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ECONOMIC AND TOURIST FUNCTIONS OF THE FORESTS IN LUBLIN PROVINCE

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ABSTRACT: The research objective was to present social and economic functions of forests in Lublin Province against the background of other Polish provinces, at the same time pointing at the most important functions performed by the forests of the studied region. The research was conducted with the use of the diagnostic survey method by employing the technique of questionnaire, statistical data analysis and the analysis of the documentation made available by the Directorate of National State Forests. The forests of Lublin Province yield the most forest berries in Poland (on average 2725,29 tons a year). The main motivation for visiting forests among rural residents and inhabitants of small towns is the collection of forest berries and mushrooms; 61.0% and 50.8% respectively, while for inhabitants of larger cities it is recreational tourism and rest opportunities (67.8%). The added value of the study is cohesive factsheet of the economic and social functions of forests in the Lublin Voivodship.

KEY WORDS: forest, Lublin province, forest functions

Introduction

Forests are one of the most valued resources in the world, as they have preserved the original form of nature, only slightly changed by man (Mandziuk, Janeczko, 2009, p. 64). The landscape of Poland is inseparably associated with forests. Forests deliver numerous benefits and have a positive impact on human life and communities (Dawidziuk, Klocek, 2005, p. 64-67). All those benefits called functions of the forest and their range and level depends on a given forest's characteristics, management and development plan and conducted forestry management (Cristan et al., 2016, p. 133-151). For every historic community forests may perform different functions, however among the most popular ones we can enumerate: protective, economic and social functions (Klocek, Płotkowski, 2007, p. 45).

Protective functions of forests consist in protecting pristine fragments of the natural environment, ones of particular value with regard to genetic, landscape and scientific qualities (Łonkiwicz, 1996, p. 20). The economic function of forests consists in such management of forest resources which enables maximum timber production, harvesting forest berries and mushrooms in addition to other non-timber products, while simultaneously retaining the renewability of these resources (Barbier et al., 2017, p. 10-17). Forest administrators must remember about sustainable forestry management and skillful drafting the forest management and development plan, so that the economic and tourist usage of the woods would not adversely impact forest soil or water bodies (Buchowski et al., 2015, p. 90). The social function denotes exploiting the health benefits of forests in pursuit of tourism and recreation, as well as conducting ecological education in the natural environment (Cool, Patterson, 2000, p. 111-119). It ought to be borne in mind, however, that an increase of one function may negatively affect the other functions of forests and at the same time many functions are mutually complementary (Plotkowski, 2008, p. 254; Tuffery 2007, p. 33-41). Going for a walk in the woods we can pick berries and mushrooms, and also we can benefit from the healthy forest environment (Plotkowski, 2008, p. 255).

The following hypothesis was made during the research: the weight of the modern forest farm was shifted from the production function of the forest to tourist and recreational functions. The demand for social functions of the forest grows even more when the majority of the population lives in large cities.

The objective and methodology of research

At present, there is a misconception in the society that non-economic functions can only be performed by legally protected forests, which undervalues other forest complexes that also carry out these functions and are managed by self-financing and profitable businesses, for example by developing tourism and recreation. The research objective was to present social and economic functions of forests in Lublin Province against the background of other Polish provinces, at the same time pointing at the most important functions performed by the forests of the studied region. The research was conducted with the use of the diagnostic survey method by employing the technique of questionnaire, statistical data analysis and the analysis of the documentation made available by the Directorate of National State Forests.

The questionnaire survey was conducted among 1500 inhabitants of Lublin Province using a purposeful sample selection, 500 residents were selected from rural locations, towns up to 20 thousand residents and towns/cities with population above 20 thousand, who take trips to the forest at least once a year. The research objective was to determine the main purpose of visiting the woods. The research was conducted from April to June 2016.

For statistical analyses the program Statistica 10.1 PL was employed, with a discriminating function which is used for determining which variables discriminate emerging groups. Before commencing the analyses, a multidimensional normality was investigated by inspecting every variable for distribution normality. It was assumed that the matrices of the variance of variables are homogenous within groups. Slight deviations were not as important on account of considerable numbers of respondents in particular groups. Statistical significance was assigned to those differences between mean values whose probability of randomness was lower than $p < 0,05$.

The study area characteristic

There are 584 034,25 hectares of forests in Lublin Province, where 59% are state forests and 41% are private ones. The forestation of Lublin Province is 23%. The largest forest complexes are: Janowskie Forests, Strzeleckie Forests, Roztocze Forests, Sobiborsko-Włodawskie Forests, Sandomierz Woods and Kozłowskie Forests. This terrain is geomorphologically diverse: lowland forests lie to the north of the province while uplands reaching even 300 metres above sea level lie in the south. Conifer forest habitats cover 46,8% of the area, broadleaf ones 44,3%, swampy ones 5,9% and upland ones 3,0% of the forested area. The dominant tree species in the forest of Lublin Province

is the pine (69.9%) with the remaining ones being: oak, alder, birch, beech, sycamore, fir, ash, aspen and poplar. The average forest age is 59 years (RPOPLP, 2003, p. 2).

Discussion and results of the research

Economic exploitation of the forests in Lublin Province

In opinion of Watson and Ward (2010) the economic functions of forests are exhibited as, among others, benefits from the production of timber and non-timber products (e.g. forest berries and mushrooms, game, mineral resources). Barszcz and Suder (2004) write that the traditional connection between forest and man still has huge importance. Picking mushrooms, forest berries and other forest fruits and products is one of the oldest customs.

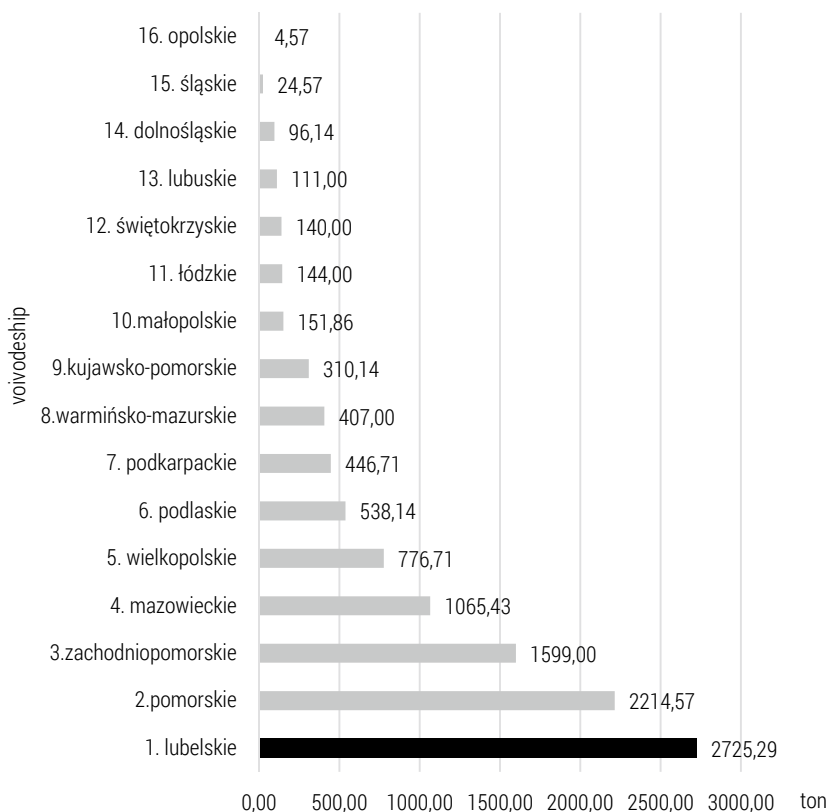


Figure 1. Supply of forest berries in Poland during 2009-2015; annual average in tons by province

Source: author's own work based on data from GUS (Central Statistical Office), Economic functions of the forests, Warsaw, 2016.

According to Regional Operational Program for Forest Policy published by National Forests (2003) forests perform a very important function, because thanks to this function new workplaces are created (in all of Poland in 2015, 375 thousand people were employed in forestry), participates in generating the gross national product (yields around 2% of GNP), the timber industry sales abroad amount to 45 billion PLN a year, accounting for 10% of the entire Polish export, provides raw materials to many industrial sectors; among others to paper, construction and furniture industries, etc.

Nationwide, Lublin region is ranked first in supplying forest berries (blueberries, raspberries, blackberries), as in the period from 2009 to 2015 gatherers supplied 2725,29 tons a year on average (figure 1).

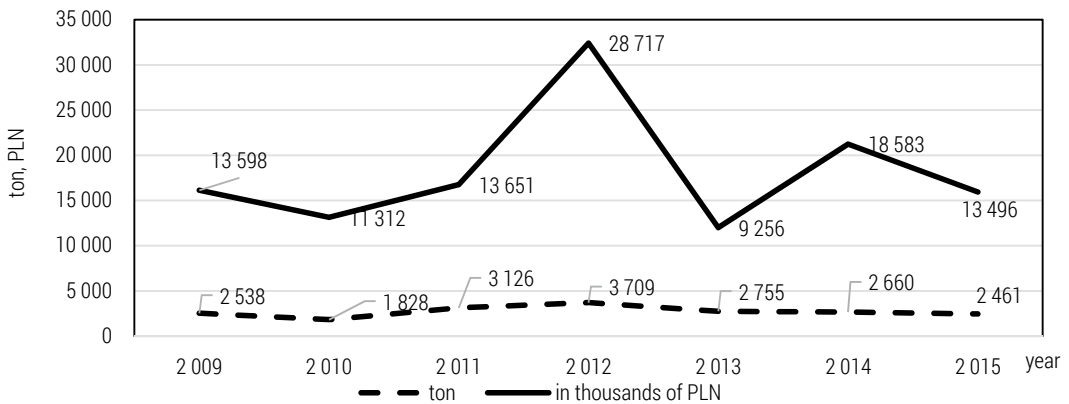


Figure 2. Purchase of forest berries in tons and its value in thousands of PLN during 2009-2015 in Lublin Province

Source: author's own work based on data from GUS (Central Statistical Office), Economic functions of the forests, Warsaw, 2016.

On the basis of the data shown in figure 2 one may note that the largest harvest of forest berries occurred in 2011 and 2012, when the purchase from gatherers was 3126 and 3709 tons of forest berries respectively. As regards purchase figures, the years 2012 and 2014 stand out with the value of purchased forest berries amounting to 28717 and 18583 thousand PLN respectively. The figures for fruit purchase also depend on the price. In the years mentioned before, the pricing of these fruits was the most favorable, since it was 7,74 PLN/kg in 2012 and 6,99 PLN/kg in 2014 (figure 3).

Purchase of mushrooms from gatherers is definitely of lesser importance in Lublin Province forests. The studied province was ranked twelfth in Poland regarding the quantity of purchased forest mushrooms. On average only 5,14 tons of mushrooms are purchased annually, while in Wielkopolskie Province as much as 1581,57 tons (figure 4).

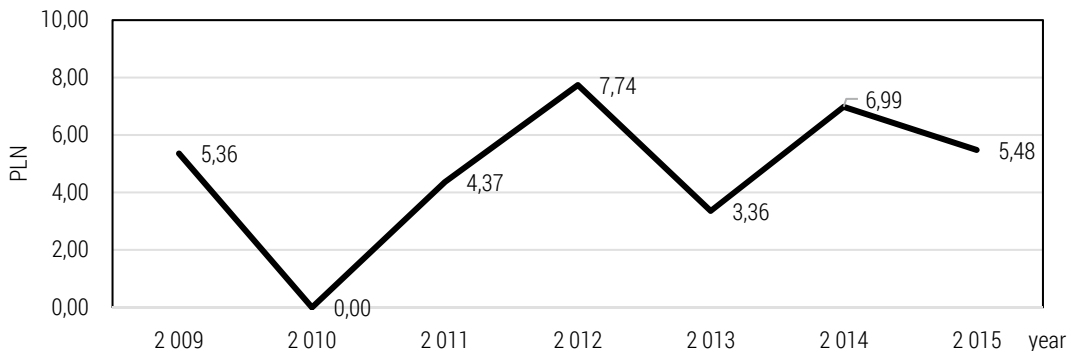


Figure 3. Average baseline purchase price of forest berries in PLN/kg during 2009-2015 in Lublin Province

Source: author's own work based on data from GUS (Central Statistical Office), Economic functions of the forests, Warsaw, 2016.

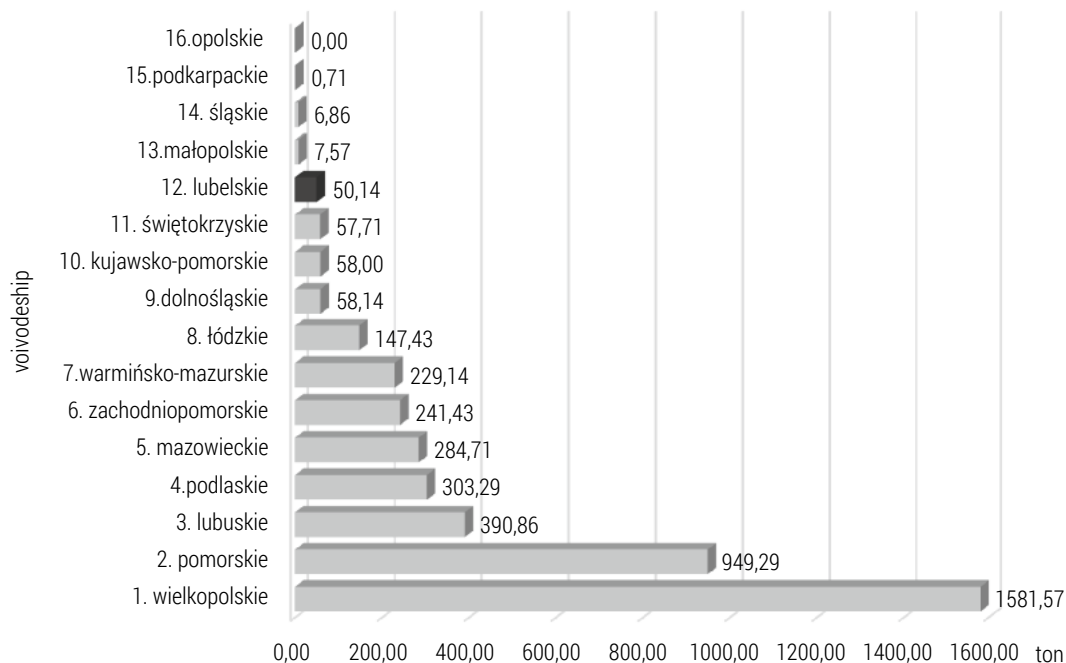


Figure 4. Average annual purchase of forest mushrooms from gatherers in Poland during 2009-2015, annual average in tons by province

Source: author's own work based on data from GUS (Central Statistical Office), Economic functions of the forests, Warsaw, 2016.

The most mushrooms were purchased in Lublin Province in 2013 (134 tons worth 1281 thousand PLN) and in 2014 (117 tons worth 927,9 thousand PLN) (figure 5). The highest purchase price of mushrooms was noted in 2015, when it was as high as 23,04 PLN/kg. it most probably stemmed from low supply of mushrooms (only 26 tons) caused by drought (figure 6).

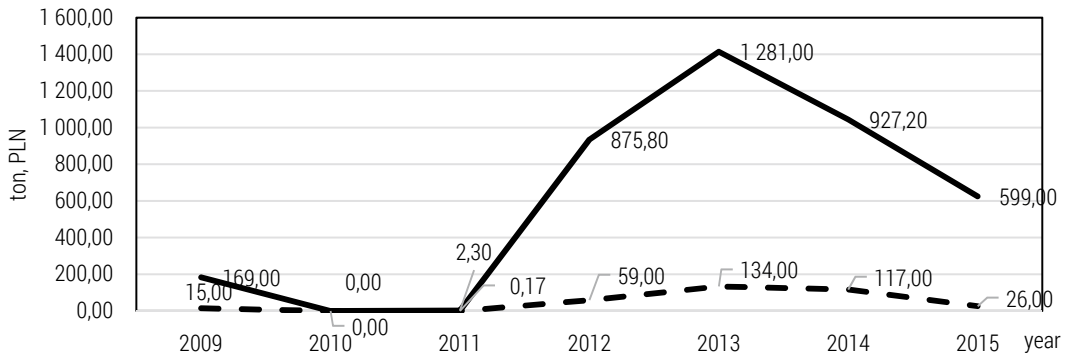


Figure 5. Purchase of forest mushrooms in tons and its value in thousands of PLN in Lublin Province during 2009-2015

Source: author's own work based on data from GUS (Central Statistical Office), Economic functions of the forests, Warsaw, 2016.

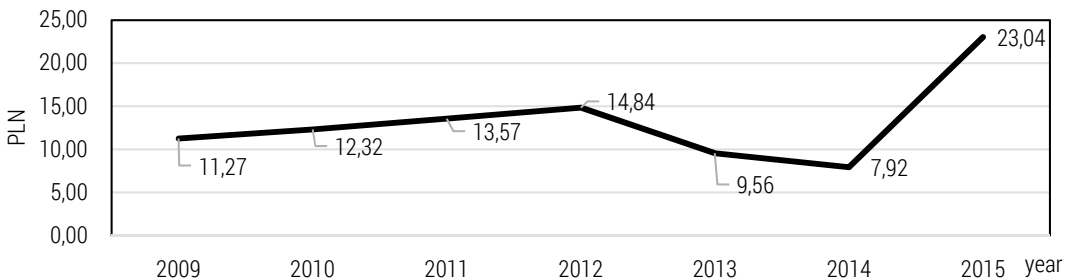


Figure 6. Average purchase price of forest mushrooms in PLN/kg during 2009-2015 in Lublin Province

Source: author's own work based on data from GUS (Central Statistical Office), Economic functions of the forests, Warsaw, 2016.

Similarly as in the case of mushrooms purchase, the supply of game placed Lublin Province in the 12th position in Poland. During 2009-2015 an annual average level of 1957,37 tons was achieved. Nationwide the largest quantities of game were purchased in Zachodniopomorskie Province (13708,03 tons), and the smallest quantity in Świętokrzyskie Province (304,51 tons), which is depicted in figure 7.

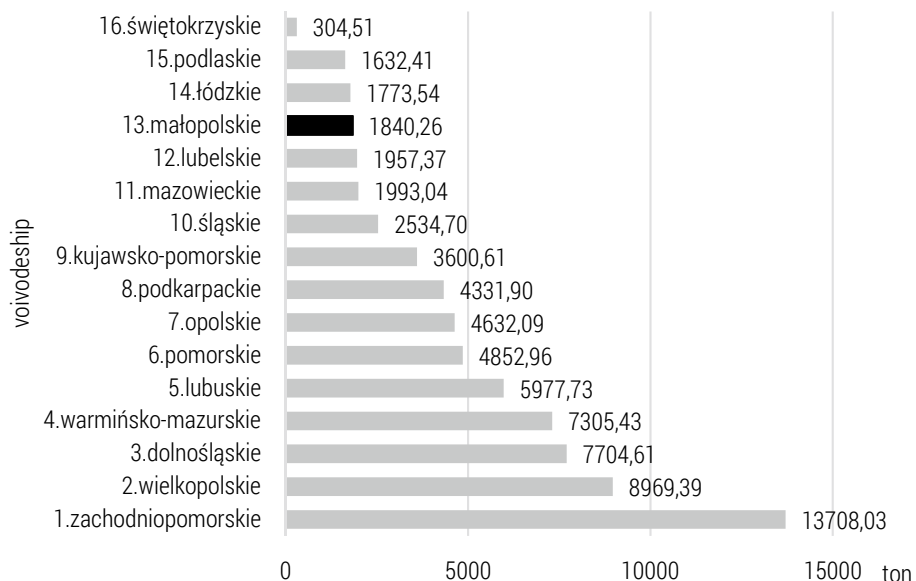


Figure 7. Average annual purchase of wild game in Poland during 2009-2015, annual average in tons by province

Source: author's own work based on data from GUS (Central Statistical Office), Economic functions of the forests, Warsaw, 2016.

When analyzing the purchase of wild game in Lublin Province during 2009-2015 it was found that the largest quantity of game was supplied in 2011 (3288,6 tons), while in 2012 there was a decrease by as much as 991,4. In 2014 the purchase amounted to 1427,6 tons, in the following year it rose by 530,3 tons, and in 2015 it maintained the level of 2163,3 tons (figure 8).

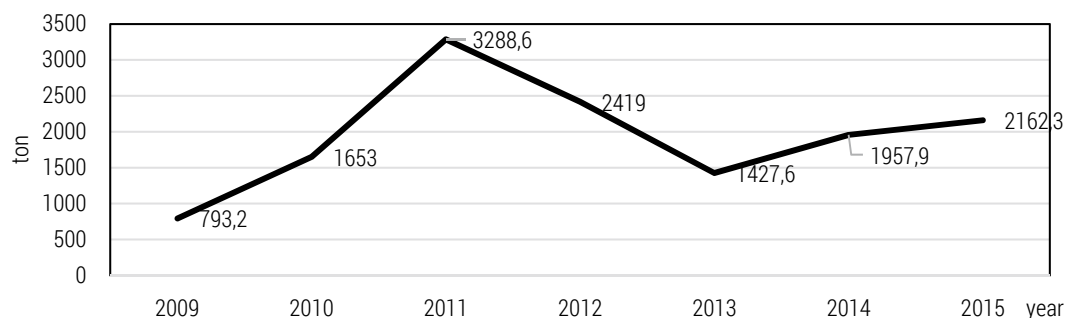


Figure 8. Purchase of wild game in tons in Lublin Province during 2009-2015

Source: author's own work based on data from GUS (Central Statistical Office), Economic functions of the forests, Warsaw, 2016.

A similar situation was recorded in the case of timber purchase. In Lublin Province this purchase amounted to an annual average of 1486,96 m³ of timber, allowing the studied province to hold the 12th position in Poland, ahead of Opolskie, Świętokrzyskie, Łódzkie and Małopolskie Provinces (figure 9).

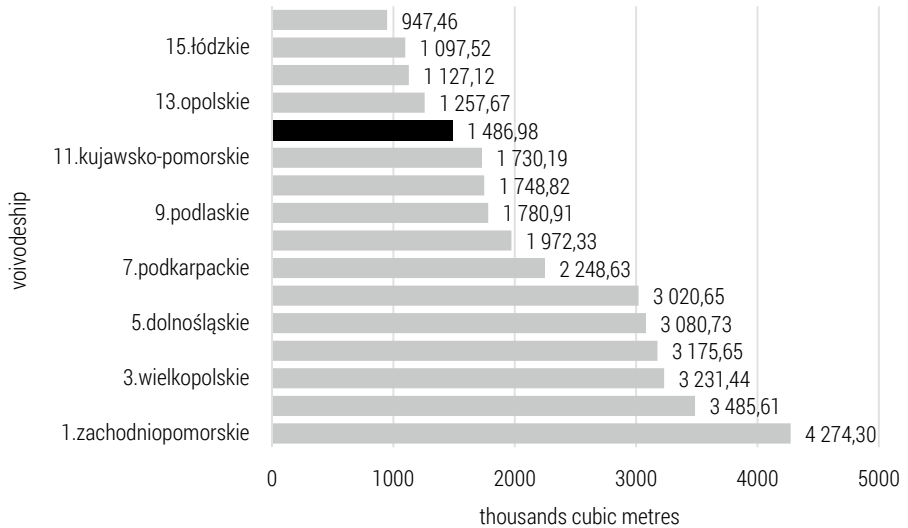


Figure 9. Average annual purchase of timber in thousands cubic metres during 2009-2015 in Poland by province

Source: author's own work based on data from GUS (Central Statistical Office), Economic functions of the forests, Warsaw, 2016.

It is noteworthy that in this respect the purchase value increased year over year. In 2009, 1225,87 m³ of timber was purchased and in 2015 as much as 1710,55 m³, thus over a six-year period there occurred a nearly 40% increase, which was depicted in figure 10.

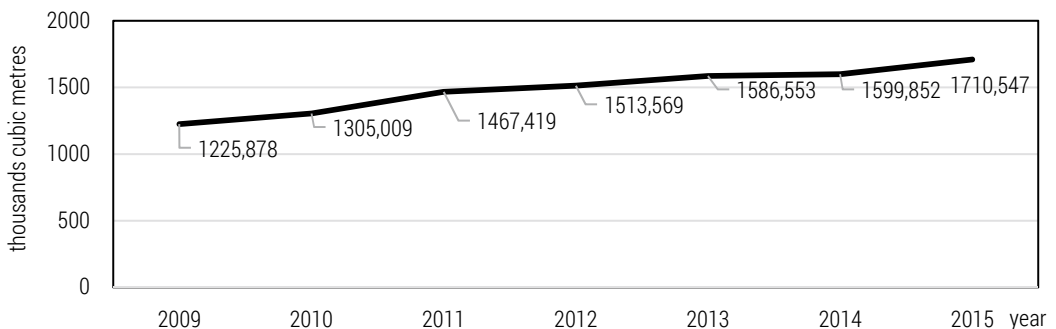


Figure 10. Purchase of timber in thousands of cubic meters in Lublin Province during 2009-2015

Source: author's own work based on data from GUS (Central Statistical Office), Economic functions of the forests, Warsaw, 2016.

In the process of harvesting timber in state forests, the principle of sustainable forestry is applied, which consists in the requirement whereby wood and paper processing should take place in regions of high forestation indicator and a large number of companies dealing with wood processing. In Lublin Province such regions include Districts of Biłgoraj, Tomaszów, Zamość, Janów, Bialsko, Radzyń, Ryki, Lubartów, Puławy, Opole, Parczew and Włodawa. In such regions new areas should be reforested for production purposes. In accordance with the forest development plans such terrains should cover an area of at least 5 hectares with width of no less than 200 meters (Buchowski et al., 2015, p. 91).

Similar values were ascertained also in other European countries (Merlom Croitoru, 2005, p. 406). For example studies by Sisak and Dudik (2016) revealed that average annual value of the intensive forestry timber production sold from Czech forests is 19,000 mil CZK (262 EUR/ha of forest) and the material value of collected mushrooms and berries is more than 3500 mil CZK (48 EUR/ha of forest).

Management and development of Lublin Province forests for tourism

Tourism and recreation in forests is one of the major forms of non-commercial functions of forests and ought to be continuously developed and refined (Tuffery, 2017, p. 33-41). Mandziuk and Janeczko' survey (2009, p. 65) shows that in recent years there has been observed a growing interest of the society in tourism and recreation in forests, which stems from, among others, an increase in the ecological awareness of the population. According to the data by POT, forest tourism in 2014 was pursued by circa 63% of the Polish citizens (Zientarska, 2016 p. 3). Nevertheless, in many European countries, forests has not only a economics but also the social, entertaining, recreational importance (Glück, 2000, p. 178-185).

The management and development of forests for tourism purposes consists in equipping them with accommodation and recreational facilities and amenities (Destan, 2011, p. 212-223). The development intensity is largely dependent on the location of forests and the functions associated with them, as well as on the financial capabilities of forestry inspectorates (Reeson et al., 2015, p. 267-272).

Table 1. Management and development of Polish forests for tourism per province

| Description | Car parks in forests | Forest campsites | Sites for campfires | Lodging for hunters | Accommodation in forested areas | Educational trails and tourist trails | Education and museum facilities | Training and recreation centres |
|---------------------|----------------------|------------------|---------------------|---------------------|---------------------------------|---------------------------------------|---------------------------------|---------------------------------|
| dolnośląskie | 36 | 3 | 16 | 7 | 9 | 51 | 10 | 3 |
| kujawsko-pomorskie | 142 | 17 | 6 | 5 | 5 | 43 | 10 | 2 |
| lubelskie | 53 | 4 | 18 | 10 | 12 | 66 | 10 | 3 |
| lubuskie | 153 | 43 | 17 | 7 | 1 | 76 | 15 | 2 |
| łódzkie | 10 | 0 | 1 | 7 | 2 | 29 | 9 | 2 |
| małopolskie | 18 | 18 | 10 | 2 | 4 | 16 | 13 | 4 |
| mazowieckie | 80 | 3 | 16 | 3 | 5 | 55 | 19 | 2 |
| opolskie | 114 | 21 | 8 | 0 | 4 | 37 | 9 | 0 |
| podkarpackie | 25 | 9 | 6 | 4 | 5 | 103 | 25 | 2 |
| podlaskie | 33 | 21 | 25 | 5 | 16 | 74 | 26 | 4 |
| pomorskie | 186 | 20 | 14 | 7 | 8 | 82 | 11 | 5 |
| śląskie | 32 | 4 | 4 | 2 | 1 | 45 | 12 | 2 |
| świętokrzyskie | 35 | 2 | 6 | 1 | 4 | 31 | 9 | 0 |
| warmińsko-mazurskie | 100 | 49 | 10 | 6 | 11 | 78 | 23 | 1 |
| wielkopolskie | 197 | 22 | 25 | 8 | 12 | 75 | 29 | 4 |
| zachodniopomorskie | 247 | 78 | 13 | 4 | 7 | 73 | 20 | 6 |
| Amount | 1461 | 314 | 195 | 78 | 106 | 934 | 250 | 42 |

Source: author's own work based on the data from the Directorate of State National Forests in Warsaw.

Table 1 presents tourism-oriented development of forests in Lublin Province against the background of other provinces. What follows here is that in the forests of Lublin region there are still too few equipped forest campsites (with only 4 functioning), hunters' lodgings (only 10) or forest centers for training and recreation (only 3). Hunters' lodgings are located within the grounds of Centers for Game Husbandry belonging to State National Forests and are used both by foreign hunters and, increasingly, by domestic tourists, hence care should be taken to increase their number. Also for the purposes of tourism and recreation, forest centers for training and recreation, of which there are only 3 (Biłgoraj, Hanów and Zwierzyniec), should be used to a greater extent. Presently, none of these facilities is not used in its full capacity despite the very good technical condition of these facilities and possibility full catering.

Main purposes of visiting forests among the residents of Lublin Province

On the basis of the data shown in figure 11, one can notice that for 61% of rural residents of Lublin Province the main purpose of staying in the forest is the collection of mushrooms and berries, while only for 19.6% of them it is recreational tourism. A similar situation is recorded in the case of respondents from small towns of up to 20 thousand population. Nearly 51% of respondents indicated that the main purpose behind forest visits is berries and mushrooms gathering, and for only 33.2% it is tourism and recreation.

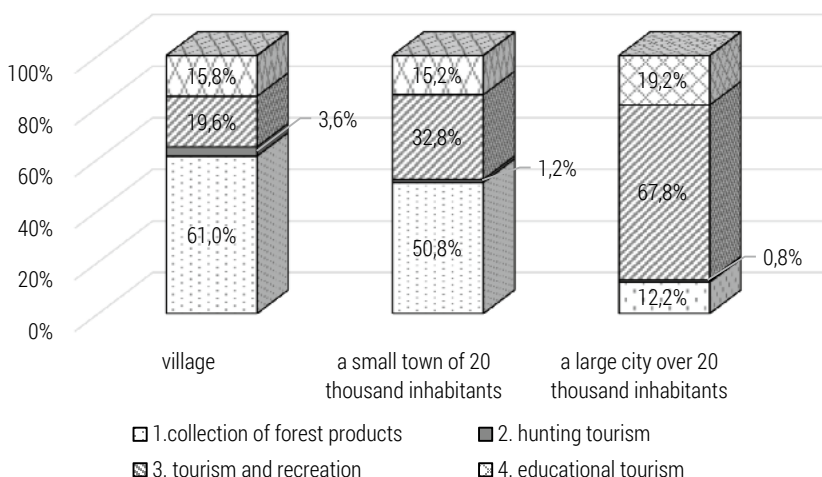


Figure 11. The main purpose of visiting the forest per the place of residence of respondents
 Source: author's own work based on questionnaire survey.

The conducted research shows that residents of large cities treat forest mainly as a location for rest and recreation (62.8% of indications), as well as the place for gaining new knowledge (19.2% of indications). Hunting tourism is mainly pursued by rural residents (3.6%).

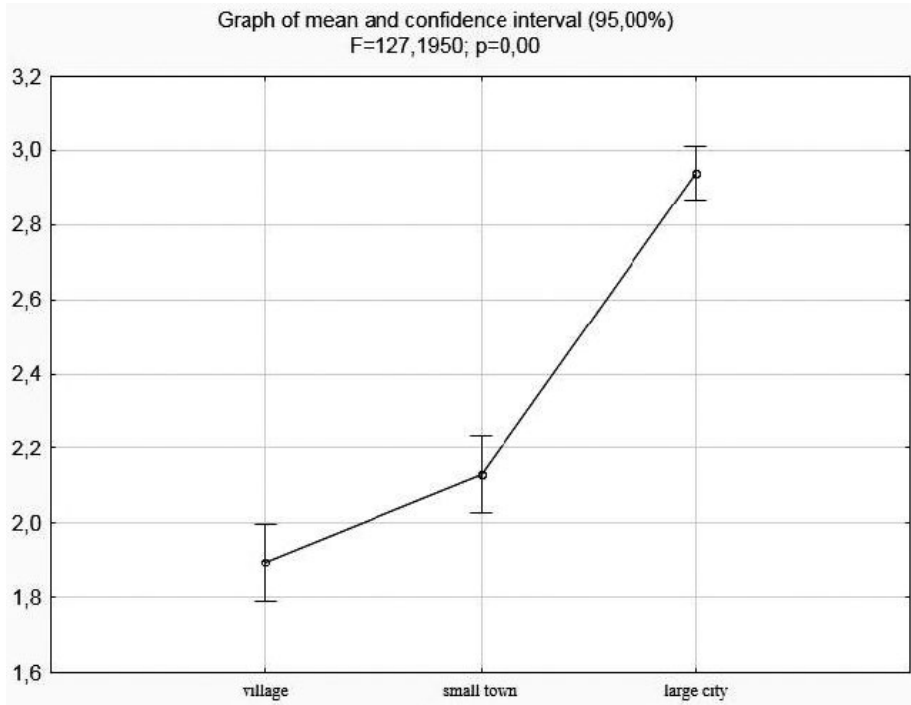


Figure 12. Interaction graph – the main purpose of visiting the forest per the place of residence

Source: author's own work based on questionnaire survey.

By resorting to the analysis of variance, the significance of differences between the place of residence and the main purpose of visiting forests was investigated. What follows from the variance analysis is that at $p=0,00$, i.e. $p>0,005$, the zero hypothesis postulating the lack of the significance of differences should be rejected in favour of an alternative hypothesis which states significant differences between the place of residence of respondents and the main purpose of their visits in forests. Test results confirm the interaction graph (figure 12).

Barszcz's survey (2006, p. 2) shows also that a great socio-economic role of forests in small as well as great communities but its importance is different and depends on place of residence. Forests for inhabitants of villages and small towns are the place of working. They harvest a greater amount mush-

rooms and fruit in comparison with the residents of large towns. City-dwellers do not treat forests as a source of income but rather as an element of recreation.

Conclusions for practice:

- The forests of Lublin Province yield the most forest berries in Poland (on average 2725,29 tons a year). Of lesser importance is the harvest and sale of mushrooms (50,14 tons) or sourcing game (1957,37 tons). These forests meet the local demand for timber, whose purchase reaches the level of 1486,98 cubic metres a year.
- The tourist function of the forests in Lublin Province is not fully exploited. In the studied area there are as many as 66 educational trails and tourist trails. There are, however, too few accommodation facilities, campsites or training centres. Moreover, the existing tourism infrastructure is not too plentiful and the accommodation facilities, found in the forests, require better promotion as they are not fully booked, especially outside the tourist season.
- The main motivation for visiting forests among rural residents and inhabitants of small towns is the collection of forest berries and mushrooms; 61.0% and 50.8% respectively, while for inhabitants of larger cities it is recreational tourism and rest opportunities (67.8%). The data also indicate that the population of villages and small towns seek additional income in forests but they lack knowledge with regard to opportunities of gaining profits from the recreational function of the forest.
- Further research should address the reasons for low occupancy of hunting lodges and recreation centers in Lublin forests.

Conclusions for science

- From an economic point of view, it is very important to indicate both the total benefits and the social costs of implementing the economic and social functions of the forest. Knowledge of these categories is essential for practical solutions that are today the subject of the forest management reforms in many countries.
- One should look at the role and function of forests from the perspective of the social value of the forest concept. This is reflected in the complex perception of forest values.

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