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The Need to Establish a Social and Economic Database of Private Forest Owners: The Case of Lithuania

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Abstract: In Lithuania, as in other analyzed countries, greatest attention is concentrated on the protection and monitoring of state forests, while the situation in the private forest sector is quite unclear and uncertain. In most European countries, as well as in Lithuania, there are a lack of socio-economic data, and there are no planned forest monitoring methods and permanent programs. We claim that the problem of achieving sustainability in the forest sector, in the case of the estates of the private forest owners, could be partially solved by implementing the monitoring of social and economic indicators. This study proposes the need for the establishment of a social and economic database of private forest owners in Lithuania. In this article, we have carried out a detailed analysis of scientific sources and selected socio-economic indicators to help the adoption of optimal management solutions for sustainability in the private forest sector. To explore the need to establish a social and economic database of private forest owners in Lithuania, we conducted an empirical study by applying the method of semi-structured interview to a group of experts/specialists in the forestry field. Summarizing the results of the research, it can be concluded that the need for socio-economic information about the owners of private forests in Lithuania is obvious, as it would clarify the most pressing problems that forest owners face when farming in their forest estates. This information would also allow the improvement of policy formulation and implementation, the adoption of legal regulations, and the organization of the necessary changes in private forestry. Therefore, it is necessary to establish criteria and indicators that could ensure more sustainable forest management.

Keywords: private forest owners; legal data of private forests owners; social and economic indicators

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Citation: Perkumienė, D.; Doftartė, A.; Škėma, M.; Aleinikovas, M.; Elvan, O.D. The Need to Establish a Social and Economic Database of Private Forest Owners: The Case of Lithuania. *Forests* **2023**, *14*, 476. https://doi.org/10.3390/f14030476

Academic Editor: Luis Diaz-Balteiro

Received: 13 February 2023
Revised: 21 February 2023
Accepted: 22 February 2023
Published: 27 February 2023

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1. Introduction

Forests are the main contributors to the fight against biodiversity loss and climate change. They reduce the effects of climate change by acting as carbon sinks, reduce the effects of droughts, cool cities and also protect us from major floods. Therefore, th need for conservation and protection of forests is generally recognized in the pursuit of sustainability. In order to achieve the most effective protection of forests, various data about the ecological, economic, social, and legal aspects of forest management are needed [1–3]. When we make decisions related to sustainable and rational use of forests, we are faced with various socio-economic indicators. These indicators are becoming increasingly complex. Such a situation is affected by the increasing influence of non-state actors and changing consumer needs, and also depends on the growth of private forest areas. Therefore, for the provision of information on methods of monitoring the social and economic development of private forest owners, it is particularly important to obtain not only technically reliable but also

economic data which are relevant and accessible to interested parties. Forests and other wooded lands make up 40% of the total land area of the European Union (EU). The strategic importance of forests should be emphasized, since different land use strategies are used to meet the increasing competition between ecosystem services and forest goods [1]. When we discuss forest management policy, we must pay attention to the importance of the role of private forest owners and their influence on the establishment of social and economic databases. Analysis of scientific sources shows that private forest owners have little interest in forest policy and its provisions. Owners of private forests are also reluctant to comply with laws and regulations [2–4]. National policies and European Union laws related to forests are inconsistent and often contradict the requirements of forest management. Forest owners, managers and decision-makers, as well as the forest industry have different and often competing requirements for sustainable forest use.

Currently, the following main problems of forest policy are identified, particularly in the private forest sector: preservation of forest habitats, changes in land use, the relationship between forestry and recreation, use of wood materials, increasing use of wood, and application of wood biomass for bioenergy and forestry [5].

In Europe, the forestry sector and policy makers recognize the growth and diversity of private forest owners. These current trends raise concerns about the management of private forests. The priority of forest policy is the mobilization of forest resources and increasing demand for forest products, especially from "unused" private forests [6,7]. Both society and forest owners seek to maintain forests through the provision of services, for example, as an object of tourism, recreation, and health support. To achieve this goal, it is necessary to classify forest owners according to their actual or expected management behavior. This has led various researchers as well as practitioners to develop typologies of private forest owners (PFOs), known as non-industrial private forest owners (NIPF) [8,9].

Analysis of the results of scientific research shows that forest owners are interested in the economic aspects of forestry [10], forest owners focus on forest management and prefer more intensive wood processing [11,12], and they also apply ecological forest management measures [11–13].

Private forest owners also emphasize the recreational aspects and opportunities of the forest [14,15]. It is important to garner essential information about the owners of private forests, farming and its changes in private forest estates in order to achieve comprehensive and assured private forest policy making. It should be noted that in Lithuania there is sufficient statistical information related to private forest areas. There also exists information about tax indicators of forest holdings, the number of owners, and the size of their holdings; however, there is a lack of socio-economic data (for example, the education level of forest owners, their attitudes towards managed property, values, social structure, their goals, problems, farming goals, motivations, types of behavior, etc.) [14,16]. Changes of private forest owners also cause problems, as forest holdings can be bought, inherited, sold, etc. Continuous and systematic collection and accumulation of social and economic data about private forest owners would help to reveal the aforementioned changes and trends in the development of private forestry.

This study aims to determine the need to establish social and economic databases of private forest owners in Lithuania in pursuit of sustainability.

2. Literature Review

The theoretical framework of this study covers concepts and theories to gain a deeper understanding of the socio-economic factors of private forest owners. Moreover, the main purpose of this theoretical framework is to form a basis for analysis and to support the main conclusions.

2.1. The Concept of Socio-Economic and Legal Data of Private Forest Owners

The collection of socio-economic data and the need for such data regarding private forest owners varies greatly across the European Union. Some EU member states have been conducting socio-economic data surveys for a long time [1,3], while others have analyzed their potential advantages or disadvantages [15–17]. For example, in Scandinavia, research on the monitoring of social and economic data of forest owners aimed to create a data system that would reflect the social and economic characteristics of forest management in the respective countries [18–20]. The major challenge is obtaining representative data reflecting the diversity of small forest holdings. Hegetschweiler et al. [15], when they analyze the socio-economic data of private forest owners, suggest the use of computational models because surveys require quite high research costs to be incurred. The researchers suggest that there are more aspects to consider when studying the socio-economic data of private forest owners, e.g., value, not only market benefit.

The first European forest management sustainability criteria and indicators system was prepared in 1992, at the experts' conference in Geneva [12,21]. It consisted of six criteria and 128 indicators. The system of criteria and indicators was legalized in 1998, at the Ministerial Conference for the protection of European Forests, Lisbon, through the resolution "European Criteria, Indicators and Operational Level Instructions" [22]. The system was improved and approved by Forest Europe experts in 2002, and approved by Forest Europe in 2003 [23]. According to this option, all indicators are divided into quantitative (six criteria, some 35 indicators) and qualitative (descriptive) (17 indicators) [22]. Improved pan-European indicators for sustainable forest management were adopted by the MCPFE expert-level meeting on 7–8 October 2002, in Vienna, Austria. The latest version of the European Forestry Sustainability Criteria and Indicators was presented of Forest Europe in 2015 [11]. It consists of six criteria selected according to elements of forestry sustainability, 34 quantitative indicators and 11 qualitative indicators (i.e., a total of 45 indicators).

In order to comprehensively assess the sustainability of forestry, a social and economic database evaluation system is needed [23–27]. It basically consists of (1) a compilation of a set of criteria and indicators; (2) criteria and assessment of the importance of these indicators; and (3) their evaluation procedures. Compilation of a set of criteria and the indicators' assessment scheme are presented in Figure 1.

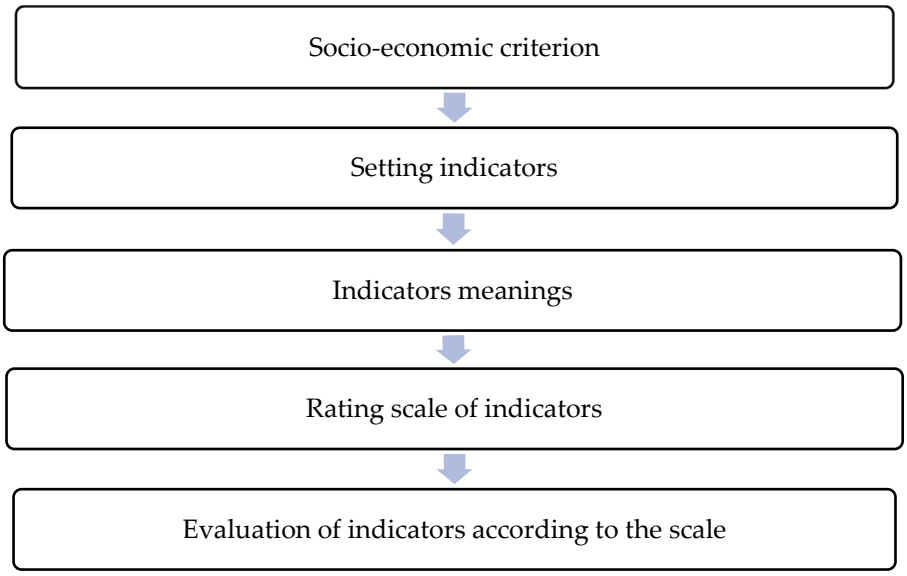


Figure 1. Socio-economic criteria assessment scheme [22–28].

Indicators detail each criterion. Each socio-economic criterion is characterized by ten indicators: forest holdings, contribution of forest sector to GDP, net revenue, investments in forests and forestry, forest sector workforce, occupational, wood, trade in wood, wood energy, and recreation in forests [11].

Regarding socio-economic data monitoring of private forest owners for sustainable forest development, attention should also be paid to legal aspects. Analysis of the scientific literature shows that despite the significant impact of different ownership categories on actual forest management and the implementation of policy goals, the ownership aspect is rarely included in forest management or forest policy research. Weiss et al. [17] have stated that a differentiated system of legal forest ownership categories and types of owners must be created; it should not be limited to a simple dichotomy of public and private forms of ownership or to only simplified typologies [17]. The researchers believe that the question of how the form of ownership relates to forest management and the provision of goods and services, and to what extent different types of owners need new management methods, must be addressed [29].

The use of structural forest attributes and the concept of socio-economic data on private forest owners to distinguish one type of forest owner from another has a long history [30]. Socio-economic data have generally been interpreted holistically and referred to as a socio-economic profile [15]. Some typologies of private forest owners, especially the earliest ones developed in the 1980s, used the socioeconomic profile to explain the management orientation and behavior of the forest owner [13]. Using breakpoint analysis, Butler et al. [31] showed that the size of forest holdings is highly correlated with forest management behavior and wood production goals. Even the differences within established size categories can be large [32]. For example, Matilainen and Lähdesmäki [10] expressed different attitudes towards forest management, especially in the group of passive forest owners. In addition to theoretical significance, the use of structural attributes to differentiate forest owners based on their understanding of forest management has practical implications. The use of age, gender, monthly income, education, annual logging, holding size and socio-economic forest holding type in explanatory models of attitudes towards a certain concept enables interpretations that are more applicable in practice [1,13,17,33].

The results of the research conducted by Mizaras et al. confirmed that achievement of sustainability is one of the main objectives of forest policy. The scientists noted that rational management of small-scale private forestry should be based on the principles of sustainability [34]. For the implementation of this purpose, it is necessary to establish a social and economic database of private forest owners in Lithuania.

The social aspects of sustainable forestry are non-timber forest products, public benefits of forests, economic security, cultural heritage, ethical–aesthetic aspects, pleasant living conditions, recreation, and hunting. According to Kuliešius et al. [35], human needs, such as wood and wood products, water, food, fodder, medicine, fuel, shelter, work, recreation, animal and plant habitats, landscape diversity, absorbable carbon accumulation, etc., involve forest products and other goods.

Riepšas disputes [36] whether or not forests are harvested for their main use, and whether pesticides are used. In cases of mass pest outbreaks, the use of biopreparations and selective insecticides is permitted.

Ficko notes that forest management depends on the socioeconomic profile of the forest owner. Their research found that the social, demographic and economic characteristics of private forest owners are poor, but statistically significant, determining the concepts of forest management [37].

Hegetschweiler et al. [15] argue that socio-economic data of private forest owners, such as their aesthetic and recreational values, are increasing in importance, especially in cities, and need to be taken into account in silvicultural practices.

2.2. Experience and Benefits of Socio-Economic Data Monitoring of Private Forest Owners for Sustainable Forest Development

The number of private forest holdings and areas of private forests in Europe since 1990 has increased significantly [38]. One of the most prominent development factors was the structural changes in the European agricultural sector and the family farming system. In most European countries, smallholder forest ownership has historically been associated with smallholder farming [39]. However, the link between farming and forestry is gradually disappearing, leading to the fragmentation of forest ownership (by dividing land or common ownership), alienation due to poor involvement of forest owners in forest management, and increasing alienation of landowners from the land.

In recent years, more and more scientific research related to the perception of private forest owners and their motivations has been conducted in Europe. For example, private forest owners' attitudes towards biodiversity conservation were studied in Latvia, and the results showed that financial dependence on income from logging was the main factor leading to negative attitudes towards biodiversity conservation [40,41]. Private forest owners' intentions to adopt alternative management practices were examined by Juutinen et al. [19], and the willingness of owners to voluntarily implement measures to protect forest biodiversity was investigated by Juutinen et al. in Finland [19]. Thomas et al. [13] surveyed private forest owners in France to understand adaptation decision making and found that adaptation decisions are influenced by the owner/property's characteristics.

Different countries use different methods of assessing and monitoring forest resources [41]. For example, in Sweden, Norway and Finland, iterative multipurpose inventories based on sample plots (commonly referred to as National Forest Inventory [NFI]) provide regional and national level statistics and national full-coverage forest maps, combining field and remote sensing data. Since the turn of the last century, the previously narrow focus on timber resources has expanded to include information on land use, vegetation, soil, forest health and other parameters found to be important for assessing biodiversity and greenhouse gas emissions [42]. Combining ownership information from the Swedish National Property Board with sample plot data from the Swedish NFI enables the calculation of forest characteristics and forest management practices for different ownership categories [43,44].

In many countries, non-industrial private forests predominate. Most often, this type of forest is owned by individuals or small families [9,31]. For example, private forest ownership in Turkey is less than 1% of the total forest area [45–47]. Individuals and families owning these forests have been given a variety of names that reflect the diversity of their approaches to the forest and forest management [12,13]. Because of their low participation in silvicultural activities and logging, policymakers and forest researchers often refer to private forest owners as "passive" [13]. However, private forest owners often claim the opposite; they see themselves as active managers, according to their own conditions and criteria [12].

Several studies have been conducted to investigate private forest owners' perceptions of forest management [15,16] using the theory of social representation [17,18]; these compared private forest owners' perceptions of forest management in seven European countries. The theory of social representation states that the beliefs, attitudes, or emotions of a social group are socially specific. Thus, different social groups may have different understandings of forest management, but members of a social group share similar images. Using structural equation modeling, Ficko and Boncina [33] confirmed that forest owners in Slovenia understand forest management as a mix of stewardship and ecosystem- and economy-oriented management, while private forest owners see forest stewardship as a key principle of forest management. When it comes to forest management, their emphasis is on continuing the work started by ancestors, ensuring a clean environment in the neighborhood, or simply taking care of the forest so that it is not neglected.

Feliciano et al. [48] in their study identified how private forest owners in seven European countries including the Czech Republic conceptualized forest management.

Stachova [49] studied the attitudes of private forest managers in the Czech Republic from a sociological perspective. A joint study was also conducted on the different forms of forest ownership in Europe and their relationship to forest management practices, effective communication strategies and policy instruments [17,50].

Westin et al. [7] examined the value orientation and management behavior of private small forest owners in five EU countries. Respondents assessed the importance of economic, environmental, and social values for their forest holdings.

Tiebel et al. [51,52] provided a systematic literature review focusing on small private forest owners and their conservation perspectives, synthesizing research methods, socio-ecological factors, and legal and forest policy recommendations.

Private forest owners are commonly categorized by researchers as multipurpose owners, vacationers, investors and farmers, indifferent owners, conservationists, multipurpose owners, and self-employed forest owners. Less often, the owners of private forests are identified as residents of small towns, custodians or ad hoc owners. Owners of private forests are also perceived as owners with formal economic goals, as owners who rely on professionals or do not perform bush clearing and other mandatory obligations [37].

Many researchers, both in Europe and on other continents, especially the USA, argue that the fate of many of the country's forests depends on a diverse and dynamic group of private forest owners [53].

Joa and Schraml [54] studied the attitudes of private forest owners towards forest protection programs and noted that they should be fair and have acceptable conditions. Mäntymaa et al. [55] noted that forest conservation programs should be broadly based, for example, by including economic and recreational aspects along with ecological issues. Other research has shown that sufficient resources need to be allocated, for example, to ensure a functioning monitoring system [56]. Furthermore, studies have called for more attention to be paid to the heterogeneity of forest owner types and their ownership rights [42,43,54].

As for the research of Lithuanian scientists on this topic, it should be noted that they cover separate aspects and do not form a unified system. For example, Doftartė et al. [57] tested a model for assessing the sustainability of private forest smallholdings based on social, ecological, economic, and future criteria.

Brukas et al. [58] studied the attitude of Lithuanian private forest owners towards prohibitions and restrictions in their private forests. The researchers found a negative attitude of private forest owners towards strict prohibitions and restrictions aimed at preserving endangered plant and animal species. The researchers recommended applying a compensation mechanism to private forest owners for the losses incurred.

Winkel et al. [39], analyzing forest monitoring in Europe, find significant inconsistencies in attitudes towards forest monitoring and policy and information needs in EU-level forest policy issues. The authors propose a new policy for the concept of forest monitoring with the definition of priorities, and EU-level implementation principles and measures. Recently, there has been a renewed focus on large-scale forest monitoring, with discussions about reporting and verification [40].

Sotirov et al. [1,5] identified five profiles of forest owners based on participation in forest management, integration of environmental and social services, and membership in peer-to-peer networks. These profiles were labeled 'economically oriented', 'customary and traditional knowledge-oriented', 'passive or outsider' and 'environmentally oriented'. Based on this classification, researchers analyzed the influence of structural factors on decision making.

Juutinen et al. [19], analyzed the socio-economic factors influencing forest management in non-industrial private forests; the scholars examined the intentions of private forest owners to adopt alternative management practices, thereby contributing to sustainable forest development in their research. The results of the research showed that private forest owners still use traditional even-aged forestry as the most common silvicultural practice

in Finland, but they intend to use increasingly uneven-aged forestry in the future. Forest owners intended to apply different management practices in their forests [19].

3. Methods

3.1. Methodologic Structure

In this study, qualitative research methods were used. Since qualitative research methods are sensitive to understanding and recognizing the natural environment in which the research is conducted and explaining its effects on the results, they provide the opportunity to reveal educational facts in a multidimensional way [59]. Qualitative research methods were used to gather non-numerical data such as opinions, attitudes, beliefs, experiences, and behaviors. This type of research was used to gain an in-depth understanding of the social and cultural phenomena being studied.

3.2. Sample Group

We used a purposive sampling method for the formation of the research group. The purposive sampling method provides in-depth information in many cases. It also provides a significant benefit in the discovery and explanation of facts and events [60]. Purposive sampling is a type of non-probability sampling method in which the researcher deliberately chooses specific participants based on specific criteria to participate in a study. This method is used when the researcher has a clear idea of the population of interest and wants to study a specific subgroup of that population. The purpose of purposive sampling is to select participants who have relevant experiences, knowledge, or characteristics that are important for the research questions being studied. Purposive sampling can provide a focused and efficient way to collect data, but it may not necessarily lead to a representative sample of the population and may result in bias. It is important to consider the limitations and potential sources of bias when using purposive sampling methods [61].

During the expert study, specially selected interviewers who have the highest competence and the most reliable and sufficiently detailed information about the research problem were interviewed. A group of specialists working in the field of forestry was formed for the expert interview. Experts representing science, business, government institutions and private forest owners participated in the study.

For the study, ten experts were selected according to the following selection criteria:

- At least university-level education.
- At least 5 years of work experience in the field of forestry, forest economy or forest policy formation.

Priority is given to experts holding managerial positions.

3.3. Data Collection

The questions of the survey are designed to best reflect the problem under consideration. The survey questionnaire features an introduction that provides information about the purpose of this study. A total of 12 open-ended questions are presented in order to find out and determine the experts' point of view on the necessity, possible challenges, threats and necessity of a database of the social and economic development of Lithuanian private forest owners. Qualitative analysis was used for data processing [62]. Since this research used open-ended questions, it was important to work with the information in the text, using search, extraction, and classification. At the beginning of the research, while analyzing the interviews of each respondent, we made notes and comments about each interview participant; essential emerging statements that indicated one or more relevant problems were simply noted in the research notes. For further analysis, we used the obtained results as auxiliary material. The experts who participated in the study were coded–I x. These encodings were created to make working with the textual information easier.

When organizing expert assessment and data processing, during the survey, direct contact was maintained with the informant, i.e., a personal interview was conducted in one physical environment or using communication technologies. There was no significant

break between the question and the answer [60]. The expert survey was conducted in September–October 2022.

3.4. Data Analysis

The data obtained within the scope of the research were analyzed descriptively with the help of the NVivo 12 package program, and content analysis was carried out. NVivo 12 is a qualitative data analysis software program used to help researchers organize, analyze, and interpret qualitative data such as unstructured text, audio, and video. The program allows users to import and categorize data, identify patterns and themes, and create visualizations to help with the interpretation of the data. The program is designed to help researchers streamline their analysis process, improve the rigor and transparency of their research, and support the discovery of insights and new understandings. In this process, the opinions of the participants were directly conveyed. This is because what should be emphasized in the reporting process of the interviews is not the numbers, but rather what the participants had to say [63].

4. Results and Discussion

After evaluating the informants' answers, four subcategories were distinguished: (1) the need to establish a database and the purpose of the database; (2) the benefits of establishing the database; (3) the social and economic indicators; and (4) the possible deficiencies of establishing the database.

Summarizing the statements of the informants, it can be argued that all respondents who participated in the survey agreed that it is necessary to determine the establishment of a database of social and economic data for Lithuanian private forest owners. It is expected that establishment of the database will help to determine long-term change trends, "From the received information it would be possible to create models, recommendations, changes in laws . . . , . . . will depend the level of investments and progress in the forest processing industry . . . , . . . database establishment will help to understand the real situation of the private forest sector, to form forest policy, to improve legal regulation . . . , . . . to make rational decisions". During this study, experts were asked what the purpose of the database's establishment is. Informants indicated this purpose differently: " . . . to encourage the creation of associations and the gathering of larger farms . . . , . . . it would be possible to monitor the efficiency of forest farm development, how forest resources are used, to form and/or conserve forest resources . . . , . . . to improve forestry activities . . . I1", " . . . participation in programs for the protection of natural values . . . I4", " . . . assess the quality of the owners' forestry . . . I6", " . . . to assess the owners' attitude towards forests . . . I7".

Regarding the need for the database's establishment and its purpose, it should be noted that all informants confirmed the need for and the importance of the database's establishment. According to the opinion of the interviewees, it is important to present the latest and most important socio-economic data of the owners of private forests. These data should be properly processed and scientifically based so that experts, policy makers and legislators can make rational decisions in order to achieve sustainable forest management.

Experts expect that the implementation of a database of private forest owners in Lithuania will be effective and efficient and will generate tangible benefits. In this research, the opinion of the informants on the benefits of the database's establishment was also discussed. This category covers how the sustainability of forests can be ensured, and was divided into three subthemes: (1) identification of problems; (2) political decisions, legal regulation, legislation, and forestry management; and (3) measures and methods for forestry efficiency. This case is depicted in Table 1.

Table 1. The main benefits of establishing the database.

Theme	Subthemes
Benefits of the database's establishment	Identification of problems
	Political decisions, legal regulation, legislation, forestry management
	Measures and methods for forestry efficiency

The participants' views on the definition of the problem's first sub-theme, under the theme of the database's benefits, were as follows:

"Would reveal the real problems that exist in private forestry" (I1). "It is not clear how the owner disposes of his forestry property" (I3). "It would be clear why there are unequal farming conditions, what bureaucratic problems exist in private forestry" (I5). "It would become clear why forest owners are reluctant to manage and abandon their forests" (I9). "The reasons why the owners do not manage their forest property would be revealed" (I10).

The participants' views on political decisions, legal regulation, legislation, and forestry management, the second sub-theme under the theme of the database's benefits, were as follows:

"Provide suggestions on how to make the activities of private forest owners more efficient" (I1). "Would improve the regulation of this sector" (I2). "Predict the provisions of the Lithuanian forest strategy" (I4). "Understanding the real situation will help form forest policy" I5 "Improve policy, legislation, awareness and training" (I6). "Changes in private forestry could be managed" (I8).

The participants' views on measures and methods for forestry efficiency, the third sub-theme under the theme of the database's benefits, were are as follows:

"Provide recommendations necessary to carry out forestry activities" (I1). "Accurate data, forecasting trend" (I2). "To organize education of private forest owners" (I3). "Owners would be focused on ways and means to increase forestry efficiency" (I7). "To plan what kind of training would be needed for forest owners" (I9). "To plan and manage changes in the private forest estate" (I8). "Improve consulting services and their system for forest owners" (I10).

Informants indicated that, during database establishment, it would be possible to identify the essential problems faced by private forest owners. After identifying the main problems, it would be possible to make political decisions and improve legislation, legal regulation, and forestry management. After the database's establishment, it would be possible to plan how to increase the productivity of forests and ensure the rational use of natural resources while preserving the biological diversity, ecological systems, and landscape characteristics of our country, thereby ensuring a healthy and clean environment. Thus, for private forestry to be based on the principles of sustainability (satisfying the economic, ecological and social needs of the current society), a system of criteria and indicators is needed to define this sustainability. In order to apply the system of indicators of sustainable development, it is necessary to determine socio-economic indicators according to which private forest holdings should be evaluated. Table 2 presents the main social and economic indicators that experts assessed as the most important for the establishment of a database of the social and economic information of Lithuanian private forest owners.

The experts distinguished 11 indicators in the social criterion, and six indicators in the economic criterion. As can be seen from the information presented in Table 3, the social indicators cover a wide spectrum which can be divided into three groups: factors describing the forest owner, forest management, and forestry activities.

Table 2. Social and economic indicators for establishment of a database of the social and economic data of Lithuanian private forest owners.

Level 1: Goal	Selecting socio-economic indicators to establish a database of Lithuanian private forest owners	
Level 2: Criteria	Social	Economical
Level 3: Index	Holding area Forest group Owner's age Residence Education Knowledge of forestry Annual number of working days in forests Form of farming Forestry objectives Form of ownership Forest property acquisition form	Income from forest management Income from 1 ha Income by activity areas Main cost groups Investments in forests Subsidies, grants, support

Table 3. Possible interference of the database.

Theme	**Subthemes**
Database interference and risks	Negative attitudes of forest owners
	Database establishment organization problems
	Data submission

Forest owner indicators were as follows: age (years), education (primary, secondary, tertiary), forestry knowledge (higher forestry education, forestry experience, courses and seminars, public information tools, no knowledge), place of residence (urban or rural), forestry goals of the forest owner (sales, investments, preservation of biodiversity, self-sufficiency, etc.). Forest management indicators included the following indicators: size (ha), forest group (II–special purpose forests, III–protection forests, IV–economic forests). Forestry activities are characterized by the following indicators: annual number of working days in forests (how many working days worked per year), form of farming (everything is organized and worked by the owner of the forest estate and/or family members, Everything is organized by the owner of the forest estate/family members, but the work is done by other individuals or companies, I consult with specialists and the work is performed by hired individuals or companies), form of ownership (the legal form, i.e., personal or legal), form of acquisition of forest property (returned/transferred former property, inherited, donated, purchased from under a purchase–sale agreement). In social indicators, legal aspects such as the form of management and the form of acquisition of forest property appear. The economic indicators were as follows: income from forest holdings (Eur/holding), income from ha (Eur/ha), and income by types of activity (from sold uncut forest; from sold raw wood (logs); from solid wood products (prepared firewood, boards, etc.) from sold by-products of the forest (mushrooms, berries, nuts, Christmas trees, juice, etc.); income received for recreation (either rest in the forest or hunting). Other economic indicators are the main cost groups and investments (planting, maintenance of forest plantations, young trees and scrub reorganization, preparation of internal forest management and forest afforestation and thinning projects, sanitary forest protection, forest protection against fires and illegal actions, maintenance of forest roads, installation, and maintenance of recreational facilities; implementation of nature management measures in forests, protection of species and habitats), subsidies, grants, and support (e.g., the support of national and regional institutions of the Republic of Lithuania, and European Union support for forestry technologies and activities).

In order to monitor the social and economic development of Lithuanian private forest owners, one of the experts suggested calculating the index of social and economic well-being for each private holding of the owner. When calculating this index, certain dimensions would be assessed, such as the age of the owner, knowledge in the field of forestry, their form of farming, their place of residence, gender, income and expenses from the holding, and their investments in the holding.

Although their experience of different monitoring in various fields is already quite significant, the experts presented and highlighted a group of possible threats and problems. When was asked about the database's establishment, we distinguished three subthemes from the received interviewees' commentary: (1) the negative attitudes of the forest owners; (2) the organizational problems of establishing a database; (3) the submission of data; and (4) see Table 3.

The participants' views on the negative attitudes of forest owners, the first subtheme under the theme of database establishment interference and risks, were as follows:

"The owners will think about where the data will go, they will think about the penalties" (I1). "Weak activity of forest owners "(I2)."The reluctance of forest owners to share data "(I3). "Owners are afraid that the data can be used by third parties carrying out unfair transactions and speculations" (I4). "Reluctance to cooperate, insufficient data coverage" I5."Reluctance to disclose financial and sensitive social information" (I6). "Owners' interests" (I7). "I don't want interference in my private life" (I8). "People will be reluctant to answer; the data provided will be inaccurate" (I9). "Fear of the owners of violation of their personal rights, violations of personal data protection" (I10).

The participants' views on database establishment organizational problems, the second subtheme under the theme of database establishment interference and risks, were as follows:

"Distrust of the owner" (I1). "Communication barrier for objective information" (I6). "Lack of resources for database establishment, availability of information" (I2). "Objectivity of selection, accessibility of owners" (I6). "Badly designed questionnaires that will not reveal the necessary information" (I7). "Formal approach–only to organize the process, lack of funding and expertise, fragmentation" (I8). "Intervention of state institutions, especially of the political sector" (I9).

The participants' views on data submission, the third sub-theme under the theme of database establishment interference and risks, qwre as follows:

"Unreliability of obtained results" (I1). "Information availability problems, compatibility of various databases" (I2). "Problems of incorrect and fragmented information" (I8)." "possible violations of the human right to personal data protection and ensuring a high level of personal data protection" (I10).

Summarizing the information presented in this chapter, it can be concluded that the need for socio-economic information about the owners of private forests in Lithuania is obvious. It would clarify the most pressing problems faced by forest owners when farming in their forest estates, and it would allow for the improvement of policy formulation and implementation, the adoption of legal regulations, and the organization of the necessary changes in private forestry. Experts noted that private forest estates are unique, and the owners' farming and socio-economic goals can be very diverse. Therefore, it is necessary to establish criteria and indicators that could ensure more sustainable forest management. It is a large complex work that should be managed and controlled at internal (for example, control of the quality of service of individuals in order to determine the behavior of employees) and external (for example, independent audits contracted by third parties) levels.

Private forest owners are the main group of forest owners in Europe, and their land has significant conservation value. However, small plot sizes, societal heterogeneity and structural changes hinder the development and implementation of effective forest protection programs in private forests. The conducted research and the analysis of documents and scientific sources showed that in Lithuania there is enough information about the

number of private forest owners, the size of the holdings, the managed forest areas, and the tax indicators of the forest holdings. The State Forestry Service provides these statistical data every year, but socio-economic data are still missing. In the Republic of Lithuania, regarding the attitude of private forest owners to managing property, their values and farming goals, etc., no monitoring system has been created, and only isolated and inconsistent investigations have been carried out [2,14,16,34–36]. The results of the research conducted by Mizaras et al. confirm that achievement of sustainability is one of the main objectives of forest policy. The scientists noted that rational management of small-scale private forestry should be based on the principles of sustainability [34]. For the implementation of this purpose, it is necessary to establish a social and economic database of private forest owners in Lithuania.

The need to establish a social and economic database of private forest owners for use in the sustainable management of forests has also been emphasized by foreign researchers [1,3,7,8,11,12,29]. According to these researchers, considering the perspectives of small private forest owners in current forestry decisions, there is great potential to strengthen sustainable forest management that integrates conservation of natural resources [51]. Regarding the future of private forest ownership, Mozgeris et al., [16] and Feliciano et al., [48] argue that owners' gender, age or management goals are not so important; what is more important is how these factors influence the management of private forests. For example, typologies based on structural variables or values and goals are of limited use when they can predict owner behavior but cannot predict changes.

Analysis of the results of the conducted research showed that the experts are convinced that the implementation of a social and economic database of private forest owners in Lithuania is purposeful, and would significantly contribute to the sustainable use of forests. According to experts, the establishment of such a database would allow us to plan how to increase the productivity of forests and the rational use of natural resources, and allow us to preserve the biological diversity, ecological systems, and landscape characteristics of our country, ensuring a healthy and clean environment. The specialists noted that it is necessary to establish appropriate criteria and indicators for the effective collection of periodically updated domains. Appropriate selection of criteria is important because private forest and estates are unique, and owners' farming and socio-economic goals can be very diverse. The importance of selecting rational criteria and indicators for the creation of an effective social and economic database is emphasized by various researchers on this topic [11,12,21,23–27].

5. Conclusions

The need for establishment of a database of social and economic information about private forest owners in Lithuania is substantiated by a detailed theoretical analysis of the conducted scientific research and the insights of experts' interview responses. The establishment of this social and economic information database will encourage the adoption of appropriate political and legal regulatory decisions that would enable positive changes in the private forest sector in pursuit of sustainability.

The study provides only partial, unfocused insights into socio-economic forest management criteria in the private forest sector; these could help to further sustainable forest management policy. Considering the increased interest in the sustainable use and preservation of forest resources and uncertain future perspectives, it should be noted that the social and economic database that is established should also seek permanent and effective reinforcement, responding to constant changes in environment monitoring systems as the private forest sector moves towards sustainability.

The limitation of this work is that the chosen research method gives incompletely representative results because the qualitative interview was based on open questions that are not broad enough and depend on the flow of the conversation during the interview. It would also be appropriate to interview not only forest experts, but also private forest owners. This research will be accomplished in the next stages of our studies. In addition, to present the most detailed results that would be useful for the development of monitoring

of social and economic indicators of private forests, it would be appropriate to use a quantitative data collection method for further exploration of the topic. We did not use this method due to the rather large scope of the study, so the authors intend to develop this study in the future. The current phase of the research aims to verify the results of the scientific and interview analysis. In addition, the authors wish to encourage national and international scientists and practitioners to engage in open discussion about this topic, in order to produce possible solutions for the establishment or improvement of a social and economic database for the implementation of a unified monitoring system for private forestry sector as it moves towards sustainability.

Author Contributions: Conceptualization, D.P., A.D., M.Š., M.A. and O.D.E.; methodology, A.D. and D.P.; validation, A.D. and D.P.; formal analysis, A.D., D.P. and M.Š.; investigation, M.A., O.D.E. and A.D.; resources, M.A.; data curation, A.D., D.P. and O.D.E.; writing—original draft preparation, D.P. and A.D.; writing—review and editing, D.P., A.D. and M.Š.; visualization, D.P., A.D. and O.D.E.; project administration, D.P. and A.D.; funding acquisition, M.A. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the Ministry of Environment of the Republic of Lithuania. Project number—VPS-2022-6-SBMŪRP.

Data Availability Statement: Data is unavailable due to privacy or ethical restrictions.

Conflicts of Interest: The authors declare no conflict of interest.

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