


ORIGINAL PAPER

Social preferences of financing recreational ecosystem services in forest – the case of the 'Janowskie Forests' Promotional Forest Complex

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ABSTRACT

The aim of the study was to determine the willingness to pay for recreational ecosystem services in the 'Janowskie Forests' ('Lasy Janowskie') Promotional Forest Complex (LKP) in Poland according to different social characteristics. To this end, we conducted a survey from May to August 2023 among a group of 820 respondents visiting in the area. The study used the contingent valuation method, in the Willingness to Pay (WTP) variant. In order to exclude the income factor, respondents were presented with a scenario in which their income would be increased tenfold (WTP2). The results obtained were subjected to statistical analyses (the Chi² test, the Mann-Whitney U test and the Kruskal-Wallis test). The analyses were performed with PAST 4.0 software. The level of significance of observed differences was determined at 0.05. As a result of the study, we have established that slightly more than half of all the respondents were willing to pay some amounts for the maintenance of Janowskie Forests (51%). The average declared payment was to PLN 65.5/person/year. Looking at the relationship between the declared amounts (WTP) and sociological characteristics of respondents, we demonstrated that gender had a significant influence on the willingness to financially support the LKP 'Janowskie Forests'. Women gave significantly more negative answers than men. The level of education of the respondents also significantly influenced their willingness to support the LKP. The higher the level of education of the respondents, the more willing they were to declare WTP. The results of the study showed significant discrepancies with regard to the age of the respondents, and no statistically significant relationships were found between age and the declared amount of WTP. With regard to the respondents' place of residence, we found that local residents were significantly less willing to pay for LKP protection than respondents from other regions of Poland. The occupational status of the respondents also had a significant impact on the issue of financial support for the LKP. Statistically significant differences between occupational status were also found in situations of increased income (WTP2). The respondents' income level had a significant influence on their willingness to pay for the maintenance of the LKP. We observed that respondents with higher income declared higher WTP. The study results could prove helpful for managers of forest areas with increased recreational function in developing pro-environmental policies at different management levels.

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KEY WORDS

community needs, contingent valuation method, public participation, rest, sociological characteristics, willingness to pay

Introduction

Currently, forest areas are credited with providing a number of ecosystem services, defined as natural assets and processes, and with the effects of their existence and functioning, which provide the values necessary for life and human development and for the course of economic production processes. The most important forest ecosystem services include: provisioning (including timber, game or forest fruits), regulating (protection of air, soil, water, biodiversity) and cultural benefits (recreation, jobs) (The Millenium Ecosystem Assessment, 2005). These services constitute a combination of the numerous assets of the forest environment that benefit the public (Kałamucka, 2015). Kaliszewski *et al.* (2023) point out that the forest ecosystem services can be examined on the national, regional and local scales. This is especially important for determining their recreational value for the local communities. Therefore, the rank of ecosystem services in light of their protection due to the benefits provided to humans is gaining new importance in the relationship between people and the environment (Kałamucka, 2015; Stepniewska, 2020). The division of ecosystem services is in part concurrent with the division of the main functions of the forest into production, protective and social functions (Kaliszewski *et al.*, 2024). The importance of the different forest functions changes over time, which is reflected, among others, in the State Forests' silvicultural principles (ZHL, 2023), which currently define two main groups of functions – the natural ones (resulting from the very existence of forests) and ones that can be shaped (protective, economic and social functions – achieved with the forest management methods). Forest functions are understood as the benefits that people derive from the forest.

As regards the social needs, many studies analysing the importance of ecosystem services of the forests indicate that regulatory and cultural benefits of forests are perceived by the society as more valuable than the provisioning services (Martín-López *et al.*, 2012; Gołos 2018; He *et al.*, 2018; Nastran *et al.*, 2022). The environmental services are of particular importance for the public. In countrywide studies conducted in Poland the respondents rated the protective services of the forest environment (the air, soil, habitat for plants and animals, the influence of forest on the climate) and the recreational services of the forest higher than the function of forests seen as source of timber, forest fruits and mushrooms (Gołos, 2018). This is associated with the increasing role of the social services of the forest in recent years and is due to, among other things, more leisure time, increased awareness of the ecological environment, better access to knowledge and concern for the physical and mental wellbeing of people (Kaplan and Petersen, 1993; Janeczko *et al.*, 2019; Scarascia-Mugnozza *et al.*, 2000).

Forest recreation has a special place in the group of cultural ecosystem services. Due to the universal and free access to forests and due to the fact that they take up about 30% of the territory of Poland, the large, compact forest complexes are a popular recreational area for the public. The recreational function, as one of the many non-productive functions, has the characteristics of a non-market (public) good. Therefore, its value is most often determined as a component of many types of non-market values, identified with the non-productive benefits of forests (Sarker and McKenney, 1992; Żylicz and Giergiczy, 2013). Research findings prove that the public often finds it difficult to assign a specific value category to the recreational function of the forest

(Mandziuk *et al.*, 2021b), although the studies conducted by Gołos (2018) and Żylicz (2004) indicate that most frequently, the public most often assigns non-market value to recreation in forest areas in terms of consumption (passive-use), use, bequest and option value.

The aim of this study is to determine the willingness to pay (WTP) recreation in forest areas depending on the sociological characteristics of the respondents, such as their gender, age, place of residence, social status and income, based on the example of the Promotional Forest Complex 'Janowskie Forests' (LKP LJ) in Poland.

Materials and method

Promotional Forest Complex 'Janowskie Forests' ('Lasy Janowskie') is located within the area of the Janów Lubelski Forest District (Regional Directorate of the State Forests in Lublin). The LKP LJ is a large, compact forest complex with area of approximately 31.5 thousand hectares, established as one of the first complexes of that type in Poland; forms part of the Solska Forest. Currently, there are 25 Promotional Forest Complexes in Poland. The LKP LJ was established by force of the ordinance of General Director of the State Forests (Zarządzenie, 1994). It was established to promote multi-functional forest management based on nature and forestry education, while taking advantage of the many scenic, natural and historical values of this area. The Janowskie Forests comprise primarily stands of pine trees and are characterized by a significant variety of the landscape, including forest meadows, peat bogs and ponds. The whole LKP LJ is included in the European NATURA 2000 network of nature protection areas; and comprises 6 nature sanctuaries with total area of approximately 4.35 thousand hectares as well as three nature educational routes and the Janowskie Forests Landscape Park (<https://www.lublin.lasy.gov.pl/lesny-kompleks-promocyjny>). The LKP area is very popular with tourists, due to its numerous natural and historical attractions and the developed road and accommodation infrastructure.

The method used most frequently in practice to determine the value of non-market services is the contingent valuation method (CVM), in its Willingness To Pay (WTP) and Willingness To Accept (WTA) variants. The CVM method is based on a hypothetical scenario in which one needs to determine the level of 'price' for recreational use of the forest. The WTP method involves the determination by the respondents the possibility to protect/maintain a natural resource in the hypothetical situation of its survival. The amounts suggested for its financing constitute a measure of its economic value. A study performed with the WTP method involves the determination of value of a natural resource defined as the willingness to finance it, whereas the WTA method is defined as the declaration of intent to receive compensation in exchange for giving up its use (Arrow *et al.*, 1993; Barrio and Loureiro, 2010). The WTP method can be used to determine public preferences regarding the hypothetical WTP amounts based on numerous factors, including the general presence of the forest (Gołos, 2018), the extent of forest development for recreational purposes (Giergiczny *et al.*, 2015), distance from the place of residence or many social characteristics of the respondents (Mandziuk *et al.*, 2021a).

In order to determine the dependence of the WTP amounts on the sociological characteristics of the respondents, we have conducted surveys at the LKP 'Janowskie Forests' in locations that are very popular among tourists. These locations included the educational route in the vicinity of the Environmental Education Centre, the area of the Janowskie Forests and historical sanctuary and the educational route Porytowe Wzgórze (Porytowe Hill). The survey was conducted between May and August 2023 on a group of 820 people residing in the area. These included tourist and residents of the surrounding villages. One in 10 people staying in the LKP LJ area took part in the survey after giving their consent. The survey was preceded by a pilot study conducted in 2022

which covered a group of 100 respondents. The study used questionnaire research, and due to the highest return rate, the survey distributed to respondents was selected as the research technique. The research tool used was a survey questionnaire.

The survey questionnaire included a metric, or questions regarding the sociological characteristics of the respondents, namely their gender, age, place of residence, education, social status and income. Questions in the questionnaire were formulated to determine respondents' willingness (to provide a specific monetary amount) to pay certain funds (WTP) for the protection/maintenance of LKP LJ in a hypothetical situation where their sustainability is not stability? The survey asked about the willingness to pay and a specific amount that the respondents would be willing to contribute. In the case of negative answer, the respondents were asked to provide reasons for refusal. To exclude the income factor, an additional scenario was proposed under which the respondents' income would increase tenfold (WTP2).

The obtained survey results were subjected to statistical analyses that included description of the respondents as well as investigation of the influence of various respondents' characteristics on their answers about the willingness-to-pay in favour of LKP 'Janowskie Forests'. We used the χ^2 test to check the accordance and similarity of the distributions of the answers provided by the respondents with regard to their distinguished groups. Mann-Whitney U (gender) and Kruskal-Wallis (other variables) tests were used to detect the significance of the observed differences among the groups. Analyses were performed with PAST 4.0 software (Hammer *et al.*, 2001) and the significance level for the observed differences was determined at 0.05.

Results

In total, we received 820 responses, accounting for more than 98% of all survey questionnaires. The results of the data analysis are for a sample of 820 respondents. They were quite well balanced in terms of the respondents' gender (47.4% females and 52.6% males). The majority of the answers were obtained from people aged 25-34 and 35-44 years (34.8 and 25.9%, respectively). The youngsters (≤ 24 years old) constituted 14.5% of the analysed population, while the share of the elderly people (≥ 65 years old) reached only 5.7%. The vast majority of the respondents had higher (56%) or secondary (32.2%) education, while people with vocational education constituted only 8% of the respondents. In terms of the occupation, the highest share of the responses was given by the white collars (43.8%). People who participated in the survey live mostly in the city (76.1% of the respondents), which is either small (< 50 thousand inhabitants) or large (> 200 thousand inhabitants) – 32.2 and 31.3% of all answers, respectively. The respondents originated from the local, Lubelskie Voivodeship (42.9%), or from Mazowieckie (22.7%) or Podkarpackie (14.3%) Voivodeships. In terms of their economic status, the distribution of respondents was quite even among the distinguished classes of income. Similar fractions earn ≤ 2000 and 3500-5000 PLN per month (26.5 and 28.%, respectively) as well as 2000-3500 and 5000-10,000 PLN (21.3 and 22.0%, respectively). The richest people ($> 10,000$ PLN of monthly income net) constituted the smallest group of the respondents (2.2%). Only 17.9% of the surveyed people used their income for their own only. The most common included 2-3 persons supported by that money (51.2% responses). In 30.9% of cases the declared income supported 4 or more people.

The respondents were rather reluctant towards the idea of the potential financial support to the LKP 'Janowskie Forests', as 51.3% of them declared that they wouldn't spend any money for that purpose. The lack of personal ability or resources to do so was given as the most frequent reason (41.8%). Other explanations of the negative attitude included: questioning the importance of LKP's existence or conviction that it is able to be self-financed (21.9 and 24.9% of answers,

respectively). Indication that the money for LKP should come from the other (external) sources was provided by 11.4% of the respondents. Those who expressed willingness to support the LKP financially declared an average annual support at 65.5 PLN. The distribution of WTP statistical measures is presented in Table 1. The majority pointed out the amount between 20 and 100 PLN (Fig. 1). In turn, those who declared unwillingness to pay in favour of LKP when asked about the possibility of such activity in case of their incomes being 10 times higher than at present, in the majority (58.2%) did not declare any amount. As many as 14.3% of respondents reiterated their complete lack of interest in supporting the LKP financially, while 27.6% wanted to grant some support to this forest complex. The latter ones declared 54 PLN on average. This mean amount did not differ significantly from the one calculated for those who wanted to support LKP at the current level of their income ($t=1.3, p=0.189$). However, the distribution of the declared amounts was significantly diverse ($\chi^2=12.6, p=0.013$), as those who decided to grant the support at the higher income level most often appointed the smallest amounts of support than it was the case of people willing to pay at the current income level (Fig. 1).

The respondents' gender significantly influenced their willingness to support LKP financially. For the current income level, women gave the negative statements significantly more often than men ($\chi^2=4.0, p=0.046$). However in case of the potentially higher income they were more willing to pay for the LKP ($\chi^2=11.1, p=0.001$).

We found significant discrepancies in terms of respondents' age in case of the explanation of the unwillingness to support LKP financially ($\chi^2=49.0, p<0.001$). The elder ones more frequently indicated that they cannot afford it, on the other hand they pointed out the irrelevance of that forest the most rarely. People aged 25-44 years significantly more frequently claimed that LKP is not worth financial support, while those in the 45-54 age group believed it is able to obtain funds for its functioning on its own. Also, the older people were more willing (87-93% of answers) to support LKP in case of the increased income. For such situation, only people from the 45-54 age group declared unwillingness to pay (62.5% of the responses from this group).

Table 1.

Characteristics of statistical measures of WTP values in PLN

| Arithmetics mean | Standard deviation | Minimum | Maximum | Median |
|------------------|--------------------|---------|---------|--------|
| 65.5 | 84.0 | 1 | 700 | 50 |

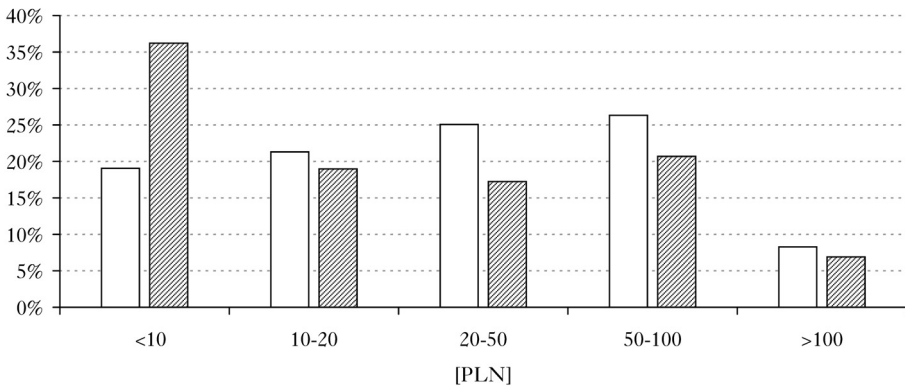


Fig. 1.

Fraction of respondents declaring willingness to support LKP 'Janowskie Forests' with the given amount of money [PLN] at the current (light) and 10 times higher (dark) income level ($N_{current}=399, N_{higher}=116$)

The origin of respondents mattered as well. People from the local, Lubelskie Voivodeship, were unwilling to pay for LKP in their present financial situation significantly more frequently than the respondents from other regions ($\chi^2=10.8, p=0.001$). On the other hand, they significantly more rarely declared the irrelevance of LKP, but more often they could not afford such an expense ($\chi^2=22.8, p<0.001$). Also people from villages were more reluctant to pay than the urban inhabitants ($\chi^2=21.3, p<0.001$). Respondents from small towns the most frequently claimed that they cannot afford the support, while those from the biggest cities gave this argument the most rarely. People from medium-sized towns declared that LKP is not capable to finance its functioning on its own and requires money from other sources.

Education level of the respondents was significant in terms of the expressed unwillingness to support LKP financially ($\chi^2=16.5, p=0.001$) and the declared reasons for such situation ($\chi^2=42.8, p<0.001$). The less educated were less willing to pay and claimed that money for the LKP should originate from other sources. In turn, people with higher education were more in favour of financial support and they less often said they cannot afford the payment or someone other should pay.

The vocational status significantly influenced the issue of financial support for LKP. The unemployed and farmers were more unwilling to pay than small businessmen or self-employed; ($\chi^2=10.8, p=0.001$). Similarly, the job diversifies the respondents in terms of the reason of unwillingness to pay ($\chi^2=58.4, p<0.001$). Small businessmen claimed the least frequently they cannot afford the support, but on the other hand the most often that LKP is not worth the money. The opposite pattern was found for the unemployed respondents. The entrepreneurs usually said that LKP should be a self-financing institution. We found the differences among the vocational statuses also in the situation of increased income ($\chi^2=9.2, p=0.008$). The self-employed were definitely against supporting LKP, while the unemployed, students and pensioners expressed their willingness of the support in case they had more money to spend.

The income class exhibited significant importance on both the willingness to pay for LKP ($\chi^2=10.8, p=0.001$) and the distribution of amount of the declared support ($\chi^2=12.6, p=0.013$). Respondents who earn more than 5000 PLN/month net tended in general to pay more. Also the income diversified the respondents in terms of their reasons for unwillingness to pay ($\chi^2=65.4, p<0.001$). Those with the lowest income more frequently admitted they cannot afford to support the LKP, but on the other hand they indicated that this institution is not worth the money or it does not need it the most rarely. In turn, the well-off ones claimed that LKP can be financially independent. The rich indicated that the analysed forest complex is not worth the financial support. Assuming that they have 100 PLN to spend for LKP 'Janowskie Forests', the respondents were asked to distribute this amount among five reasons which indicate the importance of that forest complex (four reasons were provided and the fifth was an open one). The first reason concerned spending leisure time in the LKP LJ area. The second the possibility of choosing this forest complex for recreation in the future. The third was related to the possibility of funding LKP LJ regardless of whether respondents visit this forest area. The fourth reason was related to the protection and preservation of the LKP for future generations. The last response option was open-ended, respondents could give a reason for protecting LKP themselves. A single purpose was chosen by 21.0%, while the most common decision was to divide the money among four provided reasons (39.0% and no-one decided to skip any of the proposed option in favour of their own purpose). Only 2.7% chose to split the hypothetical amount of money into five parts. The most popular reasons included the one stating that the 'Janowskie Forests' forest complex is important not only for the respondents, but also for the next generations and that is why it is worth support (28%), and the one referring to spending the respondent's time in that area (27%) (Fig. 2). The pre-

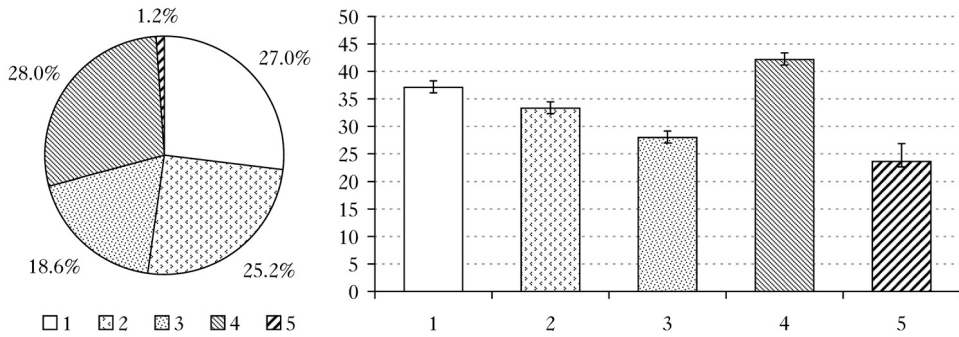


Fig. 2.

Fraction of the choices (left) and mean (\pm standard error) amount declared (right) for the reasons of financial support to LKP 'Janowskie Forests'

1 – I like to spend time in such forest complexes and I do it often; 2 – I appreciate that this institution exists and I can visit it; 3 – It is necessary to keep it working although I will not visit it; 4 – 'Janowskie Forests' forest complex is important not only for us, but for the next generations as well; 5 – respondent's choice (other)

vious was also attributed with the significantly highest average amount of money (HK-W=113.4, $p < 0.001$). None of the analysed factors that diversified the respondents had a significant impact on the distribution of money for provided purposes of potential support for LKP.

Discussion

The general public usually defines the value of forest areas through the material and non-material. The material benefits include primarily the value of timber and other resources, such as forest fruits, mushrooms and so on. The non-material values apply most frequently to the opportunities for recreation, being in touch with nature, or providing aesthetical and spiritual experiences to the public (Affek *et al.*, 2023), as well as physical and mental benefits associated with presence in the natural environment (Bowler *et al.*, 2010; Janeczko *et al.*, 2023). These benefits are associated with forest functions defined more broadly as ecosystemic cultural services. The attitude of the public to the forest environment, as noted by Gołos (2018) can be evidenced by the size of the share of people declaring their hypothetical willingness to pay voluntarily defined amounts for its protection (WTP>0). In the case of Janowskie Forests, the level of declarations was rather low, at 51%. In the study conducted by Gołos (2018) which covered different forest complexes located all over Poland, the average level of WTP>0 declarations reached 48%. Similar results were obtained in the survey conducted at the nature reserve Nad Tanwią – 46%, where, in order to exclude the income factor, the respondents were offered a variant with hypothetical ten-fold increase of their income, which led to an increase of the WTP2>0 to 56% (Mandziuk *et al.*, 2019). Higher results for WTP>0 (78%) were obtained in the study conducted in the Białowieża Forest in 1995 (Płotkowski, 1996) and in 'pocket parks' located in Warsaw (Fornal-Pieniak *et al.*, 2023a), or in the greenery areas in the Guangdong province in China (Zhang *et al.*, 2020).

The size of declared WTP amounts depends on many factors. From the gender standpoint, women declared the willingness to protect the LKP less frequently than men, in the case of hypothetical income increase a reverse trend manifested itself. Similar dependencies were shown in the Italian study, where a significant influence of gender on the amount of WTP was observed (Paletto *et al.*, 2017). As comparison, in a study conducted at the Otwock Municipal Beach which directly adjoins a forest women were willing to pay an amount twice as high as the one declared by

men (Mandziuk and Pyra, 2016). The dependence of the WTP amount on the age of respondents was demonstrated in studies conducted in municipal parks located in medium-sized French (Sirina *et al.*, 2017). The case was similar in the Colombian and Japanese studies, where older persons, showing appreciation for the forest landscape and its components, were willing to pay more for its protection and for the financing of investments tied to protection of forests (Chen *et al.*, 2017; Sloggy *et al.*, 2022). In contrast, different preferences were demonstrated in a study conducted in forest areas in China, where younger respondents with higher income declared higher WTP amounts for environmental investments meant to shape and protect forests through the development of ecological awareness and the implementation of educational programs (Zhang *et al.*, 2020).

The quality of forest environment is a factor that determines the declared amounts of $WTP > 0$. In the study conducted by Mell *et al.* (2016), the researchers demonstrated that the respondents were more frequently willing to pay WTP in the form of higher rent (by 2%) for the opportunity to live in locations with high quality of the forest environment. This was especially true in the case of younger people with lower education levels. Another factor that influences the respondents' willingness to finance forest conservation is their place of residence. We did not establish such dependence in the study of LKP LJ, where we observed that the residents of the nearest vicinity – of the Lubelskie Voivodeship – were not too willing to pay for the LKP protection; they were mostly people living in the countryside. An opposite relationship was shown in Lindemann-Matthies *et al.* (2014).

The study conducted in the Janowskie Forests demonstrated also that the higher was the respondents' education level, the more they were willing to make WTP payments. Many literature studies in this area confirm this trend, the same has been true for users of forests located all over Poland (Gołos, 2018), American forests in Savannah (Majumdar *et al.*, 2011), in Puerto Rico (Tavárez and Elbakidze, 2019) and in Malaysia (Zaiton *et al.*, 2019; Fadhlin *et al.*, 2021). As for the social status, farmers and unemployed persons were the two groups that were the groups least likely to declare their willingness to financially support LKP, just as it was the case with financing the Wielkopolski National Park (Zydroń *et al.*, 2014). The study conducted by Sloggy *et al.* (2022) has shown that age and level of income had a statistically significant impact on WTP. The older the respondents, the smaller were the amounts they were willing to pay for investments in forest conservation. Based on social status, the largest number of WTP declarations came from students (Sloggy *et al.*, 2022). The amount of hypothetical WTP payments for the conservation of forests depends also on the wealth of society, the size of income therefore differentiates social preferences in this regard (Novikova *et al.*, 2019). In general, it has been observed in numerous studies that the richer the society is, the higher the amounts declared by respondents (Majumdar *et al.*, 2011; Dhakal *et al.*, 2012; Mizaras *et al.*, 2015; Skłodowski and Gołos, 2016; Fornal-Pieniak *et al.*, 2023b). However, other studies have demonstrated an inverse relationship (Nielsen *et al.*, 2007; Witt, 2019; Bamwesigye *et al.*, 2020; Liu *et al.*, 2021). The unwillingness to finance the Janowskie Forests was associated mostly with the family finances of the respondents. This tendency is confirmed also by the study conducted by Wang *et al.* (2007) and by Gołos (2018). In the case of LKP, the average declared WTP amounts did not change significantly in a situation where the respondents' income increased (WTP2).

The factors influencing the amount and willingness to fund (WTP)/protect forest lands are many. They certainly include the socio-economic characteristics of the respondents, the environmental awareness of the public, political views, the characteristics of the study site and area, and others, such as the season (Tyrväinen and Väänänen, 1998) the forest cover of the area (Arrow

et al., 1993) or the appearance of the forest. Although, as the results of the study conducted at the Joensuu municipal forests in Finland and in the Wielkopolski National Park, the correlation between the amount of WTP and the sociological characteristics of the respondents is not always present (Tyrväinen and Väänänen, 1998; Zydroń *et al.*, 2014). Due to the complexity of the contingent valuation method, it is very important how the valuation assumptions are presented, how the research is carried out, or whether the construction of the research tools is correct (Gołos, 2018). One needs also to remember that WTP defines only the social attitudes, and not the economic capacities of the respondents (Kotchen and Reiling, 2000; Chen and Qi, 2018), and another problem is the possibility to actually verify the declared WTP in practice (Murphy *et al.*, 2005; Gołos and Ukalska, 2016). In addition, as indicated by Gołos (2018), this value could serve as an indicator useful for the estimation of environmental costs of investment decisions. Just the determination of recreational value of forest complexes can also play a significant role in the environmental education of the public. Despite the difficulty with determining the actual willingness of respondents to pay for recreation in forests, the results of surveys in this area can be used in the implementation of environmental projects, considering public preferences. This knowledge is essential for creating pro-environmental policies at the local or regional level and can be used by landscape ecologists, economists, foresters, local governments, local authorities, or researchers specialising in natural resources.

In the process of valuing environmental assets, attention should be paid to the methodological difficulties associated with the possibility of using different valuation methods. In addition, valuation results can vary significantly depending on the method used. Typically, higher values are obtained in the WTP method than in the WTA. The recreational value of LKP LJ was determined for a sample of respondents, in order to know the total recreational value of this facility it would be necessary to determine the number of tourists visiting LKP LJ per year. In addition, the survey was conducted during the summer, it is recommended to repeat the survey at other times of the year.

Conclusions

- ✦ The declared level of amounts for the conservation of the LKP ‘Janowskie Forests’ was low, only 51% of respondents demonstrated a willingness to make voluntary, one-off payments for that purpose.
- ✦ When analysing the relationship between the sociological characteristics of the respondents and their declared WTP for the LKP ‘Janowskie Forests’, we have found statistically significant differences with respect to gender, origin (province), place of residence, education level, social status and income level. We have not demonstrated such relationship for the age of respondents.
- ✦ As regards the influence that gender plays on the amount of WTP, we have observed that women gave negative answers significantly more frequently than men. Persons from the Lubelskie Voivodeship and residents of rural areas were significantly less likely to be willing to pay for LKP in their current financial situation. Unemployed people and farmers were significantly more negative about financing LKP, in contrast to entrepreneurs. We observed that respondents with higher income declared higher WTP.
- ✦ The results of our study can be useful for managers of forest areas with increased recreational function in the development of pro-environmental policy at various levels of management. Social preferences provide valuable information for landscape ecologists, economists, foresters, local and municipal governments, and researchers specialising in forest recreation.

Authors' contributions

Conceptualization – A.M.; methodology – A.M.; validation – S.B., investigation – A.M., B.F-P; data curation – A.M., S.B.; writing-original draft preparation – A.M., S.B., and B.F-P, supervision – A.M.

Conflicts of interest

The authors declare the absence of potential conflicts of interest.

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Source materials

<https://www.lublin.lasy.gov.pl/lesny-kompleks-promocyjny> [accessed: 26.03.2024].

STRESZCZENIE

Preferencje społeczne w zakresie finansowania rekreacyjnych usług ekosystemowych w lasach na przykładzie LKP „Lasy Janowskie”

Obszarom leśnym przypisuje się pełnienie wielu usług ekosystemowych. Są one definiowane jako walory i procesy przyrodnicze oraz efekty ich istnienia i funkcjonowania, które dostarczają wartości niezbędnych do życia i rozwoju ludzkości. Do najważniejszych leśnych usług ekosystemowych należą: świadczenia zaopatrzeniowe (m.in. w drewno, zwierzyńcę łowną czy owoce leśne), regulacyjne (ochrona powietrza, gleby, wody, bioróżnorodność) oraz kulturowe (rekreacja, miejsca pracy). W grupie kulturowych usług ekosystemowych szczególnie miejsce zajmuje rekreacja leśna. Ze względu na ogólny i darmowy dostęp do lasów oraz fakt, że zajmują ok. 30% powierzchni naszego kraju, duże, zwarte kompleksy leśne są popularnym miejscem wypoczynku społeczeństwa. Celem pracy jest określenie chęci finansowania (Willingness To Pay – WTP) rekreacji na terenach leśnych w zależności od cech socjologicznych respondentów, takich jak płeć, wiek, miejsce zamieszkania, wykształcenie, status społeczny i dochód. Badania przeprowadzono na terenie Leśnego Kompleksu Promocyjnego „Lasy Janowskie” (LKP „LJ”) znajdującego się na terenie Nadleśnictwa Janów Lubelski (RDLP Lublin). Stanowi on duży i zwarty kompleks leśny o powierzchni ok. 31,5 tys. ha.

W celu określenia zależności pomiędzy wysokością kwot WTP a cechami socjologicznymi respondentów przeprowadzono na terenie LKP „LJ” badania ankietowe w miejscach licznie odwiedzanych przez turystów, w okresie od maja do sierpnia 2023 r., na grupie 820 osób. Sondaż ankietowy poprzedzono badaniami pilotażowymi w 2022 r., które objęły grupę 100 respondentów. Ze względu na najwyższą zwracalność jako technikę badawczą wybrano ankietę rozdawaną. Zastosowanym narzędziem badawczym był kwestionariusz ankiety, który zawierał metryczkę (czyli charakterystykę socjologiczną respondentów) oraz pytania właściwe. Miały one na celu określenie gotowości do wpłat (WTP) na ochronę/utrzymanie LKP „LJ” w hipotetycznej sytuacji zagrożenia jego trwałości. Dotyczyły określenia gotowości do zapłaty wśród osób odwiedzających LKP „LJ” oraz wskazania konkretnej kwoty na ten cel. W przypadku odpowiedzi odmownej respondenci proszeni byli o wskazanie powodów odmowy. W celu wykluczenia czynnika dochodowego zaproponowano dodatkowo scenariusz, w którym dochody respondentów wzrosłyby 10-krotnie (WTP2).

Uzyskane wyniki poddano analizie statystycznej (test χ^2 – sprawdzenie zgodności i podobieństwa rozkładów odpowiedzi w odniesieniu do wyodrębnionych grup, U Manna-Whitneya – wykazanie istotności zaobserwowanych różnic pomiędzy grupami oraz Kruskala-Wallis – analiza pozostałych zmiennych). Analizy przeprowadzono za pomocą oprogramowania PAST 4.0. Poziomą istotność zaobserwowanych różnic ustalono na 0,05. Stwierdzono, że niewiele ponad połowa respondentów była skłonna płacić kwoty na utrzymanie „Lasów Janowskich” – 51% (ryc. 1). Średnia kwota wpłaty wyniosła 65,5 zł/osobę/rok (ryc. 2; tab. 1). Biorąc pod uwagę charakterystykę socjologiczną respondentów, wykazano, że płeć istotnie wpływała na chęć wsparcia finansowego LKP. Kobiety istotnie częściej udzielały odpowiedzi negatywnych. Wykształcenie respondentów miało istotny wpływ na wspieranie LKP: im wyższe wykształcenie mieli respondenci, tym chętniej deklarowali WTP. Wyniki badań wykazały rozbieżności pod względem wieku respondentów, jednak nie wykazano zależności istotnych statystycznie pomiędzy wiekiem a wysokością WTP. Biorąc pod uwagę pochodzenie respondentów, stwierdzono, że mieszkańcy województwa lubel-

skiego oraz wsi istotnie częściej nie chcieli płacić za LKP niż respondenci z innych regionów Polski. Status zawodowy ankietowanych znacząco wpływał na kwestię wsparcia finansowego dla LKP. Różnice istotne statystycznie stwierdzono także między statusami zawodowymi w sytuacji zwiększonego dochodu (WTP2). Wysokość dochodów respondentów wpływała istotnie na gotowość do płacenia na LKP. Wykazano, że respondenci posiadający wyższy dochód deklarowali wyższe WTP.

Poznanie preferencji społecznych stanowi cenne źródło informacji dla ekologów krajobrazu, ekonomistów, naukowców i leśników oraz władz samorządowych i lokalnych zajmujących się kształtowaniem rekreacji w lasach. Uzyskane wyniki mogą być pomocne dla zarządców terenów leśnych o zwiększonej funkcji społecznej w kreowaniu polityki środowiskowej na różnych szczeblach zarządzania.