

## INFORMATION ANALYSIS OF MANAGEMENT GOALS OF PRIVATE FOREST OWNERS IN CROATIA

### INFORMACIJSKA ANALIZA GOSPODARSKIH CILJEVA PRIVATNIH ŠUMOVLASNIKA U REPUBLICI HRVATSKOJ

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#### *Abstract*

Forestry is an important source of income for forest owners and for employees in rural areas. The future of the people, who make a living in rural areas from forestry, will considerably depend on how individuals and institutions react in view of the changes, how forest owners and managers obtain new knowledge and put it into practice in forestry, and how institutions, especially forest administration, extension services, forest research or other institutions best deal with emerging changes. The new EU strategies for economic and social revival of rural areas included the diversification of economic activities, especially into tourism and leisure, the promotion of local products and new markets, the development of human resources and the support of national and international cooperation at the same time that promoted the participation of local stakeholders in the creation of rural employment. Forest Act from 2005 is the basic law that defines the key entities and their relationships with regard to forests and forestry in the Republic of Croatia. The principle of sustainable management of forest resources is obligatory for all entities dealing with forests and forest land. The private forest ownership in Croatia is highly fragmented. On average each owner holds two parcels which are not connected. The borders are not marked and in practice there is no certainty of ownership. Accessibility of private forests by forest roads is limited. The paper presents sociological forest functions and forest management goals among small-scale forest owners based on a sample of 350 owners in Croatia.

#### *Sažetak*

Šumarstvo je važan izvor prihoda za šumovlasnike i zaposlene u ruralnim područjima. Budućnost ljudi koji žive u ruralnim područjima a rade u sektoru šumarstva, znatno će ovisiti o tome kako će pojedinci i institucije reagirati na promjene, kako će šumovlasnici i menadžeri usvajati nova znanja te ih koristiti u praksi i kako će se nadležne šumarije, istraživačke i ostale institucije prilagoditi nastalim promjenama. Nova strategija Europske unije za gospodarski i društveni oporavak ruralnih područja uključuje različite ekonomske aktivnosti, posebno u turizmu i rekreaciji, promicanju autohtonih proizvoda i novih tržišta, razvoju ljudskih resursa i potpora nacionalnoj i međunarodnoj suradnji uz istovremeno promoviranje sudjelovanja lokalnih dionika radi stvaranju novih radnih mjesta. Zakon o šumama (2005) osnovni je dokument koji definira ključne subjekte i njihove odnose prema šumama i šumarskom sektoru u Republici Hrvatskoj. Načelo održivog gospodarenja šumskim resursima obvezno je za sve subjekte koji gospodare šumama i šumskim zemljištem. Vlasništvo nad privatnim šumama u Hrvatskoj vrlo je fragmentirano. U prosjeku svaki vlasnik ima dvije parcele koje nisu povezane. Granice parcela nisu označene i u praksi često ne postoji suglasnost o vlasništvu. Dostupnost parcela šumskim prometnicama je ograničena. U radu su prikazane sociološke funkcije šuma i ciljevi gospodarenja privatnih šumovlasnika temeljeni na uzorku od 350 vlasnika u Republici Hrvatskoj.

## 1. INTRODUCTION

The results of the First National Forest Inventory in the Republic of Croatia (Čavlović, 2010) have shown that the total area of forests and forestland is 2,580,826 ha while forested areas account for 2,377,686 ha of which 77% are state owned and 23% are privately owned. According to the same source, the total growing stock is 552,146,000 m<sup>3</sup> of which 84% is state owned and 16% is privately owned. This indicates size and quality of the majority of private forests. The average growing stock in state forests is 255.84 m<sup>3</sup>/ha and in private forests 155.84 m<sup>3</sup>/ha. The annual cut in state forests is 7,325,000 m<sup>3</sup>, whereas in private forests it is 1,087,000 m<sup>3</sup>. As much as 84% of forests are dominated by deciduous tree species, while 16% of forestland is covered with conifers /1/. Degradation of private forests in Croatia began with their segregation into privately owned forests in accordance with the Royal Patent of 17 May 1877. This is still an ongoing practice. According to Starčević /2/, /3/, the main causes of degradation include private property fragmentation, owners' social status, disintegration of villages, lengthy production cycle, uncertainty of private ownership, inadequate treatments, poor control and sanctioning, and disobedience of legal regulations. For all the above reasons, these forests were, consciously or not, left out of forestry experts and institutions controls and inspections. The early 19<sup>th</sup> century saw no interest in an integral forest development that would also incorporate forest regeneration. The forest estate was treated restrictively and prohibitively, while any interest of the forest owner was disregarded. After the Second World War only public and small-scale private forest estates remained. Private forests were subjected to degradation because the forestry policy did not provide for any incentives aimed at improving the forest estate status.

Private forest owners mainly belong to the older population of the rural inhabitants. Many of them do not take care of their forest property, or they do not live in the same place where their forests are. Government support to private forestry almost does not exist, in the same way as there is no related scientific research. Man-

agement of small forest properties is not part of the knowledge of most forestry experts. Younger forest owners are not interested in work and investments into forests.

Besides, all public services (financed by forest owners), all expenses, taxes and forestry financing are conveyed through „Hrvatske šume“ Ltd., which is an enterprise with a primary function of national forests management. Private forest owners and Croatian public are poorly informed on forestry in general. The beginning of communication and education of private forest owners between government bodies and forest owners has started with establishment of private forest owners associations. With the establishment of the Forest Advisory Service (February 2007), intended as a measure of forest policy with the goal of improving the status and management of private forests and a tool for allocating the funds collected from the use of non-wood forest functions (NWFF), the procedure of organizing forest owners into associations gained momentum (as a "triggering factor",/4/). During 2008 the "Croatian Union of Private Forest Owners' Associations" was founded as an umbrella union comprising all the associations in the Republic of Croatia with its headquarters in Zagreb and with the goal of representing the interest of all forest owners. The Union currently represents 37 associations from the whole country. The programmes for private forest management are not being renewed, while there are valid programmes for only 8% of all areas. The recorded logging is carried out within the frames of the allowed volume of the necessary assignment, without management guidelines and prescribed obligations of silvicultural activities. Such situation does not attract forest owners to develop interest for their forest property, and leads to further devastation and decrease of the growing stock in private forests. There is the principle of forest management where forest owner cuts the most valuable wood, leaving the remaining area to natural development. As a result of administrative obstacles, the uncontrolled and illegal logging together with illegal wood trade is on the rise. However, the regulations of the current Forest

Law (2005) prescribe equal obligations for both private forest owners and national forests, which is practically impossible to enforce, considering all that was said before. Because of the importance of rural development the intention of research was to analyse non-wood forest functions and forest management goals among small-scale forest owners based on a sample of 180 owners in Croatia.

## 1. MATERIALS AND METHODS

Forestry is an important source of income in rural areas for forest owners. The future of the people who make a living from forestry in those areas, will considerably depend on how individuals and institutions react to changes in business environment, how forest owners and managers obtain new knowledge and put it into practice in forestry, and how institutions, especially forest administration, extension services, forest research and other institutions deal with those emerging changes. The preferences of private forest owners have been analysed in two rural areas of Croatia, North-West private forests and Gorski Kotar, chosen because of significant number of private forest owners and forest-covered areas.

### 2.1. Croatia's North-West Private Forests

Forest management preferences of private forests owners were investigated in three north-western counties: the Koprivničko-Križevačka County, the Virovitičko-Podravska County and the Bjelovarsko-Bilogorska County. The study area is characterized by a large number of small plots, which constitute bigger or smaller forest complexes surrounded by arable land and meadows. Research items consist of small forest properties which make up forest complexes totalling 2.95 ha in size, and consisting of a larger number of cadastral plots. The terrain is intersected by water courses. The inclinations are mostly mild and the terrain is hilly, while in the southern part of the study area it is flat. The lowest point of the study area is 80 m above sea level, and the highest point is 646 m above sea level. The forest stands are in the area of the Euro-Siberian – North-American region. The largest part of the study area is covered by forests of pedunculate oak and common hornbeam

(ass. *Carpino betuli* – *Quercetum roboris*) and forests of sessile oak and common hornbeam (ass. *Festuco drymeiae* – *Carpinetum betuli*). In the sessile oak - common hornbeam belt there is a large number of stands dominated by common beech /5/.

### 2.2. Forests of Gorski kotar

State forests in Gorski Kotar region are managed by the company Croatian Forests UŠP Delnice. The total forest area of Delnice Forest Administration Office is 97 749 ha. Of these, 78 897 ha are commercial forests, 15 263 ha are protective forests and 1,185 ha forests for special purposes. Growing stock is 27,383,093 m<sup>3</sup> or 287 m<sup>3</sup>/ha. The increment is 519 766 m<sup>3</sup>, cutting volume 457 613 m<sup>3</sup>. Forests and forestry have significantly influenced the development of settlements and the existence of majority of the population. Forest area of Gorski Kotar is largely indigenous, natural forests. Great biodiversity of forest and marked elevation separations are result of geological substrate, terrain and climate influences. Forest and forest land cover more than 130 890 ha of Gorski Kotar, which is 83% of the surface. State forests are represented with 73% or 95 897 ha, private owned by 28 155 ha or 22%, while the rest 5% of the forest, or 6838 ha is managed by other legal subjects, primarily Faculty of Forestry Zagreb and National Park Risnjak. The beginnings of establishment of private forest owners' associations go back to 2004 when the first associations were founded in north-western and western Croatia (UPŠ Gorski kotar – Delnice, Husto – Bednja and Kesten – Lepoglava) initiated by the Ministry of Agriculture, Forestry and Water management. The First meeting of private forest owners in Croatia was held in Delnice in 2005.

### 2.3. Research methods

As the research has arisen in the context of the Finnish project "Forest Policy Education and Research in the Western Balkan region (FOPER)" it was founded by the European Forest Research Institute (EFI) Republic of Finland. The respondents' answers have been used only for scientific purposes and are anonymous. The purpose of the survey was to

evaluate how many forestlands may be available for the production of woody biomass according to the owners' willingness, to describe those private forest owners who are willing to supply wood biomass energy feedstock, and evaluation of factors affecting owners' decision to supply biomass. Questionnaire was developed after the definition of hypothesis. The questionnaire defines questions which measure variables within several aspects (knowledge about the renewable resources, membership, economic, institutional, silvicultural and sociological aspect), and tests hypothesis. The questionnaire was divided in three different parts:

- 1) Questions about the owned forestland, as well as the landowners' motivations and attitudes toward it;
- 2) Landowners' knowledge about wood-based bioenergy, their perspectives about local wood-bioenergy markets, as well as their willingness to produce woody biomass for energy purposes and small scale forest management objectives.
- 3) Landowners' personal information, such as age, gender, ethnicity, education, and income. Before its implementation, the questionnaire was pre-tested on a small sample of landowners to assure its appropriate language and sequence of the questions.

The different question types were defined. Time needed for finishing the questionnaire was adjusted to the target group, and finally decided after pre test (approximately 30 minutes per respondent to finish a questionnaire). Based on specific target group (rural remote areas, lack of telephone lines, internet not available, etc...) only door-to-door survey has the best respondent rate and is optimal for longer questionnaires.

The private forest owners were asked to rate their forest management objectives on the Likert scale from 1 to 5 based on their importance (1 very important, 2 important, 3 neither important nor unimportant, 4 unimportant, 5 completely unimportant). It was possible to give only one answer per question. The proposed preferences for forest management goals in questionnaire were:

- a) Investment for the future: Finance investment is putting money into something with the expectation of gain, that upon thorough analysis, has a high degree of security for the principal amount, as well as security of return, within an expected period of time.
- b) To leave as a heritage: Refers to something inherited from the past, natural heritage, an inheritance of fauna and flora, geology, landscape and landforms, and other natural resources
- c) Income and employment: to consider forest as a capital from which you make a living
- d) Timber production: Timber production is the process of managing stands of deciduous trees to maximize woody output.
- e) Non-wood forest products: Considered as any commodity obtained from the forest that does not necessitate harvesting trees. It includes wildlife, nuts and seeds, berries, mushrooms, oils, foliage, medicinal plants, peat, fuelwood, forage, etc
- f) Hunting: to use forest for game management
- g) Outdoor recreation: different kinds of nature recreation (adventure racing, backpacking, bicycling, camping, caving, fishing, hiking, horseback riding, mountaineering, photography, rock climbing, running, skiing).

## 2. RESEARCH RESULTS

To understand the divergent views on the development scope of small-scale forestry it is increasingly acknowledged that forestry needs to be conceptualized not only as a sectorial activity, but also within the context of rural development /6/. The preference for private property rests on the argument that only private property rights ensure that the holder will use the resource efficiently and responsibly. Thus, private property and common property are more usefully seen not as being mutually exclusive, but as two types of property with a good deal in common /7/.

The main product from private forests is fuelwood. About 35% of annual cut is mostly roundwood. The most of the private forest

owners are not able to cut and log timber by themselves, because they do not have the equipment needed. In case when forest owner wants to sell timber, he is required to obtain and pay for a permit from the state forest company "Hrvatske Šume" Ltd., who mark and measure the trees.

According to the National Inventory in Croatia the total annual cut in private forests is 1,087 mil. m<sup>3</sup>. In the realized annual cut, most important tree species are common beech, peduncled oak and silver fir. The comparison of growing stock and increment in state and private forest by regions is presented in table 1.

With regard to the climatic, topographic and geological diversity as well as to the geographic

position, Croatia can be divided into three different geographical regions and vegetation zones: the Pannonian lowlands in the east, the hilly and mountainous region and the Mediterranean coastal zone.

Privately owned forests in Croatia are not equally distributed; 13% of private forests are in the lowland area, 82% are in the hilly-mountainous area, and 5% are in the high-mountainous and pre-alpine area /8/. Private forests are divided into approximately 1.5 million cadastral plots, which are owned by more than 600,000 forest owners. Accordingly, one forest owner has in his possession 2 cadastral plots sized 0.76 ha on average.

Table 1. Regional distribution of forest areas in Croatia /9/

REGIONAL DISTRIBUTION										
	State forests					Private forests				
	Area	Growing stock		Increment		Area	Growing stock		Increment	
	ha	m <sup>3</sup>	m <sup>3</sup> /ha	m <sup>3</sup>	m <sup>3</sup> /ha	ha	m <sup>3</sup>	m <sup>3</sup> /ha	m <sup>3</sup>	m <sup>3</sup> /ha
<b>Lowland region</b>	350.164	79.157.932	226	2.391.051	7	106.989	10.400.244	97	374.915	4
<b>Mountain region</b>	837.704	187.489.769	224	5.351.698	6	192.409	18.867.455	98	712.657	4
<b>Mediterranean region</b>	63.552	5.337.741	84	226.814	4	135.009	8.757.400	65	262.850	2

In the lowland region, the main management class in private forests are seed forests of other hard-leaved tree-species like ash and common elm. Second are low value coppice forests of hornbeam. In mountain region, private forest consists of beech, but with half growing stock and increment per hectare (compare with state forests). Coppice of other hard-broadleaved tree species with low growing stock and increment are second. In Mediterranean region, the state owns coppice forests and high forests, artificial afforestations of *Pinus halepensis*.

Private owners do not have high forests, but a lot of different coppice wood. The distribution of private forest by Counties in Croatia shows that Istarska and Primorsko Goranska County have 70-80 000 hectares of private forests. On the other hand, due to the large amount of state forest property Osječko-Baranjska, Šibensko-Kninska and Vukovarsko-Srijemska County have private forest areas of up to 10 000 hectares (Figure 1).

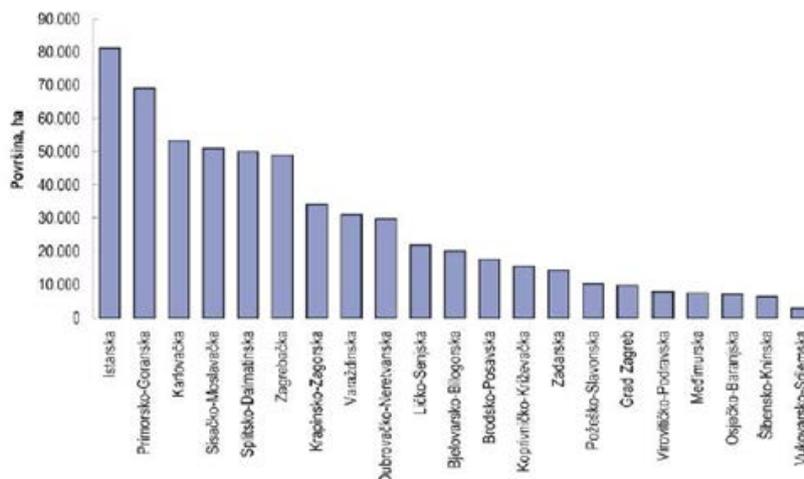
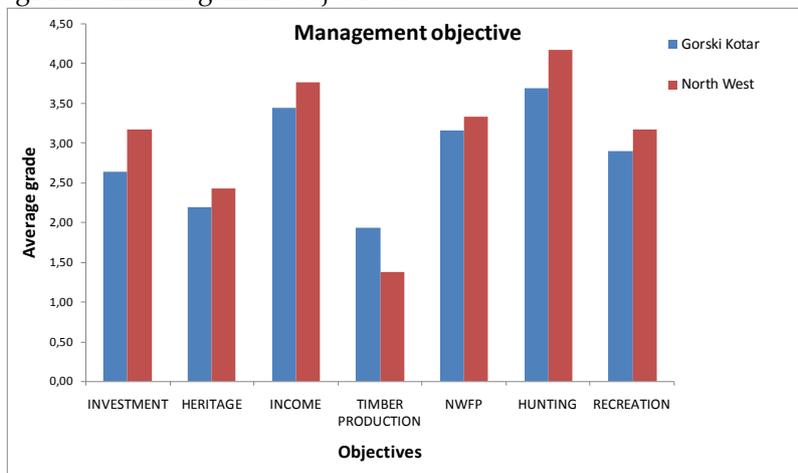


Figure 1: Private forests coverage per County in Croatia

According to the distribution of private forests research was conducted in Counties which have the biggest number of private forest owners. Data collection has been chosen randomly. The selected research areas are those with the biggest share of private forests. From the list of all villages in 4 counties, 18 villages have been chosen randomly and data has been collected from 10 people in each of 18 villages. Total number of questionnaires was 180. For the purpose of the paper two representative forest regions have been presented in the results. Overall, private forest owners in North West region considered forest management goals more important than owners in Gorski Kotar, giving them higher rates. The most favourable management objectives are to use forest for hunting (game management) or as an income. In the North West region perception of

a forest as an investment for the future is more important than in Gorski Kotar. Hunting is perceived as common and important objective for both regions. After hunting, income is the most important component in forest management; it is obvious that private forest owners have financial expectations from their forest property. Forest as heritage has almost the same average grade in both regions. Non-wood forest products are described as important because of their potential for additional income or products and services such as nuts and seeds, berries, mushrooms, oils, foliage, medicinal plants production. On the other hand, timber production has lower importance. Differences by the region and management goals are shown in Figure 2.

Figure 2: Average grades of management objectives



The different impacts could have influence on presented results like: small forest property size which causes limitations in forest management, lack of forest roads could cause inaccessibility of the forest property, fragmentation of forest property, non-existence of private forest owners associations, unsolved proprietary, ownership rights due to the cadastral issues, and illegal logging. According to the research results on this sample, private forest owners are not generally interested in using their forests for timber production. The reason for this perception is the low growing stock and poor quality in private forests (mostly coppice forests) than in the state forests.

### 3. CONCLUSIONS

The small size and fragmentation of the private forests in the region makes it difficult for individual owners to manage them efficiently in a sustainable way. Most of the forest owners have no interest in managing their forest without any economic benefit (income). Woody biomass production could offer one opportunity for the additional income in rural areas and create supply and use of renewable energy. The main beneficiaries should be private forest owners in rural areas, local communities and policy makers in the end. With good political framework and clear strategy, the share of woody biomass use in the region has the potential to double in the future. Thus, the main research benefit of the project is to define the preconditions of the woody biomass production from independent interest associations of private forest owners in the region. It is necessary to develop cross-sectorial collaboration of stakeholders (energy, forestry and statistics), the communication of private forest owners among themselves and raise awareness about the potentials of private forests. There is a strong interest association of private forest owners on national and regional levels, which has participated in the creation of forest policy and lobbying for the interests of private forest owners. Unsolved cadastre and ownership books are one of the major issues, which can not be solved easily. Regional inventory of private forest was conducted in 2006 with the usage of GIS, and it showed 21% larger surface of private forests than ten years previ-

ously. The area has not really increased, but the cadastre books did not cover the actual situation due to the small size of parcels of private forests. The ownership status is generally unsolved, and that is one of the major reasons for the non existence of market for forests. Current forest management plans are comprehensive, and it requires a lot of work to create them. It is impossible to have forest management plans of such scale for the private forests. Such management plans are appropriate for large management units, but in private hands there are none, and in the current state of very small parcels, simplification of forest management plans is necessary. How to manage Croatian private forests in the future? There are two possible management models that should be acceptable for private forest owner; to choose between self employment and contracting the management of private forests with forest management association. With the aim of improving the condition and the management of private forests there is a need to continue financing the overall private forestry sector from the green tax funds (OKFŠ); to introduce financial support for capital investment into forestry and support incentives for rehabilitation and conversion of forests, as well as forest property integration. In accordance to the rising awareness about the renewable energy, there is a need to support incentives for investments in the projects of building the systems for energy generation by using forest biomass. Forestry as a part of rural development policy plays important role in EU development strategy, as LEADER+ projects which use policy initiative for supporting new forest institutions and a range of forest-related actions in the development of non-wood forest products, value added products and environmental service /10/.

Private forest owners, through the private forest owners associations, should make more efforts to prepare projects and apply for the EU-membership funds which are mostly intended for the use of private forest owners.

For the future development of private forests it is necessary to issue a good and enforceable legislative, reduce the expenses of the private forest owners, stimulate the management of private forests, settle the property rights and

simplify forest management plans for private forests.

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