeholder attitudes and preferences concerning various ecological, socio-economic and aesthetic aspects of landscape changes have policy relevance in terms of their matter and scale.

Keywords: multi-functional forestry, stakeholder engagement, attitudinal analysis, rural landscapes, Scotland

Strategic polices planning supported by a based IBGE 2005 input-output matrix simulator

Marcos Raymundo Loest¹ and Vitor Afonso Hoeflich¹

Introduction

The forestry sector presents a complete and complex production chain, responsible for up to 3% of the world GDP (Gross Domestic Product) and permeating intensively other Brazilian production chains (76% of its intermediate products are used in other production chains). Its importance is reinforced by the fact that the 24% of the products in the forestry chain constitute 67% of the total chain value. The strong relationship between the forestry sector and other sectors demonstrate its importance and the sectors interdependency with the rest of the economy. For strategic planning purposes, the forestry industry must have accurate information that reflects current conditions. Only then is it possible to manage and stimulate forest industry. The IBGE's Brazilian National input-output matrix can be used to identify the forestry production chain, giving a research resource for sectorial strategic policy planning. This article proposes an I-O Impacts Simulator of the Brazilian forestry production chain to qualitatively and quantitatively support its comprehension and policy making.

Methods Productive Chain

A productive chain or filière is the sequence of a good transformations linked by technological and strategic chains that also could describe a group of economic and commercial relationships in different stages of production (LOEST, 2009, p.22).

Input-output Matrix

A technical direct coefficient matrix presents how much a specific economic activity needs to use from others activities to produce an additional monetary unity. Based on this matrix, the Leontief model was developed, which calculates the final level of production of each activity based on exogenous use variation (LOEST, 2009, p.26)¹.

¹ Programa de Pós-Graduação em Engenharia Florestal, UFPR, mrloest@yahoo.com.br

This article uses the 2005 IBGE's Input-output Matrix to demonstrate these relationships.

The IBGE Make-Use Table Conversion

Instead of constructing the input-output matrix, IBGE uses the Make-Use Model developed and proposed by the United Nations System National Accounts (SNA) in 1968. Some transformation operations are needed, however, to transform it into an input-output matrix. Using the FEIJO (2008, p.295) proposed method, two input-output matrices are obtained: one product/product matrix, for technological analyses; and one activity/activity matrix to evaluate intersectorial relationships.

The Leontief Model – Direct and Indirect Impacts Multipliers

For each input-output model sector its intermediate and final use and its total gross production can be calculated. Based on these values, its technical coefficient can be obtained by the relation between its intermediate use and its gross production (LOEST, 2009, P.44). When the final use of one sector increases, it starts consuming more goods from other sectors, which results in the other sectors increasing their consumption of goods, and so on - generating a cycle of economic waves (indirect impacts). The resulting sum of these waves is called Direct and Indirect Impacts. Leontief developed a method to evaluate and calculate these impacts based on matrix operations (LOEST, 2009, p.45).

Findings and arguments

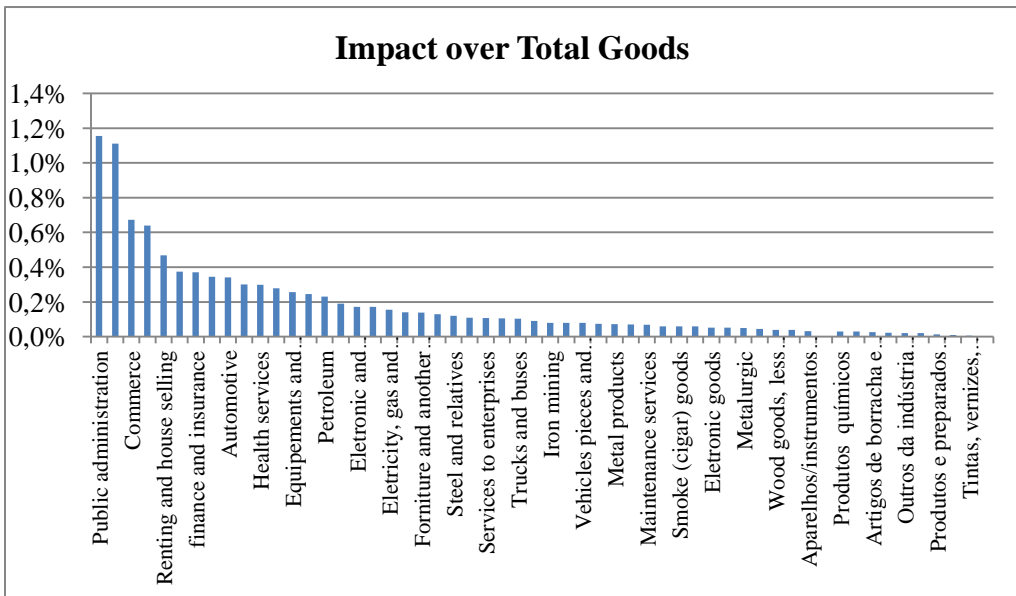
Based on the Brazilian National Economical Activities Classification – CNAE 1.0, it is possible to identify all activities linked to the forestry chain by its CNAE code. Following these codes, the following economic activities comprise the forestry chain:

- forestation and forest exploration activities,
- woods activities and furnishing,
- paper & graphics activities.

As the input-output matrix represents the Brazilian forestry sector, it is a highly aggregated matrix (different than the BEA matrix, for example). It includes only 55 activities, representing all possible economic activities. From these 55 activities only 5 were identified as part of the forestry chain (see table below).

Seventy-six percent of the sector's intermediate products go to other production chains. Its importance is reinforced by the fact that 24% of its product (used by the forestry chain) accounts for 67% of the aggregated value. The strong relationship between the forestry sector and other sectors demonstrates not only its importance but also its degree of interdependence with other sectors.

Based on the Leontief model, it is possible to simulate some final use changes in the forestry chain to view its impact over the sectors. A simple MS Excel simulator was developed for this purpose. It reproduces the Leontief theory to illustrate what happens when some exogenous change influences the system. Simulating a 10% increase use over the sector, it was possible to identify its impact in the others sectors (see figure below).



Discussion

By using the Leontief model, a simulator was created to identify the theoretical impact over all sectors caused by an exogenous use variation in the forestry chain. It is possible to identify, based on the economic structure and technological relationships shown by the IO model, the sectors/chains that are most affected by each variation. This model can be used to justify or support the use of economic policies in the forestry chain, helping policy makers, other decision makers, entrepreneurs, students, and others to develop their vision of the chain based on theory.

Keywords: Forestry production chain; input-output matrix, forestry policies, IBGE

References

LOEST, M. R. Simulador de impactos econômicos de insumo-produção com representação gráfica: desenvolvimento de um protótipo aplicado à cadeia produtiva da madeira - 2005. xxf. Dissertação (Mestrado em Engenharia Florestal)- Setor de Ciências Agrárias, Universidade Federal do Paraná, Curitiba, 2009.

FEIJÓ, C.A; et al. Contabilidade Social: A nova referência das Contas Nacionais do Brasil. Rio de Janeiro: Campus, 2008.

The 3L-model for multi-sector oriented evaluation of policy implementation by state forest institutions

Mirjana Stevanov¹ and Max Krott²

Forest-related policies are focused on the forests and the state institutions responsible for policy implementation. In former times the concept of multiple-use forestry provided a basis for defining comprehensive task bundle of state forest institutions. Other sectors were excluded. Now days however, external pressures become too strong and the forest cannot anymore be isolated from external influences of economy and society. These external influences are often organized in, and exercised through specific sectors like nature conservation, agriculture or tourism. Accordingly, state forest institutions have lost their autonomy in determining relevant forest uses. This is why evaluation and accounting of state forest institutions cannot anymore be based on the traditional tasks of state forests only, but they have to integrate other forest uses as well, which are often under auspice of other sectors.

Demand expressed by other sectors can be captured under “products and services” that the forests should deliver to the users. In cases where these deliverables are marketable products then they can be specified in natural amounts and prizes, delivering on this way information that makes evaluation and accounting sound. But if deliverables are non-marketable products and services, then they are much harder to quantify and because of that they often get assigned a verbal description only. In this way non-marketable products cannot attract the full attention of decision makers and they are endangered to remain neglected in the final decision(s). E.g. state forest institutions might be reporting profit but this quantitative result does not at the same time evidence if all public tasks are fulfilled well or even sufficiently.

Advanced accounting means and procedures have a potential to integrate non-marketable products and services into evaluation of state forest institution’s performance and reveal its overall goal implementation. Methods often require from decision makers to agree on particular goals and the respective variables, fulfillment of which is measured on the quantitative scale. From a political point of view however, it is hardly expectable that actors from other sectors will be willing to agree upon goals and scales formulated by the forest sector. That results in a situation where innovative accounting methods do not find their implementation in the practice.

¹ University of Novi Sad, Institute of Lowland Forestry and Environment, Serbia, mzavodj@gwdg.de

² University of Goettingen, Chair of Forest and Nature Conservation Policy, Germany

To overcome this shortcoming we were looking for a model that evaluates comprehensive performance of state forest institutions by taking into account their respective forest-related political environment, and simultaneously exercises scientific sharpness and empirical soundness. We accordingly came at the 3L-Model, which combines three levels: level of political relevance, level of theories and the empirical level. As such, the 3L-Model has an excellent potential to integrate different forest-related sectors into evaluation, first of all while the level of political relevance (=policy level) does not only rely on the program goals of the forest sector (meaning goals formulated in forest laws, strategies, administrative guidelines, regulations, plans, etc.) but it is fully open for all forest-related goals of other sectors. The theory level, being comprised of theories that capture vague goals from the policy level into more precise “science language”, can accordingly include all diverse theoretical frameworks, meaning that of economics, political science theories or theories of forest management. Such diversity can fully cover the key goals and issues of other, forest-related sectors as well, and assign them required scientific sharpness. Finally, the level of empirical evidence goes far beyond forestry methods and experiences only. It is all methods, data and indicators developed within different sectors that can be included into measurements. The 3L-Model combines on this way the diverse data, flowing together into a unique evaluation procedure. Its advantage, compared to other methods and procedures, lies in the ability to portray results of state forest institutions in the form of a comprehensive “profile”. This profile shows how state forest institution fulfills its tasks with respect to the forest sector goals and the goals of other forest-related sectors simultaneously.

To illustrate application of the 3L-Model we use profiles of state forest institutions from Serbia and Croatia measured by Stevanov and Krott (2013). These profiles are generated by judging performance of five institutions – Srbijašume, Vojvodinašume, Hrvatske šume and two forest directorates from Belgrade and Zagreb - against 8 criteria. Criteria, designed by linking policy and theory level, are measured by combining one to three indicators per criterion. Indicators are selected from the empirical level and different indicator sets are applied to evaluate performance of state forest institutions with management tasks (Srbijašume, Vojvodinašume and Hrvatske šume) and performance of forest authorities (two forest directorates). This is because state forest institutions are defined according to their tasks. From analyzed results we could evidence that the major focus of Srbijašume, Vojvodinašume and Hrvatske šume is on the marketable products, meaning wood assortments in the first place, by the selling of which each institution generates profit. Provision of non-marketable products and services remains at the very minimum, together with the institution’s political profile, especially when cross-sectoral issues are concerned. The two forest

Directorates neither from Belgrade and Zagreb neither show strong profile in cross-sectoral nor in sectoral issues. They exercise weak performance in all other aspects as well.

The main benefit of a 3L-Model lies in its ability to provide “orientation” about how to improve existing accounting system of the state forest institution in order to include both, the forest sector goals as well as forest-related goals of other sectors (e.g. non-marketable products from the above example). Despite its broad integrative approach the 3L-Model provides theory-based and empirical evidence based results, which are required as an orientation for developing sound accounting systems for state forest institutions further.

Key words: evaluation, forest institutions, accounting, forest policy

Utilization aspects of private forests in Western Serbia relevant to the legal framework, socioeconomic influences and property rights

Nenad Petrović¹, Vladimir Nikolić², Todor Rogelja³, Igor Golić¹

Serbia is according to the last National forest inventory (Banković et al. 2008) a medium forested country with forest coverage of 29,1%. State owned forests cover an area of 53%, while private forests are represented with 47%. Private forests are characterized by small property size, high fragmentation, and high numbers of owners, but these forests are very important, because they have significant potentials in production of wood and non-wood forests products, carbon storage, and biodiversity protection. Having on mind that process of migration from countryside to big cities is present during the last 20 years, as well as the process of restitution, which is still ongoing, new categories of forest owners emerged. Those are owners that live in big cities, and have their property at the rural area of the country. Utilization of private forests depends on several reasons, and some of them are property size, fragmentation of the property, main purpose of forest use etc. Aim of this paper is to present an overview of the main socioeconomic characteristics of private forests and their owners in the selected districts, as well as legal prescriptions related to the utilization of these forests. Research that has been done during the 2012, examined socioeconomic aspects and attitudes of private forest owners within Western part of Serbia, in the selected districts: Zlatiborski, Moravički and Kolubarski.

The main results of this research shows that forest owners are male in 82,4% of interviewees, while female forest owners are represented with less than 20% (17,6%). This can be explained by historical and cultural heritage of Serbia, where male are represented as inheritors, while female inherits the property usually in case when there is no male inheritors. This should be taken into consideration because when speaking on gender equality, in terms of equal rights and obligations, it is today considered as an important public goal in Western democracies, and Serbia committed itself in fulfilling its international obligations. (Lidestav, G. and Ekstrom, M., 2000).

Average age of interviewees was 59,2 years, where the oldest interviewee was 91 years old, while the youngest is in the age of 22. The greatest number of interviewees (25,8%) belongs to the group 51-60 years old. When observing the occupation of private forest owners within these districts more

¹ University of Belgrade – Faculty of Forestry, Kneza Višeslava 1, 11000 Belgrade, Serbia, nenadpet@tehnicom.net

² Institute for Nature Conservation of Serbia, Dr. Ivana Ribara 91, 11000 Belgrade, Serbia

³ Slovenia Forest Service, Večna pot 2, 1001 Ljubljana, Slovenia

than one third of them or 40,6% is dealing with agricultural production. Pensioners are with 31,8% represented as the second largest group of interviewees. Entrepreneurs, managers and students are represented with 5,4% in total, while public servants and physical workers are represented with 22,2%.

Concerning property size, the average was determined as 2,35 ha per owner. The biggest property size is 10 ha, while the smallest one is just 0,05 ha. Average number of parcels per owner is 2,98, and these properties are in 84,3% inherited, while only 4,8% of properties is bought by their owners. Almost 11% of properties is combined as inherited and bought, while only 0,2% of interviewees doesn't know the origin of their property. Concerning the future of these properties, 95,1% of owners will give properties to their children. Only 0,7% of them will sell their property, while 2,6% doesn't know what will be the future of their property.

When asked for the main purposes of their forest use (multiple answers was possible), 88,2% of them named firewood production for personal use as the main reason. 17,1% of interviewees use their forest for the production of saw logs for personal use, while 5,5% uses their forest for the production of saw logs and firewood (including charcoal) for further selling. Only 0,2% use their forests for nature conservation and tourism.

As the biggest problem in management of private forests within these districts is recognised missing or bad condition of forest roads which is mentioned in 62,1% of cases. Shortfall of appropriate equipment for the utilisation of private forest is recognised in 19,2% of cases. These two problems are directly connected with economic and financial situation of forest owners, because they don't have enough financial means to invest in new equipment, but use modified agricultural equipment. From the other side, entrepreneurs dealing with jobs in forestry have certain equipment for the utilisation of forests, but costs of their services are sometimes too expensive for owners. Complicated administration and shortfall of state subsidies for forest management are recognised as the main problems in 31,6% of cases.

Umbrella institution in charged for forestry sector in Serbia is Directorate for forests, as integral part of the Ministry for agriculture and environmental protection. State enterprises for forest management „Srbijašume“ and „Vojvodinašume“ provides technical support in management of private forests. When asked about institutional help in management of their forests, 37,3% of interviewees recognized forest extension service, as public body that should be in charged for this issue. 22,8% of them stated that themselves are competent for managing of their forests, and there is no need for institution that would deal with private forest management. State forest enterprises are recognized as the most suitable in 21,4% of cases, while

association of private forest owners are mentioned in 8,5%. Some of the interviewees recognize Faculty of forestry and Institute for forestry as possible institutions for help in management of their forests.

As the main legal prescription that burdens private forest owners in management of their forests is recognised issuing of cutting permit before felling, which is mentioned in 42,5% of cases. At the second place, with 38,3% is ranked an obligation of tree marking before felling, while paying a tax for felled wood is ranked as the third one with 24,8%. Issuing of permit for wood transport is represented with 20,8%. It is interesting to mention that 15,3 % of interviewees mentioned that there is no legal prescription that burdens them in their forest management.

Serbia is in the process of the EU accession and needs to harmonize national legislation with the EU and other international commitments. The legislation becomes more complex for the forestry sector, which is in close connection to the nature protection sector, having on mind that production in forestry demand long time period and needs to adjust itself to constant social, economic and environmental change. (Mitchell-Banks, P., 2006) During the 2010 new Law on forests was proclaimed, and this law brought certain changes in defining of rights and duties of private forest owners toward their forests. It defines two types of ownership and predicts some new features like private forest owners associations. New Law on forests kept some provisions from the old Law (Law on forests, 1991) concerning private forests, including tree and timber marking, issuing of delivery notes, and payment for cuttings. Law from 2010 predicts subsidies for private forest owners, developing of small and medium enterprises for providing of technical support in private forests, establishment of new bodies (e.g. Council for forests) etc.

Based on the presented results of the research it can be concluded that the main reasons for the utilisation of private forests are fuel wood and timber production for domestic use, as well as for sale. The biggest problems during the forest management and utilisation are recognized as missing of appropriate equipment for utilisation, bad condition or shortfall of forest roads and complicated administrative procedures for timber production, transport and trade. After defining the problems during the utilization of private forests, institutions that can provide professional help to private forest owners are recognized as Forest extension service, State enterprises for forest management and Directorate for forests. Legal preconditions that burdens private forest owners in utilisation of their forests are obligation of tree marking before felling, complicated administration and issuing of cutting permit. Definition of issues and problems concerning private forests management could provide a solid base for defining a platform on national level, for better management and utilisation of private forests.

Key words: Serbia, private forests, private forest owners, utilization

Are forest harvesting decisions in compliance with theory? Evidence from an economic experiment

Philipp Sauter¹, Oliver Mußhoff¹, Bernhard Möhring², Stefan Wilhelm²

Background and objectives

One of the most important decisions in forestry is to find the optimal time to harvest a stand. This decision is influenced by many parameters and is therefore highly complex. Forestry economic literature provides many approaches for optimizing this decision (cf. Newman, 2002). A milestone was the Faustmann (1849) formula that was applied by Pressler (1860) and Ohlin (1921) and is therefore referred to as the Faustmann-Pressler-Ohlin (FPO) theorem. Although the original approach is effective for profit maximization in the long run, there is some evidence for that it is hardly applied in forestry decision situations (cf. Moog and Borchert, 2001). A possible explanation may be found in partly unrealistic underlying assumptions, such as constant timber prices. Further approaches for optimizing forest harvesting decisions include fluctuating timber prices as well as further production risks. One of the main approaches in this field is the real options approach (ROA) (cf. Hildebrandt and Knoke, 2011). Thereby, irreversible decisions are analyzed in a dynamic-stochastic context (Dixit and Pindyck, 1994). The entrepreneurial flexibility regarding the time for harvesting is inherent in the problem. Due to its more realistic basic assumptions and its advantages in terms of flexibility, the ROA has been applied frequently in forestry economics. In comparison to the FPO theorem, the application of ROA leads to longer rotations and higher expected values of revenues from harvesting, especially in case of high volatility. However, beside the extensive research on the ROA, there still is a lack of knowledge to which extent ROA and other investment theories are actually applied in forest management and which socio-demographic and forest-enterprise-related parameters are influencing this decision-making process (cf. Manley and Niquidet, 2010). Understanding of the decision behavior of foresters is highly important for policy support and single enterprise decision support

¹ Department for Agricultural Economics and Rural Development, Georg-August-University of Goettingen, Platz der Goettinger Sieben 5, 37073 Goettingen, Germany, philipp.sauter@agr.uni-goettingen.de

² Department of Forest Economics and Forest Management, Georg-August-University of Goettingen, Büsgenweg 3, 37077 Goettingen, Germany

(Gong, 1998). Thus, the question arises to what extent FPO and ROA are in compliance with actual risky forest harvesting decisions.

Methodology

Therefore, we investigate foresters' decision-making behaviour under risk. Due to the lack of appropriate field data, we collect data by conducting an incentive-based economic experiment in Germany. With this experimental approach, the research question can be analyzed under controlled conditions. The experiment was conducted as an online experiment and comprises three parts in total. The first part involves an experiment which is designed in a forest harvesting framing and a neutral disinvestment framing. Thereby, participants have to decide on the preferred time to harvest/to disinvest. In the second part, we measure the participants' risk attitude by using a task in the multiple price list format according to Holt and Laury (HL, 2002). The third part is the survey for gathering specific socio-demographic and forest-enterprise-related data.

In order to control for compliance of participants' decisions with investment theories, FPO theorem and ROA serve as normative benchmarks. For incorporating the participants' individual risk attitude, we adjust the underlying risk-free interest rate in the benchmark calculations by using the results of the risk attitude measurement. To test for statistical uniformity of the optimal harvesting time according to the benchmarks and the observed harvesting time, we use the log rank test. In order to test which investment theory fits better to the observed behavior, we apply the McNemar test. For examining the influence of socio-demographic parameters and forest-enterprise-related parameters on deviations between observed behavior and investment theories, we apply a multinomial logit regression model.

Results and conclusions

As a result this article provides two core conclusions. First, we cannot verify that foresters strictly follow one of the regarded investment theories by using risk-adjusted interest rates. Mostly, participants harvested too late in comparison to both benchmarks. Since decisions are analyzed only regarding basic economic aspects, we can conclude that delayed harvesting is an inherent problem in the participants' decision making process. This implies that especially scarcity of land or / and capital is not sufficiently valued. Therefore, we suggest to pay more attention to them especially with respect to decisions support for forest companies. Although both investment theories are not strictly followed by participating foresters, the observed behaviour is rather in compliance with the ROA than with the FPO theorem. We can

conclude that to some extent foresters value the option to wait, which should be taken into account for policy support as well as decision support.

Second, education and the type of forest ownership lead to significant deviations of observed decisions in comparison to ROA. Participants holding a university degree are less likely to harvest too early, why forest enterprises should put focus on education in their human resource management. For policy support, the importance of education should be acknowledged.

Keywords: forest harvesting decision, real options approach, Faustmann-Pressler-Ohlin theorem, risk attitude, economical experiment, policy support, single enterprise decision support

Literature

Dixit, A. K., Pindyck, R. S., 1994. Investment under uncertainty. Princeton University Press, Princeton, New Jersey, USA.

Faustmann, M., 1849. Berechnung des Werthes, welchen Waldboden, sowie noch nicht haubare Holzbestände für die Waldwirthschaft besitzen. In: Allg. Forst- und Jagd-Zeitung, S. 441–455.

Gong, P., 1998. Risk Preferences and Adaptive Harvest Policies for Even-Aged Stand Management. *Forest Science* 44 (4), 496-506.

Hildebrandt, P., Knoke, T., 2011. Investment decisions under uncertainty-A methodological review on forest science studies. *Forest Policy and Economics* 13 (1), 1-15.

Holt, C. A., Laury, S. K., 2002. Risk aversion and incentive effects. *American Economic Review* 92 (5), 1644-1655.

Manley, B., Niquidet, K., 2010. What is the relevance of option pricing for forest valuation in New Zealand? *Forest Policy and Economics* 12 (4), 299-307.

Moog, M., Borchert, H., 2001. Increasing rotation periods during a time of decreasing profitability of forestry - a paradox? *Forest Policy and Economics* 2 (2), 101-116.

Newman, D. H., 2002. Forestry's golden rule and the development of the optimal forestrotation literature. *Journal of Forest Economics* 8 (1), 5-27.

Ohlin, B. G., 1921. Till frågan om skogarnas omloppstid. *Ekonomisk Tidskrift* 22. Reprinted as Ohlin, B. G., 1995. Concerning the question of the rotation period in forestry. *Journal of Forest Economics* 1 (1), 89-114.

Pressler, M. R., 1860. Zur Verständigung über den Reinertragswaldbau und dessen Betriebsideal. *Allgemeine Forst- und Jagd-Zeitung* 1860, 39-55 and 173-191.

What characteristics affect nonindustrial private forest (NIPF) landowner attitudes towards climate change and forest carbon sequestration in the United States South?

Puskar Khanal¹ and Donald L. Grebner²

There are several potential strategies for mitigating climate change. One low cost strategy is to sequester carbon in forest vegetation for extended periods of time. This can be an efficient and effective method for mitigating climate change while supporting sustainable forest management. Climate change mitigation activities are important and may assist nonindustrial private forest (NIPF) landowners in the southern United States because they own more than 70% of the forestland in this region. More importantly these landowners have widely different reasons for owning forestland, and they can often be segmented into groups such as timber owners, multi-objective owners and non-timber owners. Few studies have analyzed climate change and carbon sequestration attitudes with regards to small private forest landowners in the southern United States. The purpose of this study is to identify and segment climate change and carbon sequestration attitudes of the southern nonindustrial private forest (NIPF) landowners into relatively homogeneous groups. The specific goals are to group NIPF landowners into appropriate attitude clusters, analyze their climate change risk perception and identify their preferred communication strategies for getting climate change information.

During the fall of 2013, a mail survey was conducted to collect data about NIPF landowner attitudes. The survey included randomly selected 5,000 NIPF landowners with forest property located in the southern United States. Each landowner response on the series of 11 climate change and carbon sequestration attitude statements was received on a 5-point likert scale rating that spanned from strongly disagree to strongly agree. This study used a K-means cluster analysis on the series of attitude statements taken directly from the survey instrument.

The cluster analysis results show that southern NIPF landowners could be segmented into three groups (supportive, skeptical, and undecided) based on their attitudes toward climate change and forest carbon sequestration. The proportion of landowners who are supportive, skeptical, and undecided

¹ Graduate Research Assistant, Department of Forestry, Mississippi State University, Mississippi State, MS, USA.

² Professor, Department of Forestry, Mississippi State University, Mississippi State, MS, USA, don.grebner@msstate.edu

attitude segments were 33%, 27%, and 40%, respectively. The majority of forest landowners in the southern US are not sure about climate change and forest carbon sequestration. The landowners among different attitude segments differed significantly in terms of their forest acres, income, education, availability of forest management plan and plan to harvest forest in next 5 years. In addition, higher proportion of landowners in supportive cluster than those in other attitude clusters expected that future timber yield will increase or decrease by more than 5% due to climate change. The respondents' five major sources for forestry information were state government agencies, forestry consultants, university extension services, friends and relatives, and USDA Forest Service.

Higher proportions of landowner are undecided about climate change and carbon sequestration implies the need of more education and outreach activities related to these topics in this region. The landowners with positive attitude would be more recipient audience group to climate change mitigation and adaptation activities in this region since higher proportion of these landowners believe that their forestry investment is vulnerable due to climate change. With the provision of an appropriate incentive mechanism to manage their forest for carbon storage, a higher proportion of landowners in positive attitude group could be expected to participate in climate change mitigation activities. Besides that majority of landowners are unsure about future impacts of climate change on their forest so the agencies involved in education and outreach activities need to focus on providing information describing local impacts of climate change to make it more plausible to the landowners.

Keywords: Climate change attitudes, non-industrial forest landowners, cluster analysis, southern United States

The role of forest certification systems in the EUTR

Roman Dudík¹, Luděk Šišák¹, Zhadra Zhorabekova²

The paper outlines possible application of FSC and PEFC forest certification systems in placing timber and timber products on the EU market (EUTR). Particularly, our attention is focused on the analysis of the EUTR legislation requirements, related to operators.

First and foremost, we have to define whether the natural person or organization is an operator, trader or a subject unbound by the requirements of the Timber Regulation (Regulation (EU) No 995/2010). In case the natural person or organization identifies themselves as operators, they are liable for the following:

1. It is prohibited to place illegally harvested timber and products derived from such timber on the EU market for the first time;
2. It requires EU traders who place timber products on the EU market for the first time to exercise due diligence system (a set of processes and measurements stated in Article 6).
3. Keep and regularly evaluate their own due diligence system, unless the operator applies the due diligence system introduced by a monitoring organization (see Article 8 of the Timber Regulation).

The core of the due diligence notion is that operators undertake a risk management exercise so as to minimise the risk of placing illegally harvested timber, or timber products containing illegally harvested timber, on the EU market. The three key elements of the due diligence system are:

1. Information: The operator must have access to information describing the timber and timber products.
2. Risk assessment.
3. Risk mitigation.

Requirements of forestry certification systems are analysed, in relation to the certified organizations and to the EUTR generally. The comparison of the

¹ Department of Forestry Economics and Management, Faculty of Forestry and Wood Sciences, Czech University of Life Sciences Prague, Prague, Czech Republic ro.dudik@gmail.com

² Department of Forest Resources and Game Management, Kazakh National Agrarian University Almaty, Kazakhstan

surveyed requirements clarifies the role of forest certification systems in the EUTR.

Discussions on EUTR issues in the Czech Republic have been marked by two myths lately. First, people often erroneously suppose an operator can keep to current records (records of forestry output, among others) and that would sufficiently meet the requirements of the Timber Regulation and due diligence system. The first misconception was dispelled (explained) in the paragraphs above. The other misconception is based on a presumption that an operator might as well get by with a certified FSC or PEFC system to meet and that would comply with the Timber Regulation.

First, it is worth highlighting that the Commission Implementing Regulation (EU) No 607/2012 sets basic terms of use of certification in risk assessment and mitigation. When a forest certification system meets the requirements, it can be used in the framework of EUTR. Besides, forest certification systems in the context of the Czech Republic constitute an independent and separate certification:

- Sustainable Forest Management (SFM) and
- Chain-of-Custody of Forest Based Product (C-o-C).

Forest certification systems applied in the Czech Republic:

- FCS – Forest Stewardship Council
- PEFC – Programme for the Endorsement of Forest Certification

In the framework of both systems, SFM and C-o-C are separately certified. On the face of it, it is misleading to presume: “When you have PEFC, you meet the demands of the Regulation”, at the very least. The misleading conception was forged in the following context: In 2013, the PEFC International revised its international standard for C-o-C, and consequently, the Czech Republic revised its technical document setting the requirements for C-o-C. A revised C-o-C document TD CFCS 2002:2013 resulted. This technical document contains – apart of standard demands for C-o-C – also minimum requirements for the due diligence system. Actually, if operators apply C-o-C system together with the TD CFCS 2002:2013, they will also, in principle, meet the due diligence system requirements. Nevertheless, operators should take on the responsibility to create a due diligence system customized for their particular circumstances. TD CFCS 2002:2013 standard formulates concrete requirements in defined frameworks, i.e. not the particular circumstances of a particular operator; therefore, it is important to apply a due diligence system in accordance with EUTR European

regulations. The above mentioned standard, however, presents a good concept of how the due diligence system might look like.

EUTR Implementation Rules complements the situation: *“Certification of the supply chain can be used as a proof that no non-certified or non-controlled timber enters the supply chain. Generally, it is desirable that only licensed timber enters the supply chain ‘at critical check points’ and that the timber is traceable to its previous owner (who must also be certified), not only to the forest it was harvested in. A supply-chain-certified product might contain a mix of certified and other licensed materials from various sources. If the certification of the supply chain is used as a proof of legitimate origin, the operator should ensure that all the material is licensed, certified, and its monitoring processes sufficient to eliminate other than the licensed material.”*

The citation applies to C-o-C certification of any forest certification system. It is obvious – in relation to the explanation above – that it might be cost ineffective for some operators to create an appropriate due diligence system by TD CFCS 2002:2013 – especially in case of our smaller subjects who apply an easy and unambiguous identification of their timber sources. Major subjects with varied sources of timber entering the market might find the creation of a due diligence system (by TD CFCS 2002:2013 standards) a possible way to comply with the Timber Regulation.

For the sake of completeness, we have to mention the circumstances of SFM certification. The Commission Implementing Regulation (EU) No 607/2012 obliges *“a third party to carry out an appropriate monitoring regularly, at least once a year, including on-site checks”*; therefore, the SFM certification does not meet the criterion, as every subject in the group certification usually fails to be checked upon annually. This also applies in the Czech Republic – to use SFM certification in the framework of EUTR, the operator must be audited annually by a third party (certifying body).

Generally, it can be said, that SFM certification cannot substitute the due diligence system in case of operators who place timber and timber products on the EU market. The certification can, though, simplify the implementation and maintenance of the due diligence system. The SFM certification is based on an evidential monitoring and evaluation of keeping the forest management requirements. Timber harvested in certified forests can therefore be branded as legitimate. It ensures the origin is not a problematic issue.

Keywords: PEFC, FSC, EU Timber Regulation, operator, due diligence system

Opportunities and challenges for forestry investments in Federation of Bosnia-Herzegovina

Sabina Delić¹, Dženan Bećirović,¹ Mersudin Avdibegović¹, Senka Mutabadžija¹, Bruno Marić¹

The Ministry of agriculture, water management and forestry is responsible for forest management in the Federation of Bosnia-Herzegovina (FB-H). The Law on forest of the FB-H was proclaimed as unconstitutional and forest management was transferred to the cantonal administrative level. At this administrative level, in each of ten Cantons in the FB-H, cantonal Laws on forest were adopted. By this, in almost all cases, the FB-H as owner of public forests was excluded from forest management. Consequences of these regulatory changes are reflected in continuous reduction of funds dedicated to the biological works (e.g. regeneration of forests, forest protection etc.). Regulatory framework in forest sector prescribes the modes and funds sources for biological investments. The main sources of funds are the payments of forest public companies that were prescribed by Law on forests. The amount of these funds is directly connected to the total revenues of public forest company. Other important sources for biological investments are in relation to the funds that are paid by all legal entities registered at the territory of the FB-H as compensation for public-benefit forest functions. These funds could be considered as compensation for forest ecosystem services and represent important part of public (budget) revenues in the forest sector. Beside abovementioned funds, the budget revenues in forest sector are constituted from funds dedicated to the extended biological reproduction of forests that are paid by forest public companies, compensations for deforestation, compensations for restriction in forest management, funds for biological reproduction and professional works in private forests, as well as funds from selling of public forests. Collected funds could be used for forest protection and improvement of forest conditions, enhance of ecological functions of forests, forest planning and management, as well as improvement of economical functions of forests. Furthermore, the regulatory framework prescribes modalities for funds distribution among different administrative levels (FB-H and Cantons) that have significant influence on amount of biological investments in forestry.

Overall objective of this research is to analyze modalities, dynamics and structure of budget revenues in forestry and influence of changes in

¹University of Sarajevo, Faculty of Forestry, Zagrebačka 20. Sarajevo, Bosnia-Herzegovina, sabinadelic@yahoo.com

legislative framework (2008 – 2013) to the designated spending of these funds. In the period 2008 to 2013 legislative framework in forestry of the FB-H had passed through significant and dynamic changes that are resulted with three different legal solutions for forest sector in the FB-H: Law on forest, Regulation of forest and adoption of Laws on forest at the cantonal administrative level.

Results of this research are based on comparative analysis of biological investments in forestry at different administrative levels (FB-H and Una-Sana Canton - USC) in the period from 2008 to 2013. Main finding indicates that level of investments in forestry has been continuously decreased. The level of investment in 2013 was diminished by 37% at the FB-H level and 72% at USC level compared to the 2008. Apparently drastic decrease of investments in simple biological reproduction was a consequence of proclamation of Law on forests from 2002 as unconstitutional that terminated obligation of public forest companies to allocate funds for this purpose. Consequently, in 2013 at the USC administrative level only 2,3% of total revenues of the public forest company was allocated to the biological investments, which is 4,5 times less compared to the period when the Law on forests was valid, while investments in extended biological reproduction completely missed. Unbalanced ratio between revenues of public forest companies and funds that are allocated to the biological investments could lead to the disturbance of sustainable reproduction of forests.

Budget revenues in forestry had declining trend at both administrative levels. In analysed period (2008 – 2013) total budget revenues in forestry were 60% lower at FB-H level and 22% lower at USC level comparing 2008 to 2013. The structure of budget revenues in forestry reveals that most of the collected funds are related to the compensation for public-benefit forest functions or forest ecosystem services (77% at the FB-H level and 60% at USC level). The spending of collected funds were directed toward financial support to the guardian service at the USC administrative level, while at the FB-H administrative level just 36% of collected funds had been dedicated biological investment in forestry.

Having in mind financing and fundraising in forest sector of the FB-H, main conclusions of this research indicates that analysed period (2008 – 2013) is characterised with three different forest legislation proposals. Those proposals are completely different when it comes to the regulation of investments in forestry, while changes in legislative framework of forest sector resulted with decrease in scope of work and level of investments in biological reproduction. Furthermore, absence of Law on forests at FB-H administrative level resulted with exclusion of owner (FB-H) from decision making process as well as financial flows in forestry. This arise strong needs for forest legislation improvement in part of fundraising and investments.

The analysis pointed out that there were no investments from special accounts at cantonal level in observed period, while some investments were made from special account at FB-H administrative level in the period when Law on forests was valid. Following, this was a period when public forest companies invested the most.

Fundraising based on compensation for forest utilisation, as well as instruments for control of calculation and payment instruments were under strong influence of forest legislation. According to the Law on forest at Cantonal level, the funds based on compensation for forest utilisation are directly allocated to accounts of municipalities, without any possibilities for solid control of their use. Taking into consideration abovementioned facts as well as absence of obligation for public forest companies to invest in biological reproduction, it is expected that negative implementation trend regarding regeneration works will continue.

In order to establish and enforce institutional competences regarding forest management it is essential to adopt Law on forests which will enable implementation of public interests and sustainable management in forest sector of the FB-H. For effective forest management it is important to take into account interests at all administrative levels including those of municipalities that have rights to gain financial support from forests on their territory and to enable an appropriate control system for funds expenditures.

Keywords: budget revenues, investments in biological reproduction, payment for ecosystem services, legislative framework, Federation of B-H, Una-Sana Canton

References:

- Delić, S., Vuletić, D., Zadnik Stirn, L., Avdibegović, M., Bećirović, Dž., Mutabdžija, S., Marić B., Pezdevšek Malovrh, Š. (2013): Models of Financing Forest Ecosystem Services in the Federation of Bosnia and Herzegovina, Croatia and Slovenia, Proceedings of International Symposium Socio-economic Analyses of Sustainable Forest Management, Czech Republic Prague 15th-17th of May 2013
- Delić, S., Pružan, E., Pozderac, M. (2011): Financing of multifunctional forestry, Final report, www.fmpvs.gov.ba/texts/239_376_h.pdf
- Law on Forests of Una-Sana Canton, Official Gazette of Una-Sana Canton, 1/04 and 11/04
- Law on Forests, Official Gazette F B-H 23/02

- The information on forest management in the Federation of Bosnia-Herzegovina for 2013 with plans for 2014 (2014), Federal Ministry of Agriculture, Water management and Forestry, www.fmpvs.gov.ba
- Report on the work of forest company “Unsko-sanske šume” for period 2008-2013

Cross-sectoral perception of financing and economic instruments of forest governance in the Federation of Bosnia-Herzegovina

Senka Mutabdžija Bećirović¹, Mersudin Avdibegović¹, Dženan Bećirović¹, Bruno Marić¹, Sabina Delić¹, Dragan Čomić² and Špela Pezdevšek Malovrh³

For proper regulation of policy, legal, institutional and regulatory framework of any sector, issues of financing and economic instruments are indispensable. That is the reason why fifth forest governance component (Financial incentives and economic instruments for sustainable forest management and assurance of equitable benefit sharing) represents the last component of the first pillar (Policy, legal, institutional and regulatory framework) of the Framework for assessing and monitoring forest governance (FAO and PROFOR, 2011). The content of this component had been a subject of serious debates on previous initiatives for formulation of forest governance components/principles. It is so since economic and financial results of implementation of the forest governance concept heavily depends upon general economic policy, especially in segment of assuring different subsidies that should, together with other instruments of economic policy, be in concordance with general and specific goals of forest sector (Mutabdžija, 2012). Within the Framework for assessing and monitoring forest governance (hereinafter FAMFG), this component is focused on the analysis of the existence of legal provisions and mechanisms for equitable sharing of forest revenue, equity in distribution of access to forest resources, rights and rents (FAO and PROFOR, 2011). Onward, component is focused on the existence of economic incentives and policies to promote increased value-addition and sustainable utilization of timber and non-timber forest products as well as the existence of incentives for sustainable management of forests and measures to correct inappropriate subsidies and distortions in forest products prices (FAO and PROFOR, 2011). Openness and competitiveness of procedures, such as auctions, for allocation of forest resources are also in the focus of this component (FAO and PROFOR, 2011). This component try to investigate mechanisms for the internalization of social and environmental externalities from forest resource use, including payments for forest-derived environmental services as well as the existence

¹ University of Sarajevo, Faculty of Forestry, Zagrebačka 20 71000 Sarajevo, Bosnia and Herzegovina, e-mail: senka.mutabdžija@gmail.com

² University of Banja Luka, Faculty of Forestry, Bulevar Vojvode Stepe Stepanovića 75a 78000 Banja Luka, Bosnia and Herzegovina

³ Biotechnical Faculty, University of Ljubljana, Večni pot 83, 1000 Ljubljana, Slovenia

and adequacy of safeguards against social and environmental harm from forest-related policies and activities (FAO and PROFOR, 2011).

The goal of this paper is to investigate possible differences in cross-sectoral perception of importance and current implementation of this component within the forest sector of the Federation of Bosnia-Herzegovina (hereinafter FB-H). Results presented in this paper are one of the results of the research on cross-sectoral perception of forest governance concept in the FB-H conducted as a part of the GovoR project (The adaptation of national forest policy systems in South-East European countries (Bosnia-Herzegovina, Croatia, Macedonia and Serbia) to new modes of international forest governance). For the purpose of this research, questionnaire on assessing the perception of importance and current implementation of forest governance components developed within FAMFG (FAO and PROFOR, 2011) by representatives of forest, wood-processing and nature protection sectors of the FB-H had been developed. The research had been conducted on statistically relevant samples of representatives from three sectors in period January-May 2012. The assessment of possible cross-sectoral differences in perception of forest governance components implies implementation of three-steps statistical analysis as follows: frequency analysis of the rates given for the importance and implementation of the forest governance components; binary logistic regression (Enter algorithm) in order to assess the influence of specific socio-demographic characteristics on the respondents rates of components importance and implementation; Kruskal-Wallis and Mann-Whitney U test (as an appropriate post-hoc test) for assessing the statistically significant differences between three sectors in terms of differences between rates for importance and implementation of forest governance components. For purpose of conducting abovementioned steps in statistical analysis, results of the assessment of each of the 13 forest governance components of the FAMFG implied presentation of sectoral rates for both importance and implementation of forest governance components, average sectoral rates of importance and implementation of all components and average differences of sectoral rates for importance and implementation of forest governance components.

As concerns rates for component's implementation, results revealed that 94% of the respondents from forest and nature protection sectors and 80% of the respondents from the wood-processing sector rated the importance of this component with the highest rates ("important" and "very important"). On contrary, 70% of the respondents from forest, 59% of the respondents from wood-processing and 79% of the respondents from nature protection sector rated the implementation of this component as "unimplemented" and "slightly implemented". Furthermore, 17% of the respondents from wood-processing sector stated that they are not familiar with the implementation of

this component. This can be explained by the fact that financial issues are specificity of each sector (in this case forest sector) meaning that representatives of other sectors do not need to know details about such issues. Yet, such result could be perceived as an indicator of shortages in transparent and purposeful allocation of the funds. Average rates for component's importance are equal for all three sectors while average rates for its implementation are slightly different. This caused smaller sectoral differences in the average differences between component's importance and implementation (5.5 in case of forest sector, 5.9 in case of wood processing sector and 5.7 in case of nature protection sector). Still, despite of these differences, all of the average differences are higher than 5. This leads to the conclusion that representatives of analysed sectors perceived implementation of this component as insufficient. Onward, results of the non-parametric tests (Kruskal-Wallis and Mann-Whitney U test) had proved the absence of statistically significant difference between average differences of the rates for component's importance and implementation. Furthermore, results of logistic regressions had not showed that any socio-demographic characteristics significantly influenced the ratings of component's importance and current implementation. Such results lead to the conclusion that implementation of this component were similarly criticised by the representatives of all three sectors.

Furthermore, according to the Article 60 of the Law on Forests of the FB-H from 2002, all legal entities registered at the territory of the FB-H except cantonal forest enterprises were obliged to pay the compensation for usage of forest ecosystem services in the amount of 0.1% of their income (Delić et al 2013). These funds were intended for afforestation, road infrastructure and maintenance, research projects, nature protection etc. Efficiency of collecting these funds, their transparent and purposeful allocation and expenditure are subject of constant debate in forest sector of the FB-H. Evidence for such claim could be found in the answers of the sectors' representatives together with the estimations that in the year 2008 only 40% of these funds were actually collected (Delić et al 2013). Certain changes regarding financing could be recognized both in case of the FB-H as well as in the case of some neighbouring countries. Forest Regulation of the FB-H (Official Gazette of the FB-H No.83/09) prescribed that 7% of the total timber-sales income calculated from the prices of the tree at the stump should be devoted as a fee for forest usage (Delić et al 2013). Out of these 7%, 5% is intended for the local-community development, 1% for the budget of the FB-H and 1% for the cantonal budget (Delić et al 2013). Furthermore, this Regulation prescribes decreased value of fee for the forest ecosystem services to the amount of 0.07% of the income (Delić et al 2013). Reduction of this fee was notified in Croatia as well (from the 0.07% to the 0.0265% of the income) (Delić et al

2013). Partially, this decision was based on the frequent criticism of the financial model that general public considered as a pure political decision.

Perception of the component's importance and implementation together with abovementioned trends leave place for various speculations regarding future changes in financing of the forest sector in the FB-H. Taking into consideration that distribution of these funds were one of the causes for repealing the Law on Forests of the FB-H from 2002, turbulent and dynamic future scenarios regarding financing of the forest sector in the FB-H should be expected.

Key words: cross-sectoral perception, forest governance, economic instruments, financial incentives, the FB-H.

References:

- Mutabdžija, S. 2012. Defining the set of forest governance principles in forestry sector of the Federation of Bosnia-Herzegovina. Master thesis, Faculty of Forestry of the University of Sarajevo.
- FAO and PROFOR, 2011: Framework for Assessing and Monitoring Forest Governance, Rome.
- Mutabdžija, S. 2013: Cross-sectoral perception of forest governance concept in the Federation of Bosnia-Herzegovina, Master thesis, Faculty of Forestry of the University of Sarajevo.
- Delić S., Vuletić D., Zadnik Stirn L., Avdibegović M., Bećirović Dž., Mutabdžija S., Marić B., Pezdevšek Malovrh Š. 2013: Models of Financing Forest Ecosystem Services in the Federation of Bosnia and Herzegovina, Croatia and Slovenia, Proceedings of International Symposium Socio-economic Analyses of Sustainable Forest Management, Czech Republic Prague 15th-17th of May 2013.

Croatian forestry production as potential for wood industry growth

Stjepan Posavec¹, Darko Motik¹, Karlo Beljan¹, Andreja Pirc Barčić¹, Aida Kopljar²

Most of the valuable forest resources are owned by the State and managed by Croatian Forests Company who practices a form of management that is ‘close to nature’. They are also for the most part selectively felled rather than clear cut which helps to maintain the forest stands in optimal condition and provides continuous cover over large areas.

The industrial wood processing in Croatia has significant comparative advantages. The availability and accessibility of quality raw material, particularly quality oak and beech wood, as a century old tradition in the industrial wood processing, are usually considered as the main comparative advantages of this sector. Thanks to these practices, all state forests are accredited with the prestigious Forest Stewardship Council’s certificate (FSC) which enables Croatia to sell its wood on the international market as a product coming from a sustainable source.

Recognized as an important subject in the value added chain of Croatian economy development success, wood industry sector was included as a one of very important drivers in Croatian Industrial Strategy. In recent years market of wood and wood-based products on the global and European level, and also in Croatia has been going through turbulent times. With regards to the economic problems, a decline in consumption of wood product was expected.

In the days of crisis, when the purchasing power of population decline, products such as wood products are not high on the priority list of products. Croatian wood manufacturing companies are export-oriented, so the wood industry has a significant share in the total export activities of the Croatian industry. In 2013 the total production of Croatian wood industry amounted cca. 726 million EUR, representing about 3,5% of total manufacturing industry of the country. The total employment of the wood industry sector (C 16 and C 31) in 2013 was about 16 500 people, which presents around 6% of total number of employees in the Croatian manufacturing industry. In comparison to 2009 the number of employees in 2013 decreased around 8%. Also, wood industry companies in 2013. generated about 3% lower total income in comparison to 2009. On the other hand, in 2014 export share of

¹ Faculty of Forestry, University of Zagreb, Svetošimunska 25, 10 000 Zagreb, Croatia, sposavec@sumfak.hr

² Ministry of Agriculture, Wood Industry Department, Planinska 2, 10 000 Zagreb, Croatia

wood industry in total export of Croatia was about 10%, which presents a significant increase compared to 7% in 2009.

Wood processing and furniture production of the Republic of Croatia developed on a highly valuable forest raw material, and their work is based on its exploitation, long tradition of wood processing and quality human resources. Therefore, this activity is an important segment of Croatia's economy. New trends in furniture design and production will cause changes in the demand of certain wood species. Due to predetermined management regulations, conditioned by biological characteristics, forestry companies are unable to give a timely response to the demands of certain trends.

According to the FRA 2011, linkages between the forest industry and the energy, chemicals and food sectors are becoming more evident, while policies that drive renewable energy, climate change mitigation and food security all influence the forest industry, both directly and indirectly. In the economy of the Republic of Croatia, the significance and role of forestry, wood processing, furniture production, paper production and processing, wood and wood products trade is insufficiently highlighted only with data on their quantitative share. The connection and mutual dependence, especially with chemical industry, metal processing, production of tools and machines for wood processing, as well as transport on the entry side, and construction, trade, science, infrastructural institutions, investment and personal spending as well as export on the exit side show this economic activity is an important factor of the economic development of the Republic of Croatia.

The aim of this paper is to analyze forest sector raw material potential and its possibilities for wood industry growth in Croatia.

Key words: forestry, wood industry, policy, production, growth

Cross-sectoral perceptions of the operational environment of forest bioenergy production and use in Slovenia

Špela Pezdevšek Malovrh¹, Vasja Leban¹, Lidija Zadnik Stirn¹, Janez Krč¹

Introduction

Renewable energy policies in the European Union (EU) have developed gradually since the 1990s, with the EU Renewable Energy Directive 2009/28/EC, hereafter EU-RED (2009/28/EC, 2009), as an important cornerstone which set a 20% renewable energy target at the EU level for the year 2020. The EU-RED also set mandatory targets for all member states. So the national target share in Slovenia is 25%. Parallel to EU-RED, Slovenia has developed and implemented their own means; National Renewable Energy Action Plan (NREAP), to reach renewable energy targets (Commission, 2010). NREAP specifies various policy instruments for renewable energy. It includes regulative (e.g. aiming to remove legal constraints to wood mobilization), economic (e.g. fiscal measures to help stimulate increased wood mobilization and mechanisms for financing, markets and marketing) and informative (e.g. information sharing for forest owners) instruments which emphasize both the supply (i.e. factors that improve the provision of bioenergy from forests) and demand (i.e. factors that increase the use of forest bioenergy) side of bioenergy provision and use (Hillring, 1998; Jacobsson et al., 2009; Mantau et al., 2010).

The possibilities to increase the use of forest bioenergy are affected by various factors (e.g. technical, environmental, economic, political and social) (Mantau et al., 2010; Pelkonen et al., 2014; Verkerk et al., 2011) and depend on country specific conditions. For example, in Slovenia a considerable part of the available biomass is located in very small, privately owned forests, which makes the mobilization of these resources more challenging. In addition to ownership structure, forest use traditions, soil productivity, the structure and capacity of the forest industry, available forest management models and public perceptions are factors that shape the country strategies (Mantau et al., 2010). For this reason, knowing the current state and the expected development of the operational environment in the whole EU and in individual countries is crucial. One traditional and commonly used tool to assess operational environments is SWOT analysis, which enables a systematic examination of an organization's internal (own strengths and

¹ Biotechnical Faculty, Department of Forestry and Renewable Forest Resources, Večna pot 83, 1000 Ljubljana, Slovenia, spela.pezdevsek.malovrh@bf.uni-lj.si

weaknesses) and external (opportunities and threats external to organization) operational environments (Lussier, 2006). The major objective of this paper was to present three-phase decision making framework for analysing the operational environment, which integrates SWOT analysis and Simple Multi-Attribute Rating Technique (SMART) and enables inclusion of different stakeholders in decision making process. Therefore, SWOT factors affecting the operational environment related to country strategies on forest bioenergy provision in Slovenia were firstly identified. Secondly, we defined the importance of the SWOT factors and underlying SWOT categories and groups in order to identify needs for related and relevant forest policy and management changes. The results of this research could be used by policy makers to overcome existing obstacles for future development towards the more flexible EU 2030 targets for the production and use of forest bioenergy. Furthermore, it may help policy decision-makers to proactively shape policy instruments so that the future operational environment is ready for increased forest bioenergy targets.

Materials and methods

Stakeholder interviews carried out in 2013 and described in more detail in Peters et al. (2015) were utilized to identify the potential effects of increased bioenergy use on other forest uses and functions. From those interviews the most frequently expressed positions of stakeholders were identified and modified to SWOT factors under four pre-determined categories associated with each of the SWOT groups. Afterwards, the stakeholders from ecology (n=2), economy (n=2), policy (n=1), practitioner (n=2) and science (n=2) group, who are experienced with respect to bioenergy, were asked to consider the bioenergy production and use targets of the country strategy from the perspective of the following four categories: a) Forest Characteristics and Management – FM (factors affecting the potential use of forest biomass for energy), b) Policy Framework – PF (political drivers, policy making environment etc.), c) Science and Technology – S&T (scientific knowledge and results and technological development affecting the use of forest biomass for energy) and d) Consumers and Society – C&S (consumer behaviour and societal aspects affecting the country strategy).

In addition to the Business-as-Usual scenario (BAU), the importance of the identified factors was evaluated in two other future scenarios - Increase (INC) and Decrease (DEC). However, the results of DEC are not reported in this study because the EU 2020 targets (2009/28/EC, 2009) and the recently created Bioeconomy Strategy for Europe (2012) make this scenario less probable. The scenario descriptions were adopted from the European Forest Sector Outlook Study II (EFSOS II) (UN, 2011). In BAU the assumption was

that energy use would reach the targets set for 2020 and stay at that level until 2030. In INC it was assumed that forest bioenergy use would increase significantly by 2030.

The weighting of the SWOT groups, factors and categories was conducted using the Simple Multi-Attribute Rating Technique (SMART method) (Edwards and Barron, 1994; Kangas et al., 2008). The SMART method is a simple and practical tool to evaluate and rank alternatives.

Results and conclusions

Only minor differences between SWOT group weights between BAU and INC were observed by stakeholders (Figure 1). This may imply that Slovenia already has a rather adjusted operational environment that is capable of coping with an increase in forest bioenergy provision and use, or alternatively that the stakeholders were for some reason unable to foresee that their country should take a different perspective of the operational environment in INC.

In both scenarios strengths were estimated to be the most important. However, strengths and opportunities were both seen to be more important in INC than in BAU, while weaknesses and threats were considered to be more important in BAU.

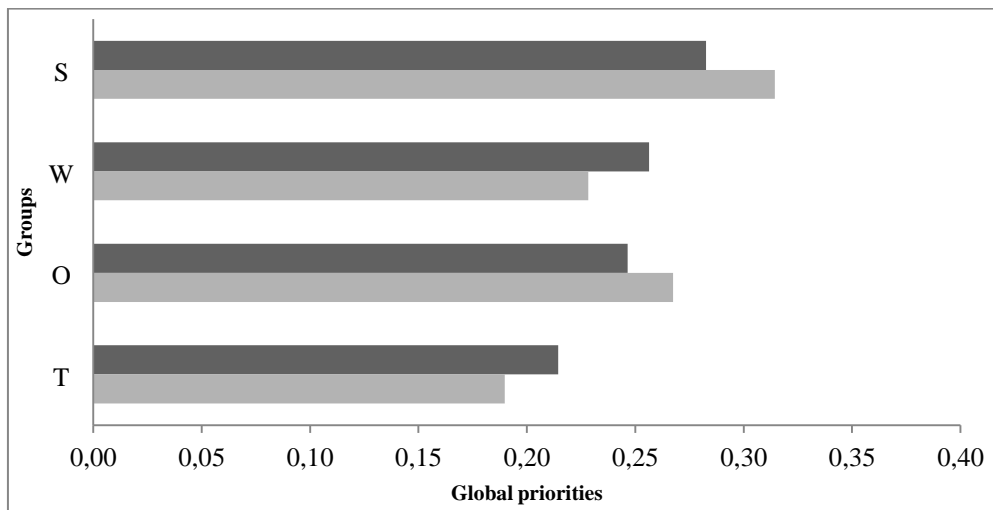


Figure 1: The importance of SWOT groups for BAU (the black horizontal bars) and INC (grey horizontal bars)

The Slovenian stakeholders weighted categories in different SWOT groups differently in BAU and INC (Figure 2). In *strengths* the focus is particularly on FM in both scenarios, as wood is the most important renewable energy

source in Slovenia. Due to the prevailing small-scale private ownership of forest (Pezdevšek Malovrh et al., 2010), the wood based potential is currently underutilized (the harvesting rate is below the potential and thinning operations in young stands are neglected). In BAU the absolutely highest weight was given to C&S, indicating the use of wood for energy is supported since wood in Slovenia is an important primary energy source in households (Triplat et al., 2013). In INC the importance of S&T is notably higher than in BAU. Scientific and technological know-how for the utilization of energy wood exist, what should contribute to more energy efficient utilization of bioenergy. Finally, the importance of PF in INC is higher than the importance of PF in BAU. The stakeholders indicated that a good political framework (e.g. National Forest Program and Forest Act) for forest management is available, which gives possibilities for achieving the required share of renewable energy sources in the final energy consumption in 2020 from domestic sources.

The most important weaknesses found by participants in both scenarios are the (operational) factors within the PF. Stakeholders agreed that the whole system of political measures does not adequately support biomass production, due to insufficient implementation of political measures (e.g. incentives and mechanisms for promoting the use of renewable energy sources). This clearly indicates that significant shortcomings in the political framework for energy wood production and utilization exist. This could be the reason for the high weight of PF in BAU. On the other hand, in INC the importance of FM and C&S are higher than in BAU. According to participants, the increased use of renewable energy sources from forests to achieve the targets might strengthen the pressure on forest ecosystems and biodiversity.

In *opportunities* the most important category in both scenarios was C&S, where innovative cooperation of private forest owners could increase the supply of forest bioenergy. Contrary to the weaknesses, in opportunities PF became notably more important in INC, which refers to the National Energy Action Plan (2010) in which measures to promote increased use of renewable energy sources (e.g. subsidies for district heating systems using wood biomass) have been defined. The weight of FM is lower in INC than in BAU. The opportunities in this category are related to the generation of new employment for private forest owners and doubts related to biodiversity and nutrient balance.

In *threats* the most important category in both scenarios was FM. Increased biomass use is important for Slovenia to improve the reliability and competitiveness of its energy supply. But due to insufficient exploitation of natural resources, stakeholders perceive the import of wood for energy purposes from countries such as Croatia and Bosnia and Herzegovina as a major threat (Avdibegović and Pezdevšek Malovrh, 2014). In INC the

importance of PF decreased, which is related to development changes that the Slovenian energy sector is facing, including energy prices and the competitiveness of biomass. Therefore, uncertainty in future policy exists although the NREAP (2010) predicts excise policy to ensure that biomass and biofuel prices are competitive.

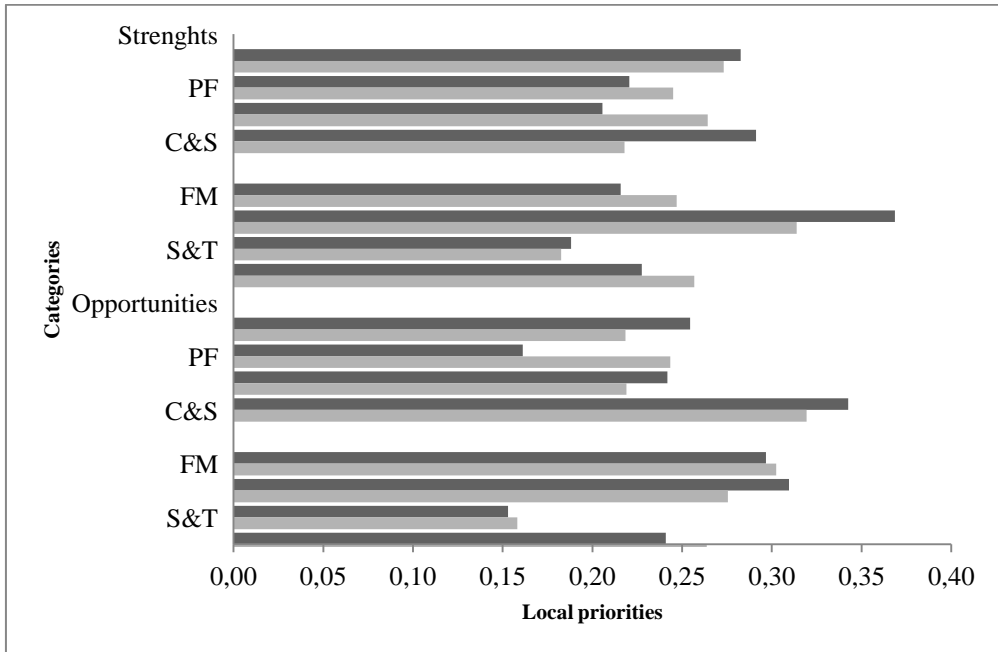


Figure 2: The local weights of categories included in the SWOT analyses for BAU (black horizontal bar) and INC (grey horizontal bars)

From the analysis it can be concluded that the stakeholders identified either PF or FM as the most important categories. Therefore, it can be inferred that in order to prepare and respond to the set targets and anticipated changes, carefully designed policy innovations may be needed for promoting forest biomass based bioenergy development. To be able to implement the current country strategy, one should firstly solve and agree on complex trade-offs not only in relation to other forest functions but also between different policies (Stupak et al., 2007). Secondly, one should identify and refine policy measures that may influence wood availability and demand (e.g. providing support for forest owners and silvicultural measures, implement favourable fiscal treatment for certain management actions) (Mantau et al., 2010). Finally, from a forest management perspective, the consequences of increasing wood supply will involve either the promotion of the use of wood in the traditional forest industry or the modification of forest management

practices. The perceived management practices are mainly connected with intensifying forest management through stand treatments (thinning of young and middle-aged stands) or planting fast growing tree species.

Keywords: Renewable Energy, Biomass Production, Increased Use, Cross-sectoral Stakeholder Perception

Acknowledgements

This study was part of the COOL project (*COmpeting uses Of forest Land*), a project within the ERA-Nets WoodWisdom-Net 2 and Bioenergy, with financial support the Ministry of Education, Science and Sport in Slovenia

References

- Avdibegović, M., Pezdevšek Malovrh, Š., 2014. Corruption in Forestry and the EU's Policy Against Illegal Logging: a Perspective Form the Balkan, Freiburgs talks on International and European Forest Policy. Albert Ludwigs University of Freiburg, Faculty of Environmental and Natural Resources, p. 6.
- Edwards, W., Barron, F.H., 1994. SMARTS and SMARTER: Improved Simple Methods for Multiattribute Utility Measurement. *Organizational Behavior and Human Decision Processes* 60, 306-325.
- European Commission, 2009. Directive 2009/28/ EC of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources. European Commission, Brussels, 5.6.2009.
- European Commission, 2010. Renewable Energy Action Plans and Forecasts. European Commission, Brussels. Available online: <http://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans> (accessed 8.12.2014.)
- European Commission, 2012. Innovating for Sustainable Growth: a Bioeconomy for Europe. European Commission, Brussels, 3.2.2012.
- Hillring, B., 1998. National Strategies for Stimulating the Use of Bioenergy: Policy Instruments in Sweden. *Biomass and Bioenergy* 14, 425-437.
- Jacobsson, S., Bergek, A., Finon, D., Lauber, V., Mitchell, C., Toke, D., Verbruggen, A., 2009. EU Renewable Energy Support Policy: Faith or Facts? *Energy Policy* 37, 2143-2146.
- Kangas, A., Kangas, J., Kurttila, M., 2008. Decision Support for Forest Management. Springer.
- Lussier, R.N., 2006. Management Fundamentals: Concepts, Applications & Skill Development. Thomson

- Mantau, U., Saal, U., Prins, K., Steierer, F., Lindner, M., Verkerk, H., Eggers, J., Leek, N., Oldenburger, J., Asikainen, A., Anttila, P., 2010. Euwood-Real Potential for Changes in Growth and Use of EU Forests. UHAM, Hamburg, Germany, p. 160.
- NREAP, 2010. National Renewable Energy Action Plan 2010-2020 (NREAP), p. 143.
- Pelkonen, P., Mustonen, M., Asikainen, A., Egnell, G., Kant, P., Leduc, S., Pettenella, D., 2014. Forest Bioenergy for Europe, In: Lauri, H. (Ed.), What science can tell us. European Forestry Institute, Joensuu, p. 109.
- Pezdevšek Malovrh, Š., Zadnik Stirn, L., Krč, J., 2010. Influence of Property and Ownership Conditions on Willingness to Cooperate. Šumarski list 134, 139-149.
- Stupak, I., et. al., 2007. Sustainable Utilisation of Forest Biomass for Energy—Possibilities and Problems: Policy, Legislation, Certification, and Recommendations and Guidelines in the Nordic, Baltic, and Other European Countries. Biomass and Bioenergy 31, 666-684.
- Triplat, M., Prislán, P., Jemec, T., Piškur, M., Krajnc, N., 2013. Regional Profile of the Biomass Sector in Slovenia. FOROPA - Biomass to the Masses, Ljubljana, p. 26.
- UN, 2011. The European Forest Sector Outlook Study II. 2010–2030. UNECE, FAO, Geneva, p. 111
- Verkerk, P.J., Anttila, P., Eggers, J., Lindner, M., Asikainen, A., 2011. The Realisable Potential Supply of Woody Biomass from Forests in the European Union. Forest Ecology and Management 261, 2007-2015.
- Peters, D.M., Wirth, K., Böhr, B., Ferranti, F., Górriz, E., Kärkkäinen, L., Krč, J., Kurttila, M., Leban, V., Lindstad, B.H., Pezdevšek Malovrh, Š., Pistorius, T., Rhodius, R., Solberg, B., Zadnik Stirn, L., 2015. Energy wood from forests- stakeholder perception in Europe, 28 p.

DACH 2.0: Towards international compatibility of forest accountancy data networks

Walter Sekot¹, Philipp Toscani¹, Patric Bürgi², Nils Ermisch³

Introduction

The interest in comparative analysis of costs and revenues in European forestry can be traced back for decades and is documented e.g. by Stridsberg & Algvere (1967), Hyttinen et al. (1997) and Sekot et al. (2010). The IUFRO groups on Managerial Economics and Accounting as well as Small-scale Forestry addressed this issue repeatedly in an even more international context (e.g. Brandl (1993), Hartebrodt & Howard (2010)). The countries of the so-called “DACH-region” (Germany (D), Austria (A) and Switzerland (CH)) share a long tradition in monitoring the economic performance of forest enterprises by means of forest accountancy data networks (FANs). In spite of common characteristics like beginnings in the 1950ies and approaches in terms of cost accounting, the respective results are not generally compatible and simplistic comparisons may even trigger severe misjudgments. The national FANs reflect the existing differences in terms of structure of ownership, management goals, average size of enterprises and property rights. The DACH-initiative aims at improving the comparability of the national datasets for better assessing competitiveness and assisting various benchmark exercises. For this purpose, common definitions and a consolidated framework of ratios were agreed upon, specific national protocols developed and remaining gaps identified. In a first effort, 200 ratios were identified and analyzed as documented by Sekot et al. (2010). The second phase of intense cooperation targeted at augmenting and refining the framework of initial ratios as well as computing harmonized results for the fiscal years 2008-2012 in terms of time series.

Material and Method

The international comparison relies on basic data of three FANs for the period 2008–2012 which were specifically adjusted to a common framework. The technical description of the FANs provided by Sekot et al. (2010) is still valid. However, this time the German results are provided at the national

¹ University of Natural Resources and Life Sciences, Vienna. Austria,
walter.sekot@boku.ac.at

² Bern University of Applied Sciences. Switzerland

³ Johann Heinrich von Thünen Institute. Germany

level and not just for the federal state of Baden-Württemberg. Monetary figures are provided as nominal values and Swiss data converted according to annual exchange rates.

A comparative economic analysis of timber production is hampered by the fact that aspects of multifunctional forest management are dealt with differently in the three countries and the national reporting standards do not comply to the same degree to the standards of full cost accounting for timber production as such. On the other hand, a comprehensive assessment of all business activities is not straightforward, either.

The German FAN comprises private and municipal forestry as well as state forest organizations, some of which even acting as forest authorities. The accounting system refers to five product categories which serve as units for full cost accounting. Product category 1 comprises apart from timber production also the provision of non-wood forest products, lending and leasing as well as hunting and fishery. In the case of Austria, the FAN comprises mostly private enterprises and focuses on timber production as such. Hunting is the only auxiliary activity which is generally documented in terms of full cost accounting. All other business activities are recorded optionally only (Ungerböck et al., 2015). The Swiss FAN is composed of public enterprises which are to various degrees devoted to the subsidized provision of non-marketable ecosystem services. Safeguarding of protective functions is of special importance due to topographic conditions. Management activities within an enterprise are recorded separately in terms of full cost accounting as dependent on the primary function of the respective area. Consequently, timber production, protection, recreation and nature conservation are to be distinguished. Other business activities are recorded as well. However, hunting is no line of business, the respective property rights being not connected to the ownership of the land.

The DACH-framework of ratios for international comparisons has been designed in order to elicit the utmost degree of compatibility. It has to be kept in mind, though, that the quality and consistency of the data is not generally the same so that the results still have to be interpreted prudently. Costs, revenues and profits are documented according to a hierarchical design: The ratios for the enterprise in total are differentiated into forest management (including auxiliary activities such as hunting) on the one hand and the provision of services for third parties as well as acting as an authority (wherever it matters) on the other. Within forest management timber production (including non-wood forest products) is addressed specifically. Information at the level of cost centers but also timber revenues are therefore presented twofold: for forest management as a whole as well as for timber production. This distinction is of special importance for CH, where the

contribution margin (timber revenues less harvesting costs) of timber production is significantly higher than the one of forest management in total.

Results

The differences between standard results and DACH-specific data and hence the relevance of respective adjustments are illustrated at the example of Austria for the year 2013 (Table 1). Apart from the fact that many DACH-ratios are not documented in standard reports, different definitions especially of the key items ‘area’ and ‘volume’ trigger deviations in the magnitude of between 2% and 12% as far as the presented figures are concerned.

Table 1: Comparison of standard and DACH-adjusted ratios of timber production for Austria, year 2013

item	unit	(1) standard	(2) DACH-adjusted	(2) in % of (1)
reference area (Ø per enterprise)	ha	3186	2913	91%
intensity of harvest	m ³ /ha	6.73	7.56	112%
unit cost of harvesting	€/m ³	25.67	26.06	102%
total cost	€/ha	387	393	102%
timber revenues	€/ha	479	524	109%
total revenues	€/ha	527	546	104%
profit	€/m ³	18.72	20.26	108%
profit	€/ha	140	153	109%
revenue-cost ratio	%	136	139	102%
turnover ratio	%	25	28	112%

The contribution margin per ha is one of the most significant ratios in managerial accounting. It is driven by the intensity of cutting, the average timber revenues (both strongly influenced by tree species composition, the share of enterprises dominated by coniferous species (> 2/3) being close to 40% in D, 50% in CH and almost 80% in A) as well as the unit costs of harvesting (as dependent inter alia on topography, road network and wage rates). The five years average for 2008 – 2012 is by far highest in A (312 €/ha), D reaching 69% and CH just 60 % of this benchmark in timber production. Whereas the unit costs of harvesting are practically equal in D and A (averages of 24.69 €/m³ (D) and 24.73 €/m³ (A) respectively), the Swiss level of cost is much higher and averages 39.94 €/m³ in timber production and even 49.68 €/m³ for the total of forest management. The public forest enterprises in Switzerland benefit most from subsidies which contribute some 17.6 % to the total revenues of timber production and even 31.7 % for the total of forest management (especially driven by contributions for the tending of protective forests). In A the respective shares are 2.8 % and 3.2 %. In D, the overrepresented public forest enterprises are hardly entitled

to subsidies so that the average contribution of subsidies to total revenues is 0.4% in timber production and 0.8% in forest management only.

The potential of comparative analysis in regard to developments is exemplified in Figure 1. The total profit of forest management is clearly dominated by the profitability of timber production in all of the three countries. Whereas the general increase in timber proceeds per m³ from 2009 onwards triggered improved profitability in D and A, the profits in CH declined from 2010 to 2012 in spite of a stable level of harvest. Activities apart from timber production modify the profit at enterprise level especially in CH.

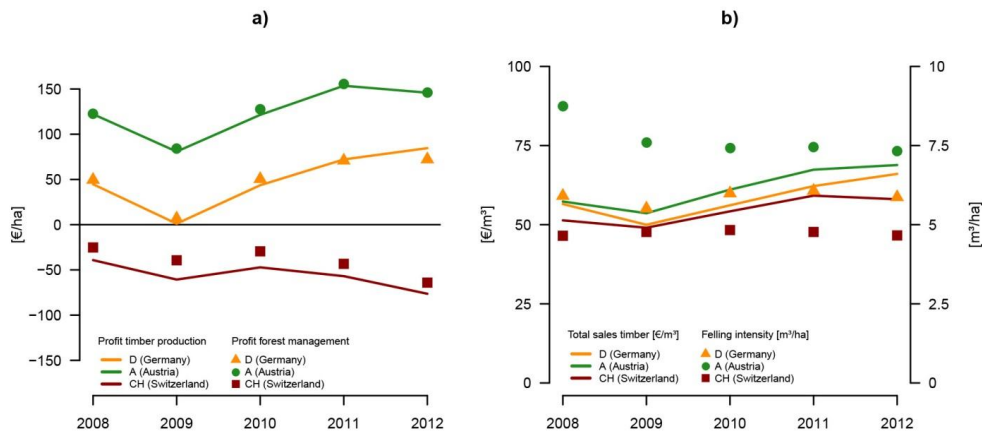


Figure 1: Comparison of the development of some key ratios in the DACH-region for 2008-2012

Discussion and Outlook

It is neither possible nor intended to impose a strict international standard for monitoring the profitability of forestry. Nevertheless, international comparisons are of political, practical as well as academic interest. The significance of any such exercise hinges on the compatibility of the respective accounting schemes, however. Consequently, the aspect of comparability should be considered whenever a forest accountancy network is designed (Niskanen & Sekot, 2001). The comparison of existing data requires a prudent assessment of the underlying accountancy schemes in order to come up with sound results and to elicit the limits of compatibility. Addressing developments adds a new dimension to comparisons based on national accountancy data. Extending the respective time frame to at least ten years promises interesting insights. Moreover, the direct cooperation of the national institutions in charge of data analysis bears the potential for more specific and hence also more significant comparisons in regard to aggregates such as size classes or types of ownership. The current framework of DACH-

ratios may well be extended further: Whereas the possibilities for even more detailed multilateral comparisons are rather limited, bilateral assessments of compatibility indicate further potentials for international benchmarking. Finally, experiences gained from international comparison exercises may also help to improve the efficiency and significance of national accountancy schemes.

References

- Brandl H. (ed) (1993): Wirtschaftsergebnisse aus dem Privatwald im internationalen Vergleich und angepasste Forsttechnik für die Bewirtschaftung kleiner Besitzeinheiten. Mitteilungen der Forstlichen Versuchs- und Forschungsanstalt Baden-Württemberg, No. 176. Freiburg.
- Hartebrodt C., Howard K. (eds.) (2010): International Workshop on Figures for Forests – Proceedings. Freiburger Forstliche Forschung no. 84. Freiburg.
- Hyttinen P., Kallio T., Olischläger T., Sekot W., Winterbourne J. (1997): Monitoring forestry costs and revenues in selected European countries. European Forest Institute research report no. 7. Joensuu.
- Niskanen A., Sekot W. (eds) (2001): Guidelines for establishing farm forestry accountancy networks: MOSEFA. European Forest Institute research report no. 12. Leiden.
- Sekot W., Fillbrandt T., Zesiger A. (2010) Improving the International Compatibility of Accountancy Data: The ‘DACH-Initiative’. *Small-scale Forestry* 10, no. 2: 255–269, doi:10.1007/s11842-010-9134-y.
- Stridsberg E., Algvare K.V. (eds) (1967): Cost studies in European forestry. Studia Forestalia Suecica No. 459 49. Stockholm.
- Ungerböck E., Sekot W., Toscani P. (2015): Looking beyond timber: Empirical evidence for the diversification of forest enterprises and the profitability of auxiliary activities in Austria. *Forest Policy and Economics* (in press).

Keywords: ratio analysis, DACH-region, comparability, full cost accounting

Impact assessment of the institutional environment on business of selected public enterprises in forestry and nature protection in Serbia

Zoran Poduška¹, Jelena Nedeljković², Nenad Ranković², Dragan Nonić²

In existing practice in Serbia, public enterprises that manage forests and protected areas have dual function. They are user of the space in order to achieve material gain but also the responsible entity of protection and improvement of natural resources. Such contradictory dual role generates current problems in the management of forests and protected areas. In addition, a large number of factors affecting the forestry sector, such as population growth, migration from the countryside to the cities, the need for economic growth side by side with environmental protection and sustainable development. Further it is use of certificates and standards, international conventions and free trade as well as participatory approach in the process of creation of Laws. In daily business enterprises in the forestry and nature protection rely on different institutions from the business environment. In this paper, under the business environment the following aspects are included: technological, economic, legal, political, social, cultural, ecological environment, as well as buyers of the product/service users, suppliers, and competitors in the respective industry.

A review of relevant literature identified the main problems for companies that manage forests and nature protected areas. Main problems concern institutional, organizational and legislative aspects. It also include: the method of selection and control of managers; managers vocational, personnel and infrastructure capabilities; ownership structure in protected areas; financing of works and projects in forestry and nature protection; collision of legislation; lack of efficiency in the implementation of legislation; illegal construction and exploitation of mines and minerals. In addition to these problems, numerous studies point to the important role of education and research, and public participation in the management of forests and protected areas management.

This paper analyzes the attitudes of employees in public enterprises in forestry and nature protection in Serbia on the impact of the institutional environment on the business of the company. Under the institutional environment, here are considered relevant ministries, political organizations, institutions of local governments, international organizations, NGOs, private

¹ Institute of Forestry, Belgrade. Serbia, sm.poduskaz@neobee.net

² Faculty of Forestry, University of Belgrade. Serbia

forest owners, other companies as well as educational and research institutions.

The aim of this study was to determine the attitudes of employees about the impact of the institutional environment on the business of the public enterprises in forestry to protect nature. The purpose is to create a basis for more detailed research on this issue.

As a research technique survey was used. The sample consisted of employees of the public forest enterprise "Srbija šume" and the Public Enterprise National Park "Tara". Selected enterprises operating on the territory of the Republic of Serbia and their founder is Government of the Republic of Serbia. The main activities are the management and exploration of wood as well as nature conservation, respectively. The sample consisted of 46 subjects. Data were collected in the period June 2014 - February 2015 and were analyzed by descriptive and inferential statistics. Non-parametric tests comparing the sum of ranks between two independent samples, were used. The criteria in the selection of independent samples were: gender, work experience and size of the forests that are managed.

The youngest participant was 26 and the oldest 64 years old. Representation of men in the sample was 67,4% and 32,6% of women. A minimum work experience was one year for 4,4% of the respondents. Maximum working experience, 38 years, has 2,2% of the respondents. The average working experience of the respondents in the sample was 12,5 years, while the mode is 12 years (8.7%)

The smallest area of forests that are managed by the respondents is 5,066 *ha*, while the largest area covers 64,965 *ha*.

The results indicate that the greatest institutional impact have a political organizations. On the second place are educational and research institutions. Important influences have other companies, then sectoral Ministries as well as private forest owners. Neutral impacts have international and non-governmental organizations. Respondents estimated that the institutions of local government have smallest impact on enterprises.

Significant differences have been found in the attitudes of employees with different work experience. Employees with less work experience find that Ministries have important impact on enterprises, while employees with more working experience considered that this influence is neutral.

Employees with less working experience considered that local government has neutral impact, while respondents with more working experience considered that this influence is irrelevant. Employees with less work experience considered that the impact of international projects is neutral, while respondents with more work experience considered that this influence is irrelevant.

Based on the analysis of the research results, it can be concluded that employees are uniform attitudes that politics and political organizations have the greatest impact on the business of public enterprises in forestry and nature protection. In addition, cooperation with educational and scientific research institutions is of great importance for enterprises. Influence from other companies, such as suppliers of equipment and services, are also important aspect for public enterprises.

Based on the results and conclusions of the paper one can propose further detailed research of the possibilities for the organizational changes; restructuring and reengineering of business systems; development of entrepreneurship; adapting of enterprises to create a contemporary vision of business toward creation of new values, particularly through the implementation of the strategy of diversification; commercialization and marketing of forest recreational services; and acceptance of innovation in products and services.

Keywords: public companies, institutional environment, forestry, nature conservation

