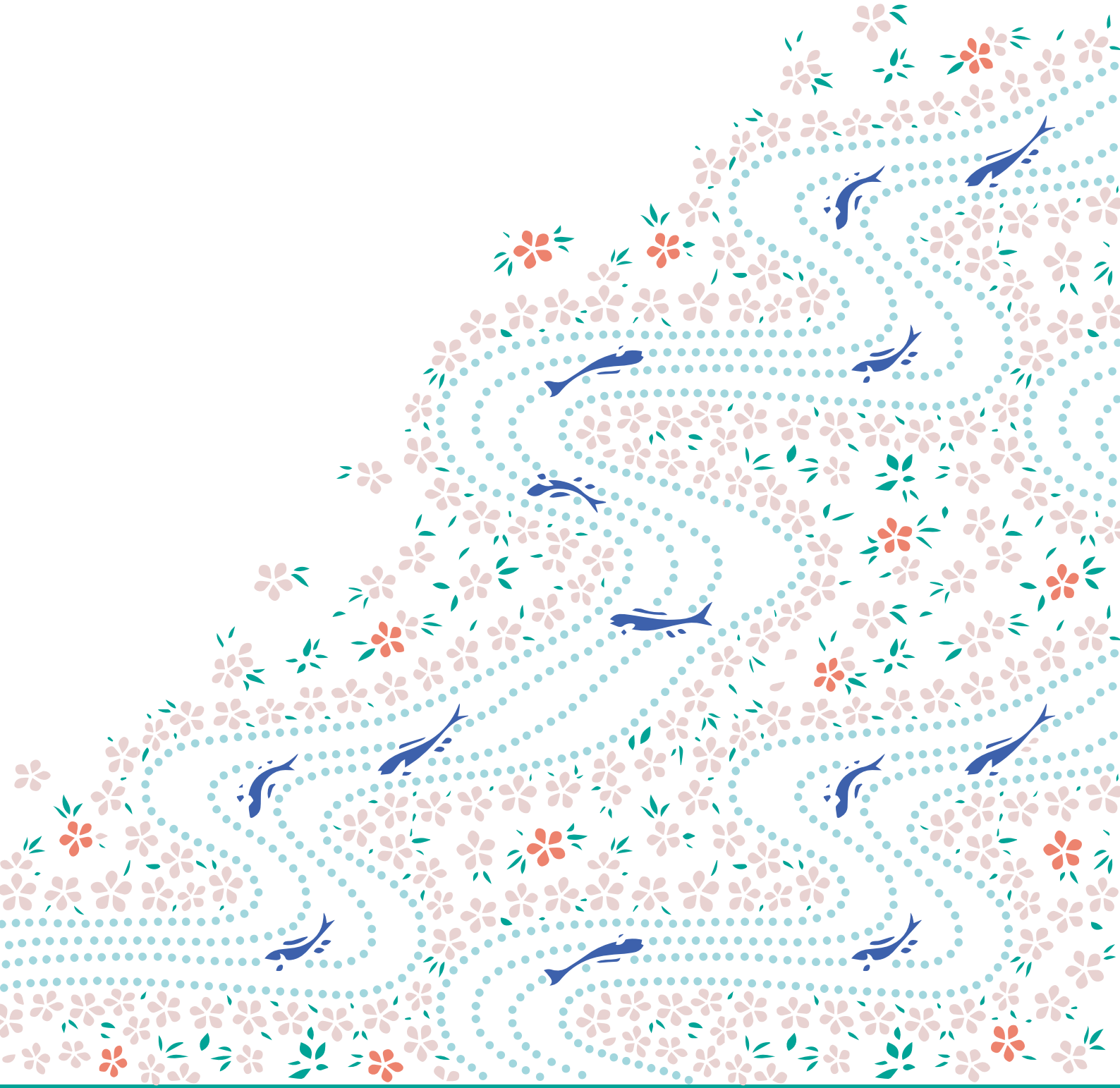
IUFRO

IUFRO 3.08 &6.08 Joint Conference

Future Directions of Small-scale and Community-based Forestry

Proceedings



Sep. 8-13, 2013 in Fukuoka, JAPAN

[CS1-1]

Perceptions and attitudes of private forest owners as related to energy wood supply and their relevance for European bioenergy sector

Pradipta Halder[1], Elvis Paladini [2], Mirjana Stevanov[3] and Sasa Orlovic[3]

1 Introduction

Excluding the Russian Federation and some of the eastern European countries, more than half of Europe's forests are privately owned (EUROSTAT 2011; Schmithüsen and Hirsch 2010). Private ownership includes forests owned by individuals, families, communities, companies, religious bodies, and other private entities. Among these diverse groups of private forest owners, forests owned by individuals and families dominate. It is, however, difficult to arrive at an exact number of small-scale private forest owners in Europe. Schmithüsen and Hirsch (2010) estimated that there were more than 4 million small-scale private forest owners in nine European countries in 2007, with an average forest holding of less than 5 ha. However, there is a difference between the total number and the average area of forest parcels. This type of private forest owners is also known as a 'non-industrial private forest owner' or NIPF and they are central to this paper in the context of the energy wood supply from their forest estates to the European bioenergy producers.

The EU (European Union) has set a target of achieving 20% renewables in its primary energy mix by 2020 under the Renewable Energy Directive (RED), and it is expected that biomass, particularly forest biomass, will play an important role in the renewable energy production of many of the EU Member States by 2020. For instance, the use of wood fuels, particularly wood chips, has been projected to increase in Finland to meet the country's target of 38% renewables in total energy consumption by 2020 under the RED (Oikari et al. 2010). On the other hand, countries such as Croatia and Serbia, which are members of the Energy Community Treaty of the EU, will follow developments in the EU's energy sector to formulate their own energy strategies. For instance, Croatia adopted a national "Energy Development Strategy" in 2009, which aims to produce 35% of its electricity from locally available renewable sources by 2020 and forest biomass is considered an important source for meeting that target (Delomez 2012). Similarly, forest biomass has been identified as one of the largest potential sources of renewable energy production in Serbia (Stojiljkovic 2011). It should be mentioned here that Croatia gained EU membership from July 2013 while Serbia is an EU 'candidate' country,

[1] School of Forest Sciences, University of Eastern Finland, Joensuu, Finland, Email: pradipta.halder@uef.fi
[2] Department for Forest Management and Forestry Economics, Croatian Forest Research Institute, Zagreb, Croatia, Email: elvisp@sumins.hr
[3] University of Novi Sad, Institute of Lowland Forestry and Environment, Novi Sad, Serbia, Email: mzavodj@gwdg.de
[3] University of Novi Sad, Institute of Lowland Forestry and Environment, Novi Sad, Serbia, Email: sasao@uns.ac.rs

which means they soon have to accept the EU targets under the RED and implement their renewable energy strategies accordingly.

Statistics suggest that NIPFs own 60% of the forest land in Finland and supply 80-90% of the domestic roundwood used by Finnish forest industries (Favada 2007). In addition, they also play an important role in supplying forest biomass to the domestic bioenergy producers who use forest residues and small diameter trees for energy production. There were approximately 740 000 NIPFs in Finland by the end of 2008, owning forest areas larger than 2 ha, while their national average forest holding stood at 24 ha (Finnish Forest Research Institute 2009). However, the situation in Croatia and Serbia regarding NIPFs and their contribution to the domestic forest-based industries is completely different. Private forests in Croatia and Serbia are characterized by high fragmentation into small parcels which have poor growing stock compared to the state forests (European Forest Institute 2011). Recent statistics show that there are about 600 000 NIPFs with an average forest holding size of 0.76 ha in Croatia (Statistical Yearbook of the Republic of Croatia 2012), whereas about 900 000 NIPFs own an average 1.27 ha of forests in Serbia (Statistical Office of the Republic of Serbia 2012).

In recent years, both Croatia and Serbia have started participating in various European bioenergy projects, with an emphasis on energy wood production from forests owned by NIPFs. Nevertheless, there has not been a study which evaluates the perceptions and attitudes of the NIPFs in these countries, as related to energy wood production. On the other hand, Rämö et al. (2009) found from their study that Finnish NIPFs were positive about selling energy wood from their forest estates, although they were concerned over the loss of soil nutrients from excessive harvesting of energy wood. Exploring the perceptions and attitudes of NIPFs in Finland, Croatia, and Serbia, concerning energy wood production, could therefore provide valuable background information for enhancing the possibilities of energy wood supply from the private forests in these countries. In this regard, Halder et al. (2012) stated that an understanding of the perceptions and attitudes of NIPFs, as related to energy wood supply, would be crucial for creating a sustainable wood supply mechanism for energy production in various parts of the world where NIPFs own large areas of forests. Moreover, by comparing the perceptions and attitudes of NIPFs from these countries, which are at different stages of development in forest-based energy production, a number of key attributes of the social dimensions of energy wood production can be understood that will be relevant for policy makers and bioenergy producers in Europe. The main objectives of the study are therefore to: (1) explore and compare the perceptions and attitudes of NIPFs in Finland, Croatia, and Serbia, as related to energy wood supply from their forest estates, and (2) provide recommendations for policy makers and bioenergy producers to improve the preconditions for NIPFs' active participation in energy wood mobilization from their forests.

2 Method and data

The study used data from questionnaire-based surveys that were conducted among NIPFs in Finland, Croatia, and Serbia. The surveys were conducted as part of two large European projects

related to sustainable forest management and bioenergy production in a number of EU and non-EU countries. The Finnish data was obtained from 79 NIPFs residing in the Finnish Karelia (North and South) through a mail survey in 2010. The survey questionnaire consisted of close-ended items in three categories: (1) a socio-demographic profile of the Finnish NIPFs (2) background information about their forest estates, utilization and selling of energy wood, and (3) their attitudes to energy wood supply.

Two surveys among the Croatian and Serbian NIPFs took place in 2012, and 232 NIPFs participated (82 from Croatia and 150 from Serbia). The surveys were conducted among NIPFs when they attended private forest owner meetings in their countries. The Croatian participants came from the Zagreb region, and the Serbian NIPFs belonged to the Vojvodina region. The questionnaires distributed among the participants were in Croatian and Serbian languages depending on the place of the survey; however, the questionnaires were similar in content for performing the comparative analysis. The questionnaires consisted of items related to NIPF socio-demographic profiles, including their forest estates, energy wood use, and sales information; using five-point Likert-scale type items (strongly agree to strongly disagree) to explore their attitudes to energy wood supply; and questions related to obstacles to energy wood mobilization from their forest estates. The survey instrument used in Croatia and Serbia was different from that used in Finland, which resulted in certain limitations for comparing the results of the three countries.

3 Results

3.1 Profile of NIPFs

The representation of NIPFs in the surveys was heavily biased towards males, as female participation was on average 10% in the three countries (Table 1). The average age of NIPFs corresponded to the general ageing population structure among NIPFs in the rest of Europe. Most NIPFs in the study appeared to have secondary school level education while university level education was more prevalent among the Finnish NIPFs compared to those in Croatia and Serbia. The majority of the Croatian NIPFs were still employed in either public or private organizations whereas nearly half of the Finnish NIPFs were retired. The average area of forest owned by NIPFs differed greatly between the Finnish NIPFs and the Croatian and Serbian NIPFs. The average area of forests owned by Finnish NIPFs was much higher than for Croatian and Serbian NIPFs. This is because 13% of Finnish NIPFs are reported to own forest estates of more than 100 ha, which increases the average size of their forest holdings.

It appeared that the majority of NIPFs in these countries used wood from their forests for household heating and the average yearly quantity of wood used for such purpose ranged from 12 solid m^3 to 20 solid m^3. Large differences appeared among NIPFs in terms of selling wood for energy production. About 7% of the Croatian NIPFs reported selling energy wood from their forest estates. However, more than half of the Serbian NIPFs and almost one third of the Finnish NIPFs reported that they sold energy wood from their forest estates.

Table 1: Profiles of NIPFs participating in the study

Information about NIPFs		Croatia (N=82)	Serbia (N=150)	Finland (N=79)
Gender	Male	95%	89%	85%
	Female	5%	11%	15%
Average age		55 years	58 years	59 years
Education	Secondary School	77%	93%	64%
	Above secondary school	17%	7%	36%
Occupation	Employee	77%	31%	26%
	Farmer and other Entrepreneur	5%	30%	26%
	Retired	18%	29%	44%
	Other	-	10%	4%
Average area of forest ownership		2.4 ha	6.5 ha	73 ha
Use of wood from own forest	Yes	79%	95%	83%
for heating household	No	21%	5%	17%
Average yearly quantity of wood used for heating household (in solid m^3)		12 m^3	18 m^3	20 m^3
Sale of wood from own	Yes	7%	51%	29%
forest for energy production	No	93%	49%	71%
Average yearly quantity of wood sold for energy production (in solid m^3)		-	28 m^3	200 m^3

3.2 NIPF motivations for supplying energy wood from their forests

Approximately 94% of the Finnish and 83% of the Serbian NIPFs reported that income generation alone was their main motivation for selling energy wood from their forest estates (Figure 1). Approximately 28% of Croatian NIPFs said that income alone would be their main motivation for supplying energy wood whereas 68% reported that both income and environmental benefits would be their main motivation for supplying energy wood from their forest estates. Similar attitudes appeared among 11% of the Serbian NIPFs. Environmental considerations alone appeared as a motivational factor for energy wood supply among 2% of the Croatian NIPFs and 6% of the Serbian and Finnish NIPFs.

3.3 NIPF attitudes towards energy wood supply

NIPF attitudes to energy wood supply were measured and compared in three issues – competition between wood used for energy production and for other purposes; price attractiveness of energy

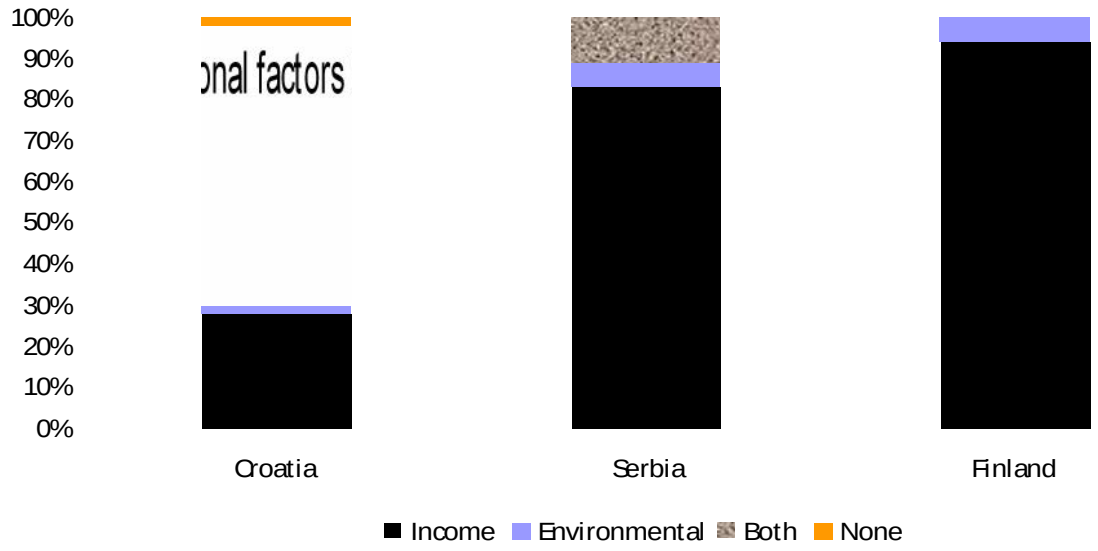


Figure 1: Motivational factors behind supply of energy wood among NIPFs in Croatia (N=82), Serbia (N=150), and Finland (N=79)

Table 2: Attitudes of NIPFs to energy wood supply from their forest estates

Attitudes to energy wood supply	Croatia (%)		Serbia (%)		Finland (%)	
	Agreement (Disagreement)	DKn	Agreement (Disagreement)	DKn	Agreement (Disagreement)	DKn
There is competition between supply of energy wood and wood for other purposes (e.g. timber and pulpwood) in my country	7 (21)	72	23 (69)	8	0 (65)	35
The price of energy wood is more attractive than the price of wood for other purposes (e.g. timber and pulpwood) in my country	9 (25)	67	43 (52)	5	11 (61)	28
I would be interested in energy wood production over pulpwood and valuable timber production if there was a stable energy wood market in my country in the future	95 (3)	2	71(26)	3	6 (74)	20

Notes: Agreement=Strongly Agree plus Agree; Disagreement=Strongly Disagree plus Disagree; DKn= I do not know; all percentages have been rounded off.

wood; and NIPF interest in supplying energy wood (Table 2). The results showed that the majority of Serbian and Finnish NIPFs, but only one fifth of Croatian NIPFs did not believe that there was competition between the supply of wood for energetic use and for other purposes (e.g. sawn timber,

pulp for paper production) in their countries. It appeared that actually none of the Finnish NIPFs considered that there was such competition in Finland while between 7-23% of the Croatian and Serbian NIPFs agreed the existence of such competition in their countries. Similar results appeared on the issue of the attractiveness of energy wood prices compared to the price of timber and pulpwood. The proportion of NIPFs who believed that the price of energy wood was not attractive was much higher than those who believed the opposite. In terms of NIPF interests in energy wood supply from their forest estates, the majority of Finnish NIPFs did not show interest in supplying energy wood from their forest estates. However, the majority of the Croatian and Serbian NIPFs were interested in the supply of energy wood from their forest estates.

3.4 NIPF perceptions of the main obstacles related to the mobilization of energy wood from their forests

More than half the Finnish NIPFs believed that the low price of energy wood was the most important obstacle against mobilizing wood from their forest estates in Finland. Approximately one-third of the Finnish NIPFs perceived logistics, and 2% perceived legal and administrative matters as the other main obstacles to energy wood mobilization from their forest estates. A lack of roads to access their forests for mobilization of energy wood was seen as the main obstacle by 73% of Croatian NIPFs whereas 84% of Serbian NIPFs believed the lack of machinery to harvest energy wood was the most important obstacle in their country (Figure 2).

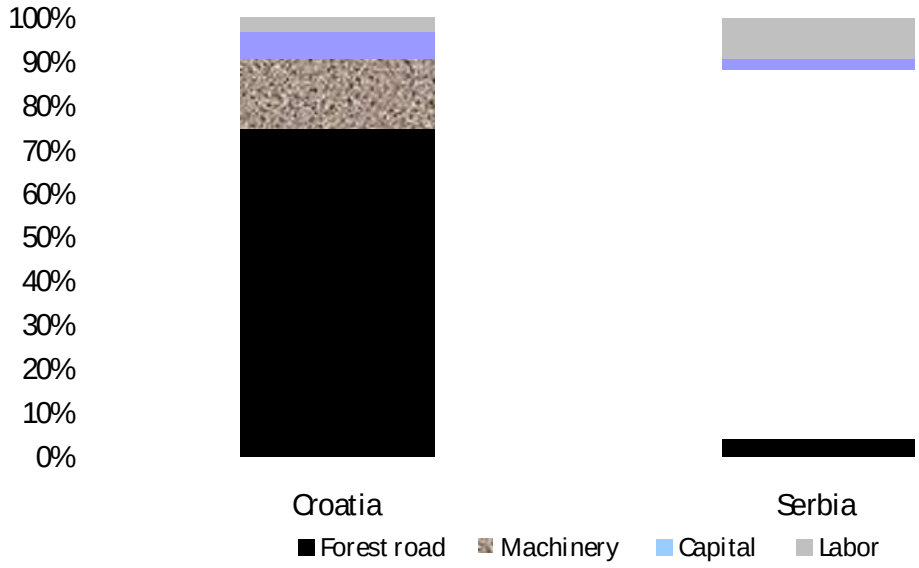


Figure 2: Obstacles to energy wood mobilization from private forests according to the Croatian (N=80) and Serbian (n=150) NIPFs.

Discussion and conclusions

The study analyzed perceptions and attitudes among small-scale private forest owners in Finland, Croatia, and Serbia, related to energy wood supply from their forest estates. The findings about thesocio-demographic profiles of NIPFs along with the size of their forest parcels, own use and selling of energy wood differed among these countries, and corresponded to a previous study where it was reported that NIPFs in Europe were relatively diverse and such diversity also existed at the national level (Wolfslehner et al. 2009). It appeared from the study that NIPFs would be motivated to supply energy wood from their forest estates provided it would be a profitable business opportunity for them. However, the study also revealed that NIPFs did not have positive attitudes towards the current price commanded by energy wood, compared to the price of timber, and pulpwood. Presently, there does not seem to be any competition between the supply of wood for energy production and for other common industrial purposes (e.g. production of timber, pulpwood for paper) in Europe, and the market for energy wood is still emerging. NIPF attitudes about the competitiveness of energy wood therefore seem to be well grounded.

The Finnish NIPFs did not show positive attitudes to supplying more energy wood than pulpwood, even in the context of a stable energy wood market in Finland. The negative attitudes of Finnish NIPFs to energy wood supply could be attributed to their negative perceptions of the price attraction of energy wood and also the logistical challenges such as harvesting and transporting energy wood from their forests to mill gates. However, the results showed that almost one-third of them were involved with the selling of energy wood business, which indicates that even though at present the trade in energy wood is not attractive to most of Finnish NIPFs, it could be an option for some, particularly those owning large forest areas. Forestry operations in Finland are highly mechanized and NIPFs are active suppliers of wood from their forest estates to the forest-based industries in the country. However, NIPFs in this study perhaps believed that the new trend in bioenergy production would depend much on forest residues rather than whole tree harvesting, which could be additional work for them. Another reason may be that Finnish NIPFs are not interested in new activities such as energy wood supply due to their older age, while younger NIPFs are less connected to the forests they own.

The positive attitude of Croatian and Serbian NIPFs to energy wood supply could have emerged due to the perceived income opportunities from such activity, and perhaps they considered it more profitable compared to the current income that they occasionally receive from their forest estates. As private forestry in these two countries is not well organized and less profitable compared to that from public forests, energy wood supply from private forests emerged as a potential source of income for them. This positive attitude among NIPFs towards energy wood supply should be encouraging for the policy makers in these two countries especially as they are planning to increase their bioenergy production in the future. However, as perceived by NIPFs in these countries, there is a need to improve forest roads for better access and transportation of energy wood in these countries and also for the introduction of modern machinery for the efficient harvesting and logistics of energy wood mobilization. These countries can therefore participate in European bioenergy related projects to obtain funds for improving their bioenergy sectors, as well as learning from countries such as Finland,

Sweden, and Austria, where forest-based bioenergy production is highly developed.

The findings of the study appear to be relevant for policy makers and bioenergy producers in these countries who wish to understand the social dimensions of energy wood mobilization from private forests. In Finland, the main challenge appears to be motivating NIPFs to participate in energy wood supply from their forest estates, as they did not have positive attitudes about such energy wood supply. However, in Croatia and Serbia, the main challenge will be to improve the pre-conditions for energy wood supply from private forests such as developing forest road networks and the utilization of modern equipment for energy wood harvesting and transportation. In addition to these improvements, there will also be a need to increase the awareness of production and the utilization of energy wood among NIPFs in Europe. The study suffers from some limitations, however, as the questionnaires used were different in Finland compared to the other two countries, so that an item-wise comparison of NIPFs' perceptions and attitudes related to energy wood supply could not be performed. Moreover, the sample size was not large enough to be considered representative of NIPFs in these countries. Future studies should include a larger sample of NIPFs from many other European countries to get a better representation of their perceptions and attitudes to the supply of energy wood from their forest estates.

Acknowledgements

The authors acknowledge the survey respondents in Finland, Croatia, and Serbia for their cooperation in this study. The data was collected as part of the two European Projects ('Bioenergy Promotion' and 'RoK-FOR') and the authors appreciate the funding support from these projects to realize the study. The authors appreciate the travel grant from the Finnish Society of Forest Science to present the work in the IUFRO conference in Fukuoka, Japan. Finally, the authors also acknowledge funding support from TERI Nordic at the University of Eastern Finland.

References

Delomez Y (2012) Renewable Energy in Croatia. Embassy of Belgium in Croatia – Economic and Commercial Office.

European Forest Institute (2011) Private Forest Owners in the Western Balkans – Ready for the Formation of Interest Associations. European Forest Institute Research Report 25. European Forest Institute, Joensuu, Finland.

EUROSTAT (2011) Forestry in the EU and the world 2011 edition - A statistical portrait. Publication office of the European Union, Luxemburg.

Favada IM (2007) Econometric Models of Finnish Non-Industrial Private Forest Owners' Timber Supply and Timber Stock. Dissertationes Forestales 46. 31 p. Available at http://www.metla.fi/dissertationes/df46.htm [Accessed on 05.06.2013]

Finnish Forest Research Institute (2009) Finnish Statistical Yearbook of Forestry 2009.

Halder P, Weckroth T, Mei Q, Pelkonen P (2012) Non-industrial private forest owners' opinions to and

awareness of energy wood market and forest-based bioenergy certification - results of a case study from Finnish Karelia. Energy, Sustainability and Society 2: 2–9.

Oikari M, Kärhä K, Palander T, Pajuoja H, Ovaskainen H (2010) Analyzing the views of wood harvesting professionals related to the approaches for increasing the cost-efficiency of wood harvesting from young stands. Silva Fennica 44: 481–495.

Rämö AK, Järvinnen E, Latvala T, Silvennoinen H (2009) Interest in energy wood and energy crop production among Finnish non-industrial private forest owners. Biomass and Bioenergy 33: 1252–1257.

Schmithüsen F and Hirsch F (2010) Private forest ownership in Europe. Geneva Timber and Forest Study Paper 26. United Nations Economic Commission for Europe/Food and Agricultural Organization of the United Nations. Forestry and Timber Section, Geneva, Switzerland.

Statistical Office of the Republic of Serbia (2012) Forestry. Available at http: // webrzs.stat.gov.rs / WebSite / Public/ PageView.aspx ? pKey = 174 [Accessed on 05.04.2013].

Statistical Yearbook of the Republic of Croatia (2012) Forest Areas. Available at http://www.dzs.hr/default_e.htm [Accessed on 05.04.2013].

Stojiljkovic D (2011) Potential of Biomass in Serbia. Available at http://www.drustvo-termicara.com/resources/files/9bae712.pdf [Accessed on 05.04.2013].

Wolfslehner B, Krajter S, Jovi D, Nestorovski L, Velichkov I (2009) Framing stakeholder and policy issues for coppice forestry in selected central and southeastern European countries. Silva Balcanica 10: 21–34.