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Analysis of State Forest Institutions in the Republic of Moldova, Using a Causative Model

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Abstract: With state institutions playing a determinant role and the state owning 86% of the forestland, the forest sector in the Republic of Moldova still strives to adapt to post-communist socio-economic realities. This paper evaluates the performance of forest state institutions in achieving ambitious policy goals oriented toward sustainable management and enhancing forest protection functions. The performance of the Moldsilva Agency; State Forest Enterprises; and Ministry of Agriculture, Regional Development and Environment were evaluated, using the criteria of the 3L Model. The research combined participatory observations, face-to-face semi-structured interviews and secondary empirical evidence. The results indicate a paternalistic regulatory approach, with state authority institutions giving marginal importance to non-state forests, and low-efficiency state forest management institutions having financial difficulties that threaten the fulfillment of sustainability goals. The Moldsilva Agency has a central role in intra-/inter-sectorial coordination and cooperation. The authorities should seriously consider a more precise formulation of policy goals, with solid budgetary support along with institutional measures aiming at more efficient forest management structures and higher concern for non-state forests and society's demands.

Keywords: Moldova; state forest institutions; sustainable forest management; causative evaluation; forest policy



Citation: Talpă, N.; Hălălișan, A.F.; Popa, B. Analysis of State Forest Institutions in the Republic of Moldova, Using a Causative Model. *Forests* **2021**, *12*, 105. <https://doi.org/10.3390/f12010105>

Received: 8 December 2020

Accepted: 17 January 2021

Published: 19 January 2021

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1. Introduction

For many former socialist countries, the forest sector institutional framework has been an important concern [1–3], the last decades being a period of prolonged institutional reforms [1,2,4,5]. In many countries of the region, significant efforts have been made to move from a hierarchical and highly interventionist system to a system characterized by greater transparency and openness to society that respects private property [2,6,7], is more sensitive to societal needs [8,9] and is more adapted to market economy requirements [10,11]. Numerous studies show that the reform process in the forest sector institutional framework has not always been a complete success, as many of the adopted solutions have proved to be too simplistic [3], and there is general concern regarding possible mistakes in the institutional area [8,12,13]. There is strong evidence indicating that traditional interventionist and paternalist types of institutional approach are still present [13,14], undermining stakeholder's involvement in forest management.

This explains why research efforts have been increasingly focusing on the evaluation of state forest institutions' (SFIs') performance in achieving their economic, ecological and social goals, aiming at formulating strategic options for the future sustainable development of the sector [14–16]. One of the primary methods for evaluating the institutional performance, successfully replicated in many former socialist countries, was designed by Krott and Stevanov [17]. It evaluates the performance of SFIs based on a benchmarking model consisting of a three-level interaction [17]. The model considers all levels of sustainable management, making it easy to use and adapt [14].

Despite many changes over the last decades and attempts from international projects calling for transformation [18], Moldova's forest sector remains conservative and less receptive to emerging socio-economic realities [19,20]. The state owns 86% of the total forest area [21], which indicates a very high responsibility of SFIs in managing the country's forest resource. According to the Forest Code [22], the main goal of the country's forest sector is to ensure the continuity of ecological and socio-economic functions assigned to forests. However, the current forest sector development presents major challenges of continuous forest degradation and the insufficient effectiveness of the existing institutional frame in maintaining the ecological balance needed for the sustainable development of society [19,23]. To address all these, a forest institutional reform strategy was elaborated in 2012, proposing solutions for strengthening SFIs and clarifying their regulatory, control and forest management roles [19]. The strategy has never been officially adopted or implemented, with some exceptions related to the management of protected areas [24].

Using the method proposed by Krott and Stevanov [17], this study aimed at determining to what extent the SFIs in the Republic of Moldova met their mandate of implementing the national forest policy goals. Our research also tried to identify the causes and processes behind SFIs' performance and, in this way, to suggest strategic options for future forest-related policies.

2. Moldova Forest Sector Snapshot

Moldova's forests cover 373,200 hectares, nearly 11% of the country's territory [21]. Of them, 86% are owned by the state, another 13.3% are so-called communal forests owned by local public authorities (LPAs) and only 0.7% are owned by private landowners [25]. An uneven forest distribution and high fragmentation negatively impact their economic and protective functions [26]. Broadleaved species predominate (98%), with oak-type forests (44%) being the most representative forest ecosystems, believed to harbor nearly 80% of the country's biodiversity [26,27]. The total growing stock is estimated at 48 million m³, while the total annual increment is only 1.3 million m³ [20].

The current forest institutional framework in the country (Figure 1) includes the Ministry of Agriculture, Regional Development and Environment (MARDE); Environmental Agency; Ecological State Inspectorate; Moldsilva Agency (Moldsilva); State Forest Enterprises (SFE); and LPAs owning forests. MARDE is responsible for developing policies and regulations [28]. MARDE is an umbrella organization comprising a number of subordinated institutions: (1) Moldsilva, in charge of forest policy enforcement [29]; (2) the Environmental Agency, issuing authorizations for the use of natural resources [30]; and (3) the Ecological State Inspectorate, enforcing environmental legislation [31]. LPAs have legal obligations towards the management of their own forests [22], but there is no clear separation between their attributions and Moldsilva's factual mandate over the communal forests [32]. The management function of the state is carried out by 25 legally independent SFEs that form a network of territorial state-owned entities managing all state public forests. Communal forests are unequally managed, only some of them by municipal enterprises specialized in providing forest management services, among other public services [33]. Moldsilva is a self-financed (There is some budgetary allocation for Moldsilva, but they are rather small, not exceeding 3% of Moldsilva's budget [25].) state agency, in charge, among other prerogatives, of SFE coordination and policy enforcement as well as other extension services for all interested in managing or creating forests. Although in the case of Moldsilva, there is a clear overlap between the regulatory and management functions [29], its mandate includes significant involvement in policy elaboration, making Moldsilva more of an authority institution than a management institution.

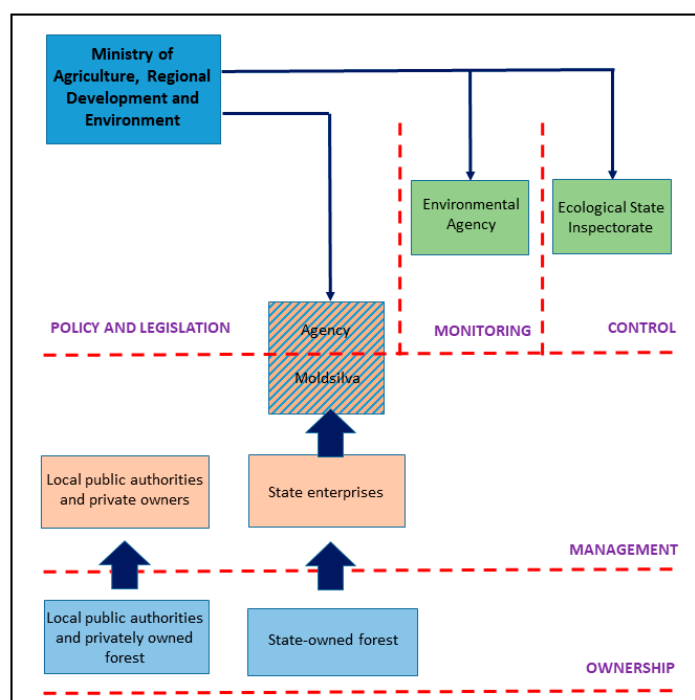


Figure 1. Institutional framework of the forest sector in the Republic of Moldova.

3. Materials and Methods

3.1. The 3L Benchmarking Model as a Theoretical Basis for Institutional Analysis

The 3L causative model was designed by Krott and Stevanov in 2008, aiming at developing a tool for evaluating SFI performance in a comprehensive, yet science-based and easy-to-apply, way [17]. In the method, SFIs are divided into two main categories: (1) management institutions with mandates related to direct management, i.e., management planning, goal setting, product and service provision, regeneration, guarding, etc., and (2) authority institutions with regulatory, policymaking and enforcement tasks [15]. The 3L model is based on designing evaluation criteria by interpreting the policy goals through a more precise theoretical framework. The core of the model is the interaction between the 3 layers (3L): the layer of public policy goals—how the principles of sustainable forest management are mirrored in the country's forestry goals—the layer of theoretical frameworks and the layer of empirical measurements [14,17]. The relevance level includes policy goals and programs formulated by the state for sustainable forest management, while the theoretical layer combines the recognized economic, political and ecological theories. The empirical layer includes perceptions of the implementation of elements from the other two layers. The novelty of the model lies with the fact that the vague and generalist language of the policy documents and programs (included in the layer of public policy goals) is translated into more precise terms by considering the natural science, political, public economics and business management theories (included in the theoretical layer) [14,17]. As a result, clear and science-based criteria [17] are formulated. The empirical level is evaluated against these criteria, and all the identified differences indicate institutional performance. The feasibility of the 3L model was successfully demonstrated by evaluating forest state institutions in Serbia and Croatia [34] and other former communist countries [14,15], but also in countries in other regions such as Tunisia [16] or Brazil [35].

Applying this model to the Republic of Moldova involved identifying criteria from the theoretical framework of the method, followed by empirical measurements of different documentary sources and forest sector stakeholders' perceptions regarding the performance of SFIs relative to the identified criteria.

3.2. Empirical Evidence Collection and Analysis

All state-owned forests are managed by SFEs, while Moldsilva and MARDE are responsible for all the forests in the country; therefore, these institutions were evaluated in this study. Functioning under the same technical and regulatory frame and acting as a national-level network, the SFEs were analyzed all together, as one management institution. Because they share most of their responsibilities, MERDE and Moldsilva were also analyzed together as one authority institution.

Both primary and secondary sources were used for data collection. Primary data were collected through participatory observations and semi-structured face-to-face interviews. Participant observation was conducted during the period of research through attendance at numerous meetings with sector representatives, by the first author of this paper, who has a solid professional background and experience in forest management planning in Moldova. Participatory observation is recommended by the methodological frame (3L model), being especially useful for collecting empirical evidence that can otherwise remain inaccessible [14,35]. For preparing semi-structured interviews, support questions were formulated for all the indicators recommended by the 3L model (20 indicators for management institutions and 17 indicators for authority institutions), these indicators being designed for Europe-wide research [14]. Using the support questions, several test face-to-face interviews were conducted in the summer of 2019 in order to assess the validity and the applicability of the indicators [36]. As a result of this preliminary test, a total of 18 indicators were selected for management institutions and 15 indicators for authority institutions (Table 1). The interview questions were formulated following the selected indicators (Table 1, Tables S1 and S2), which formed the analytical categories. The interviews were held in the offices of the respondents, in Chisinau, the capital city, and in some other locations, at the regional SFE headquarters, in Romanian, the official language of Moldova, between May and September 2020. Experts from the following institutions were interviewed: Moldsilva, the Forest Research and Management Institute, SFEs, environmental Non-Governmental Organizations (NGOs), Moldovan State University, the State Agrarian University of Moldova, the Ecological State Inspectorate, and MARDE (Table 2). Anonymity and privacy were guaranteed for all interviewed persons, allowing them to express their perceptions freely, without other interference, given that the sector is described as highly politicized [24]. For each respondent and each indicator (analytical category), the answers were coded based on five versions of indicator fulfilment: no fulfilment; weak, moderate, or total fulfilment; and a lack of knowledge (no answer). On the basis of this coding, for each indicator, general overviews were produced, ready to be assembled with the secondary empirical analysis level.

Table 1. Criteria and indicators used to evaluate state forest institutions' performance (based on [34,35]).

Criterion	Indicators	
	Management Institutions	Authority Institutions
C1 Orientation toward market demand	Market revenue Marketing competence	Quality of information about markets Freedom for harvesting
C2 Orientation toward nonmarket demand	Plans for production/provision of public/merit goods Financial inflow for public/merit good production	Restrictions on forest use Exercised control
C3 Sustained forest stands	Obligation of sustaining forest stands Forest management plans	Coverage by forest management plans Investments in sustained forest stands
C4 Technical efficiency	Technical productivity of work Managerial accounting	Technical productivity of work
C5 Profits from forests	Annual operating profit	Profitability
C6 Orientation toward new forest goods	Professional market information Investments in innovative products External partners	Encouraging the marketing of innovative services/products

Table 1. Cont.

Criterion	Indicators	
	Management Institutions	Authority Institutions
C7 Speaker for forestry	Trustful cooperation with wood-based actors, aspiration and acceptance of speaker's role	
C8 Mediator of all interests in forests	Trustful cooperation with actors from different sectors but interested in forest sector, aspiration and acceptance of mediator's role	

Table 2. List of interviews.

Interview Indicator	Institution
i 1–23	State Forest Enterprise
i 24–31, i 43–45	Forest Research and Management Planning Institute
i 32–33, i 40–42	Moldsilva
i 34, i 45, i 46	Non Governmental Organisation
i 35, i 47	Ministry of Agriculture, Regional Development and Environment
i 36	Ecological State Inspectorate
i 37–39, i 48–52	Universities

Secondary empirical evidence analysis started with collecting and assessing the regulatory framework forming the basis of the forest sector policy: The Forest Code [22] and another 20 subsequent norms and regulations defining the roles, attributions and missions of different SFIs (e.g., [28–31]) as well as other programmatic documents (e.g., [19,23,37,38]). These documents supported the identification of the forest policy goals. In the next step, a total of 37 public documents regarding the forest sector in Moldova were selected and thoroughly analyzed: activity reports of the targeted institution (e.g., [26]), forest management plans (FMPs) and technical reports (e.g., [23,39]), and various scientific papers (e.g., [32,40]). The sources were grouped based on the presence and quality of information regarding the used criterion and indicators (Table 1), thus helping us to assess whether the indicators were fulfilled or not (Tables S1 and S2).

After the above-described analysis, the information from the empirical sources helped in deriving conclusions regarding the performance of the targeted SFIs. The indicators pertaining to each criterion were combined, aiming to evaluate the level of criterion performance on a scale including (0) for no performance, (1) for weak performance, (2) for moderate performance and (3) for strong performance (Tables S1 and S2). The results were also illustrated using spider net charts, aiming at keeping the criteria connected in the same graph, but not in the same dimension [35].

4. Results

4.1. Forest Policy Goals

The qualitative analysis of the national environmental and forest policy documents revealed a clear orientation towards sustainable forest management. Forest protective functions along with the goal of increasing productivity are at the core of the main forest legislation [22]. According to the Forest Code, all forests in the Republic of Moldova are primarily assigned with protective functions, the production function being ranked as secondary. The biodiversity conservation strategy [37] is increasingly emphasizing the need for the better preservation of forest ecosystems. The Orhei National Park, created in 2013, and the recently established Biosphere Reserve Lower Prut, created in 2018, are important steps towards fulfilling the country's commitments on biodiversity conservation [38]. The protection function policy's focus is also mirrored in the concern regarding the continuous degradation of forest quality, the sector's development strategy establishing goals for forest surface increases, and forest recovery measures [23]. The existing legal frame aiming at sustainable management does not explicitly include the aim of weighing the wood production with domestic wood consumption, estimated as higher than the sup-

ply [38]. This may be an indication of possible unsustainable operations, often camouflaged under imperfect legal frames.

State forest management structures—SFEs—are economic entities, with minimal budgetary allocation [24,25], undertaking self-financing activity [29], mainly, wood harvesting. Strengthening economic performance is not a very clear overall policy objective (e.g., the financial sustainability of SFEs is formulated as such only in the draft of the institutional reform strategy for the sector [19]). Thus, the empirical evidence suggests a certain contradiction between the overall protection/conservation orientation and the internal management documents of the SFEs that shape very clear economic efficiency indicators [18].

The very few specific provisions regarding the coordination between the forest sector and other sectors, as well as between different interested actors, can be seen as a deficiency of the national forest policy. Despite the state's paternalistic approach in this matter, in recent years, some programmatic documents have been raising concerns over the involvement of other actors in the sector. LPAs and environmental NGOs are increasingly involved in the participatory process for forest policy decisions [32]. The Government has openly emphasized its objective to support the management of LPA forests, but the tasks and means are rather unclear [32,33]. On the matter of inter-sectorial cooperation, we noticed that there are clearer provisions for the relationship between the forest sector on the one hand, and the water management and agriculture sectors on the other hand [39].

Moldova's forest legislation and policy documents are seen as rather vague and imprecise, leaving room for interpretation [24], and are likely to mislead. Some efforts have been made recently in improving the legal framework and providing the substantiation necessary for sustainable forest development [24]. Forest institutions have also undertaken a number of positive actions such as increasing protected areas, the creation of a national ecological network, or the expansion of community forestlands [40]. However, many sources demonstrate that degradation processes in forest ecosystems have not been stopped [18,23], calling for deeper involvement in policy formulation and its enforcement [32].

4.2. Institutions with Management Tasks—State Forest Enterprises

The analysis of SFE performance included all eight criteria recommended by the adopted methodology [17] along with 18 adapted indicators. The results are illustrated in the spider net chart in Figure 2 and in Table S1.

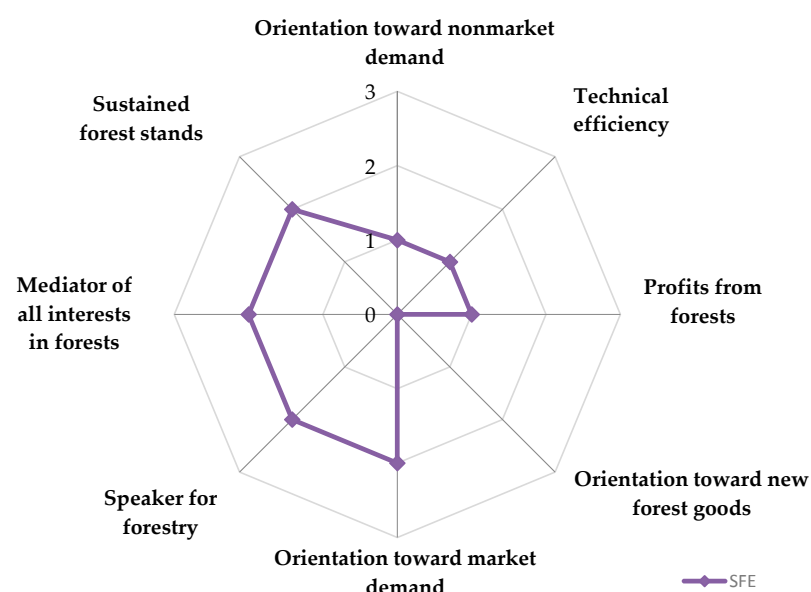


Figure 2. Performance of forest institutions with management tasks in Republic of Moldova: (0) for no performance, (1) for weak performance, (2) for moderate performance and (3) for strong performance.

4.2.1. C1: Orientation toward Market Demand

SFEs are the largest suppliers of forest products in the domestic market [40]. Interviewed experts indicated that wood market revenue is substantial, as it represents over 70% of the total SFE revenue, showing an increase compared to previous years. These findings are supported by centralized SFE financial reports [41], according to which, for 2019, an income of 421 million MDL was recorded, compared to 410 million MDL (MDL—Moldavian currency. The average exchange rate for 2019 was 19.25 MDL for 1 EUR.) in 2018. The revenues from marketing wood products, for the period of 2010–2016, represent circa 75–85% of the total revenue [20,26]. Other studies in eastern European countries revealed the same type of market revenue, with wood incomes representing more than 70% of the total revenues for management institutions in Poland [14] or Romania [42].

Interviewees claimed that auctions are no longer used for selling the timber, but this method was used in the past. While Moldovan legislation generally allows using tendering procedures for forest products [29], this “auction” practice was suspended due to many difficulties in ensuring an equitable process and fair participation (fewer companies become interested in auctions) (e.g., i 25, 32 and 33). Currently, the wood is harvested and sold directly by SFEs to all interested customers, using a chart of agreed prices, decided by each SFE’s management. Pricing forest products is a cost-based process [26], prices being generally below the market prices, as highlighted by the interviews (e.g., i 24, 27, 31, 34 and 38). Access to wood (purchased from SFEs) should be freely awarded, but interviewees mentioned many exceptions, caused by a lack of capacity to meet the demand or some buyers being favored (e.g., i 3–5, 7 and 24). Most of the interviews showed that the most important use of traded wood is fuelwood and small constructions for rural households. Difficulty in access to forest resources and insufficient supply are also indicated by a series of studies showing that there is a significant difference between the consumption of domestic firewood and the official amount sold by SFEs [43], which raises big concerns about illegal logging. According to FMP prescriptions for a 10-year period, the amount of wood to be harvested is divided equally by each year, so sales are adjusted according to FMPs and not in accordance with market demands [44]. Similar situations occur in other countries where FMPs are mandatory [14,45]. Official statistics show an increase in the amount of harvested wood from 433,968 m³ in 2010 to 588,467 m³ in 2014 [26]. This, together with the absence of quantities reported as timber exports, reinforces the idea that domestic timber demand is not being met by SFEs. Summarizing all that is stated above, the SFEs’ performance against the criterion *Orientation toward market demand* is classified as moderate or (2).

4.2.2. C2: Orientation toward Nonmarket Demand

The FMPs assign protection functions to each forest stand in accordance with a functional classification system [43]. All forest-specific works are then planned accordingly in order to ensure the needed continuity of/increase in protection functions. This situation is rather common among former communist countries where FMPs are compulsory and include provisions for the production/provision of public/merit and goods [14,15,34,42]. This result is not confirmed by studies conducted in other regions of the world [35]. However, in Moldova, most of the interviewed persons indicated that SFEs’ operational planning is oriented primarily to production and secondarily to protection. Given the self-financing mechanism adopted in early 1995, SFEs do not benefit from a permanent inflow of funds needed for public/merit good production/provision from outside the institutions, so they rely mainly on their own economic activity. Circa 3% of SFE revenues originate from budgetary sources [25], but these insignificant funds are allocated mainly to combatting pests and implementing minor afforestation activities [20,26]. Almost all the interviewees pointed out that these very limited allocations are insufficient for supporting the protection functions. The self-financing status of SFEs can also be seen in Poland [14] or Romania [42], but due to better forest quality, this is not leading to shortages that can affect the protection functions.

SFEs had access to some external sources in the past, the most conclusive examples being the so-called “carbon” payments received to reduce greenhouse gas emissions. SFEs actively participated in two projects developed within the Clean Development Mechanism under the Kyoto Protocol (1997) and the United Nations Framework Convention on Climate Change (UNFCCC, 1992) [20]. As a result of these projects, SFEs received 7,900,705 USD between 2006 and 2016 [20]. These funds were unevenly distributed among SFEs participating in afforestation activities and represented, on average, not more than 4% of SFEs’ revenues [20]. As a result, the performance of the SFEs for the criterion Orientation toward nonmarket demand C2 was evaluated as weak or (1).

4.2.3. C3: Sustained Forest Stands

Moldova’s forest legislation aims at ensuring the sustainable management of forest resources through rational use; regeneration; maintaining, conserving and improving forest biological diversity; and continuously providing forest resources for the current and future needs of society [22]. These provisions are mandatory for all forest owners and for all forest management structures [22]. The strategy for the sustainable development of the forest sector [23] argues that there is a phenomenon of the continuous degradation of forest resources due to insufficient measures for sustaining balanced ecosystems. The strategy defines two basic strategic directions: (1) restoring the eco-protective and bio-productive potential of natural forests and (2) expanding areas with forest vegetation [23]. All the interviewed foresters agreed with the sustainable management concept’s integration in the SFEs’ activity, but many of them (i 6, 11, 16, 21, 25, 28, 34 and 37) claimed that the objectives are not always met. According to interviewees, the mandatory 10-year FMPs are only partially enforced: despite the fact that all state forests have FMPs in place, their enforcement is still an issue. Only two interviewees (i 19 and 32) indicated that all FMP prescriptions and measures are entirely implemented. A challenging situation regarding the sustained forest stands was found in the Western Balkans [15], but in countries such as Poland, there are much clearer records and a higher FMP enforcement level [14]. In conclusion, forest requirements for sustainable management are partially fulfilled by SFEs, although prescribed by the existing regulatory framework. This classifies the SFEs’ performance for the criterion Sustained forest stands as moderate or (2).

4.2.4. C4: Technical Efficiency

SFEs’ efficiency and employees’ productivity in the workplace were perceived by the interviewees as rather high, but when calculating the amount of wood harvested per employee index ($1000 \text{ m}^3/\text{person}$), we obtained quite different results. We performed calculations based on 2014 data in order to compare our results with data from other countries. In 2014, SFEs harvested $588,467 \text{ m}^3$ of wood and employed as many as 4061 employees [26], resulting in a harvesting index of 0.15. This is a lower figure than for all the other SFIs elsewhere in the region for which we were able to find data, e.g., the Republic of Serbia, Croatia, North Macedonia, the Republic of Srpska, and Poland, being close to North Macedonia with an index of only 0.16 [14]. According to our interviews, a managerial accounting system is used: the costs and expenditures are strictly accounted for every SFE, and this evidence is used for allocating the overheads based on internal regulations aimed at applying a cost base system for wood pricing. However, under the limited competition conditions, the annual budgets are developed with slight changes from the previous periods, following standardized guidelines from Moldsilva, so the managerial accounting data are static and not always used in decision making [18,24]. Some of the interviewed persons (i 15, 18, 26 and 30) mentioned that top and middle managers at SFEs do not always use managerial accounting for decision making. Based on all these aspects, the SFEs’ performance for the Technical efficiency criterion was classified as weak or (1).

4.2.5. C5: Profits from Forests

The SFEs' aggregate gross profit for 2014 was 6,362,100 MDL or approximately 334,847 euros (According to the National Bank of Moldova, the exchange rate for December 2014 was 19 MDL for 1 EUR. We used the year 2014 for comparison reasons.) [20]. By dividing this value by the forest area managed by SFEs, we obtain a profit per unit area close to 1 EUR/hectare. This value is close to that for the Republic of Srpska (1.89), and higher than those for Serbia (0.16) and North Macedonia (loss), but much lower than that for Croatia (11.78) or Poland (15.92) [14]. Although the interviews indicated that the profits of SFEs remained the same or slightly increased, Moldsilva's financial reports show a profit decrease from 2018 to 2019 [41]. With an unsatisfied demand for wood [43], in a quasi-monopolistic market, there are clear indications that the profit could be increased, together with the technical productivity of work. In spite of the recorded perception—SFEs are profitable entities—according to the methodology framework, SFEs' performance for the Profits from forests criterion was evaluated as weak or (1).

4.2.6. C6: Orientation toward New Forest Goods

SFEs' share of incomes from marketing forest products and from industrial auxiliary activities represents 90% of the total amount of incomes, and the revenues cover all forest management expenses [20,26] and staff salaries, too. This may be the reason why SFEs show a very low interest in receiving incomes from sources other than traditional ones. Studies conducted in Poland [14], Romania [42] and the West Balkans [15,34] revealed the same reduced interest in new forest goods/services.

There is no evidence that new innovative products/services are being provided or even planned by SFEs. All the interviewed experts indicated SFEs' low interest for market research and design for innovative products. There are almost no investments occasioned for innovative products/services, or external partners for such activities. Therefore, SFE performance for the criterion Orientation toward new forest goods was judged as inexistent or (0).

4.2.7. C7: Speaker for Forestry

By their nature, SFEs have multiple relations with both wood buyers and state forest and environmental protection institutions (especially MARDE and Moldsilva). A positive perception was identified from many interviews, which showed a fairly good collaboration with these actors. However, SFEs are less interested in taking the lead in bringing the message to the public, though they often assume the speaker role at a regional level. Generally, SFEs keep Moldsilva informed about issues related to the sector representation, the effective role of speaker being exhibited through Moldsilva. In Poland, management institutions are more willing to act as speakers for the sector [14], while in Romania, a study performed using the same methodology revealed a situation that is similar to Moldova's [42]. We analyzed Moldsilva's communication policy and revealed that both SFEs and Moldsilva are publicly in support of sustainable forest management when it comes to the policy arena or debates [26,40]. The existing regulatory framework does not clearly stipulate what responsibilities lie with SFEs in this regard [29]. Thus, the SFE performance for the criterion Speaker for forestry can be classified as a moderate level or (2).

4.2.8. C8: Mediator of All Interests in Forests

An SFE's mandate does not explicitly frame its mediator role [29], understood as a facilitator of the deliberative process of finding solutions concerning forest use and protection, by balancing different interests in forests [17]. However, either directly at the regional level or indirectly through Moldsilva, SFEs are deeply involved in relations with numerous actors with specific interests in forests, especially in the area of biodiversity conservation [38], agriculture and LPA affairs [18]. A successful example is the long negotiation process with LPAs that agreed to actively participate in afforestation programs,

resulting in UNFCCC project implementation [33] and a fruitful relationship with various international donor agencies, such as the World Bank or UNDP [18,38]. These findings are confirmed by primary empirical evidence derived from interviews: there is a common perception that SFEs have a trustful cooperation with actors from outside the sector. Many respondents (i 2–5, 7, 10, 13–18, 20, 22, 24, 25, 27, 32–35 and 39) confirmed the aspirations of SFEs for mediators' roles and numerous situations when this role was accepted. However, there is still much to be done in improving the image of SFEs in such a way that they would be fully accepted as mediators [18]. At the end, the SFEs' performance for this criterion was judged to be at a moderate level or (2).

4.3. Institutions with Authority Tasks

As presented in Section 2, two main institutional bodies share responsibilities for the forest sector development in the country—MARDE and Moldsilva. MARDE conducts permanent assessments of the sector's status, elaborates public policy and sector-specific regulations, and makes decisions on strategic interventions and enforcement efforts. Moldsilva also has numerous authority tasks, such as (1) identifying the sector's priorities, to elaborate proposals for strategic planning and policy elaboration as well as to organize and coordinate sectoral enforcement; (2) developing and maintaining the sectoral informational database; (3) providing services to other forest owners (mainly LPAs); (4) elaborating FMPs; and (5) guiding the diversification of forest products and services adjustable with marketing strategies [28,29]. Although Moldsilva is a self-financing agency with strong institutional independence, it is still subordinate to MARDE; therefore, in this research, the analysis of institutions' performance regarding authority tasks included both MARDE and Moldsilva. The evaluation considered all eight criteria recommended by the adopted methodology [17] and 15 adapted indicators (Table 1). The results are illustrated in a spider net chart (Figure 3) and in Table S2.

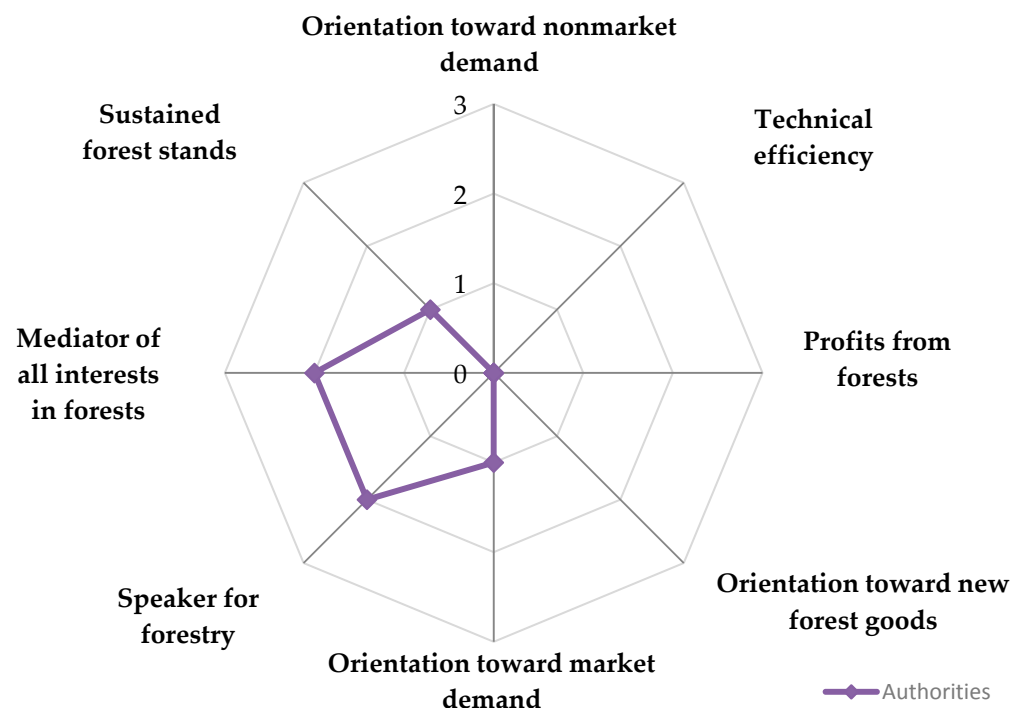


Figure 3. Performance of forest institutions with authority tasks in Republic of Moldova: (0) for no performance, (1) for weak performance, (2) for moderate performance and (3) for strong performance.

4.3.1. C1: Orientation toward Market Demand

Independent analyses [27] suggest that most of the harvested wood in Moldova is used for household needs (as energetic wood, for small constructions, etc.); also, the local

population benefits from several other forest products (e.g., nuts, fodder and fruits) used for household consumption [27]. Wood and non-wood products originate mainly from state forests, for which access is much more restricted, and the local population has to build specific relations with SFEs' personnel. Communal forests are less productive, as they mostly represent young black locust plantations, with only a few examples (e.g., Boghenii-Noi, Sinești) of traditional collectively managed forests of decent quality. Wood harvesting is severely restricted regardless of forest ownership [22], and the formal procedures are very bureaucratic, requiring various official approvals or examinations [22]. The Environmental Agency, subordinate to MARDE, issues harvesting authorizations to all forest owners regardless of whether FMPs are in place or not. Though FMPs are required, not all LPAs have FMPs, and they do actually harvest wood based on official authorizations [30]. The reduced freedom for harvesting in Moldova is confirmed in several other former communist countries such as Poland [14], Romania [42] and Serbia [34], but the situation differs in other regions of the world where the same methodology has been applied [35].

There is a reduced freedom for harvesting, which was mentioned throughout the interviews (i 41, 43–47, 51 and 52). Most of the interviewed persons indicated a lack of market information, but some of them perceived that the state is providing some market information (i 40, 41 and 47–52). Updated secondary empirical evidence was almost unavailable; only some historic wood price data for state-owned forests were found on Moldsilva's official website (www.moldsilva.gov.md, accessed on 17 September 2020). Unfortunately, Moldsilva places and updates market information on its website only periodically, often leaving readers without consistent and reliable data. Considering all these aspects, authority task institutions' performance for the criterion Orientation toward market demand was evaluated as weak or (1).

4.3.2. C2: Orientation toward Nonmarket Demand

Non-state forest owners are required to follow the same rules of forest management as the SFEs. Restrictions on use are high (all forests in the Republic of Moldova are included in the protection category, regardless of ownership) [22], but there is evidence indicating that the enforcement is stronger for state forests. It is worth mentioning that almost all forest protected areas were established in state-owned forests [26]. In many LPA cases, a combined management practice for common properties, such as forest and pastoral resources, often lacks any management plans and is performed against legal prescriptions for grazing and forest harvesting [22,33]. The average forest area managed by an LPA is very small, the communal forests being owned by more than 900 LPAs, and forest management structures exist for only 176 of them [33]. For the rest, management measures are implemented through the direct involvement of the community's members. Moldsilva supports the activity of communal forest management structures, but the legislation is rather generalist in this aspect, and budgetary restrictions limit Moldsilva in providing extended technical support [33]. MARDE's supervision over non-state forests is conducted with a rather paternalistic, top-down approach [32], rather leading to the marginalization of these forests. Consequently, the quality of forest management in these forests is significantly lower than in SFEs [40]. Some sources show both the lack of proper management and prescriptive regulatory framework as the root of the higher incidence of illegal logging in communal forests compared with forests managed by SFEs [33]. The lower-quality forest management in private forests is confirmed by studies performed in the West Balkans [34] and Poland [14], while in Romania, the private forest management structures have evolved and are able to ensure quite-good-quality forest management [2,42].

LPAs in Moldova do not receive budgetary allocations for the management of their forests, except for some assistance from the international community (e.g., the EU, Clima East projects, Japanese Government, and World Wide Fund for Nature). Neither SFEs nor LPAs receive any compensation for the restrictions imposed on local populations, which is another gap in existing policy and needs to be addressed in order to reduce "nature-human" conflicts. With the EU–Moldova Accession Agreement in place (2014) and other

donors' representation in the country, many real opportunities may have arisen, but local communities do not have the capacities to access such funding. The control function of the state is exercised by the Environmental Agency and Ecological State Inspectorate in all forests regardless of ownership [33]. In addition, SFEs have their internal control system for state forests [29]. The reasonable conclusion is that the effective supervision in non-state forests is lower than in state forests. The interviewed experts confirmed this, most of them indicating that the control capacities are sufficient, but control institutions are paying more attention to state forests (i 41–43, 46 and 49). Some other respondents (i 40–44, 46, 49 and 51) claimed that the control activity is, in general, effective and transparent, but very few official reports on forest-specific control were found among MARDE or Moldsilva public documents. By combining the performance for state and non-state forests, for the criterion Orientation toward nonmarket demand, the performance was classified as inexistent or (0).

4.3.3. C3: Sustained Forest Stands

We were not able to find any indications of how many funds LPAs allocated or received for forest management. Most of the interviewed experts were confident that the forest management-related expenditures (such as for forest stand-specific operations, afforestation, etc.) by LPAs were very low, if existent at all (and certainly lower than the level at state forests). This, once again, underlines a poor management infrastructure in communal forests (see Criterion 2 above). However, Moldovan forest authorities, in cooperation with international organizations, have successfully undertaken some initiatives for strengthening LPAs' capacities and forest management on the ground (e.g., the ENPI-FLEG projects, Clima East Moldova (European Neighborhood and Partnership Instrument East Countries Forest Law Enforcement and Governance (ENPI-FLEG); Clima East Moldova: Climate change mitigation and ecosystem-based adaptation in Orhei National Park), etc.) as well as projects funded by MARDE and implemented by Moldsilva (e.g., through the National Ecological Fund). All these efforts resulted, during 2002–2015, in the afforestation of 22,000 ha of abandoned and/or degraded land and more than 3000 ha of ecologically reconstructed land [26]. Moldsilva cooperates with LPAs through a newly created office that provides some technical support to interested LPAs, but the low level of funding from the state budget makes this process very slow [33]. Another problem is the lack of FMPs in most of the LPA forests: according to official records, only 27% of all communal forests have FMPs in place [33]. The FMP coverage for non-state forests in Moldova is smaller when compared with that for private forests in other former communist countries such as Poland, 69% [14], or Romania—more than 60% [2,42]. The next problem is that not all FMPs are strictly followed. Our interviews confirmed the secondary empirical data, meaning FMPs are generally implemented as such, but there are exceptions. Combining all this information with an SFE's moderate performance (score of 2) for the criterion Sustained forest stands, MARDE and Moldsilva authority's performance was classified as weak or (1).

4.3.4. C4: Technical Efficiency

Most of the interviewed experts and practitioners from both inside and outside forest institutions (i 41–47 and 49–52) claimed that Moldovan forest authorities pay little attention to employee productivity and work efficiency in non-state forests. While SFEs keep records on labor productivity in accordance with legal prescriptions, only some of LPAs' forest management structures do this. This may explain the absence of secondary empirical data on that matter. The lower work productivity can be explained indirectly by the higher fragmentation of non-state forests and stand characteristics (volumes/ha, density, etc.) that are rather modest compared to state-forest averages [40]. The production efficiency of state forest management was already classified as (1), and, as a result, the performance for the Technical efficiency criterion for authority task institutions was assessed as inexistent or (0).

4.3.5. C5: Profits from Forests

There are no publicly available data on the economic profits in non-state forests. In those few LPAs with “forest” potential, almost all the harvested wood is distributed among members of the community at a conventional price usually lower than that in state forests, or even provided for free to vulnerable groups of the community [46]. Small amounts of marketed wood from non-state forests are confirmed by official records, indicating that not more than 10% of the harvested wood came from LPA forests [40]. We assume, therefore, that the LPAs’ orientation towards profit making is rather low. The interviews did not express the same conclusion; some of respondents (i 40–45 and 48–50) claimed that both Moldsilva and MARDE take into consideration the economic efficiency of forests (regardless of their ownership) but only to some extent. Considering that the score of state forest management for Profits from forests is (1), the performance of authority task institutions can be judged as inexistent or (0).

4.3.6. C6: Orientation toward New Forest Goods

Most of our interviewees pointed out the fact that there is little appetite for new forest products, and both Moldsilva/MARDE and state/non-state forest owners seem to be little concerned about it. All the interviewed experts indicated that there is little interest for investments in this area, too. With limited investments in basic forest management operations and almost no profits from their forests, it is difficult to believe that LPAs are investing in the creation of new forest goods and services. None of the interviewed experts could provide any examples in this regard. Thus, the performance for the criterion Orientation toward new forest goods was evaluated as inexistent or (0). This result was confirmed by applying the same methodology in Poland [14], the West Balkans [34] and Romania [42].

4.3.7. C7: Speaker for Forestry

The Moldovan forest sector is rather well represented in mass media. Both MARDE and Moldsilva have a prerogative to represent the sector’s affairs [28,29]. Experts from MARDE (i 35 and 47) indicated Moldsilva and SFEs as their most trustful cooperators. The relationships with LPAs were also regarded as good, but some interviewed experts (i 40, 41, 44 and 49–51) identified room for improvement. The interviewees’ opinions varied, and some of them were confident that MARDE’s cooperation with sectoral stakeholders could be improved (i 42–43 and 45–47), namely, in relation to wood product purchasers. An independent analysis showed imperfect cooperation between forest-/environment-related institutions [24]. Interviewed experts also indicated that Moldsilva, more than MARDE, aspires to a forestry speaker role and both entities often find themselves in such a role. Several interviewed experts mentioned Moldsilva’s role in “speaking on behalf of LPAs” in the context of international projects (i 43–47, 49 and 51–52). Performance against the criterion *Speaker for forestry* was judged as moderate or (2).

4.3.8. C8: Mediator of All Interests in Forests

Expert interviews indicated that Moldsilva mostly cooperates with the biodiversity conservation division at MARDE and also with local authorities at all levels (not necessarily as forest owners). Numerous documents indicate a good cooperation with representatives of international agencies (the World Bank, UNDP, FAO, etc.) [18,20]. Inter-sectoral dialog between MARDE and other stakeholders was not mentioned as a deficiency by most of the interviewed experts, although some respondents claimed that frequent changes in Moldsilva and MARDE leadership were likely to affect inter-sectoral cooperation (i 40–42 and 45–47). Interviewed experts from MARDE and Moldsilva pointed out that both entities are rather interested in adopting a harmonization and conflict mediation approach between different actors in the sector, although civil society is not receiving the deserved attention. Experts from institutions other than MARDE and Moldsilva were asked to express their opinions regarding whether the aspired-to mediator role is accepted or not. Despite some

criticisms addressed to MARDE directly (i 43–45, 48, 50 and 51), most respondents agreed that Moldsilva's mediator role is generally accepted, even more than MARDE's. Indirect indications have pointed at Moldsilva being the most reliable forest-related mediator in the country [18,27,38]. For the Mediator of all interest in forests criterion, the performance of the two entities was evaluated as moderate or (2).

5. Discussion

The results show that Moldova is struggling with problems that are typical for many former communist countries, but also with some issues that are country-specific ones. The management of all forests in the Republic of Moldova is severely regulated by the state, who solely decide over the management tasks and procedures. Other 3L Model-based studies found the same situation in many eastern and central European countries [14,34,42]. SFIs in Moldova see private forest management as marginal, and there is a general lack of trust in non-state owners' ability to meet the prescriptive legal technical requirements. A similar conclusion is drawn by other studies performed in eastern and central European countries [4,6], or by comparing countries at the European level [13]. Nevertheless, under the conditions of Moldova, the severe budgetary constraints of LPAs (the main non-state forest owners) and the state forest management structures affect the effectiveness of very prescriptive regulations. Sustainable management goals are not entirely met by the current management in non-state forests. By having Moldsilva in a coordinating position for all SFEs, the central authorities are deeply involved in state forest management, with clear overlap between regulation and management functions, thus affecting the competitiveness of non-state forest management structures. This result also confirms an eastern European pattern [14,42].

Authority task institutions in Moldova show a lower performance evaluation index compared to state forest management structures, this also being typical for post-communistic forest sectors, as can be seen in Serbia and Croatia [34] or Poland [14]. As proved in other studies [14], our study reveals that state forest management structures in the Republic of Moldova have a high inertia in marketing approaches, almost ignoring the innovation opportunities for forest products and services, partially due to their monopolistic position. We argue that Moldsilva's monopolistic position backed by various interests might be among the answers. There are also some specific features of the SFIs in Moldova. The biophysical conditions of the forests (e.g., low productivity, coppice management, etc.) along with the encroachment into their functionality for quick economic gains have trapped Moldova's forest sector in a situation in which it is impossible to fulfill the wood demand without affecting sustainability goals. Additionally, Moldovan SFIs' efficiency performance (in terms of profitability and productivity) is among the lowest when compared with other studied countries' forest sectors.

Other studies conducted using the 3L methodology [14,34,35,42], especially the evaluation metrics approach for the practical application of criteria and indicators designed by Krott and Stevanov [17], was very helpful in the replication of the model in the Republic of Moldova. Some indicators (e.g., profitability and the technical productivity of work) were judged in comparison with other countries for which data were available due to the previous implementation of the model [14,34]. With very few necessary adaptations in terms of the number of indicators (due to the specific conditions in Moldova making some indicators inapplicable), the model was easy to apply and proved reliable. By using the 3L Model, the results of this study allow easy comparisons with other countries, thus proving that the model serves to fit the original benchmarking scope. The main limitation of the method is the possible difficulties in collecting the data [14] for secondary empirical evidence analysis. As in other studies [14,42], our research encountered some problems for non-state forests, although informational limitations were also experienced for state forests. We addressed these deficiencies by enriching the evidence with more accurate information collected from experts in order to obtain a reliable picture of Moldova's forest sector.

6. Conclusions

The 3L causative benchmarking model designed by Krott and Stevanov [17] was successfully applied in the Republic of Moldova, serving the purpose of assessing the performance of SFIs in charge of management or authority tasks. The general orientation of the forest policy is the sustainable management of all forests in the country regardless of their ownership or status. Our analysis of how the policy is implemented on the ground by SFIs allows highlighting some helpful conclusions and strategic options for the future:

- SFEs are more concerned about gaining short-term wood-sourced revenues (C1) to sustain their recurrent expenditures than fulfilling the sustainability goals. However, they do not excel in this direction, as the monopolistic position discourages sectoral competition and creates incentives for not seeking alternative solutions (e.g., innovative products/services) (C6).
- Nonmarket demand is perceived by SFIs only from a forest-protective-function perspective (C2). The forest management tasks are set by the forest authorities, without consulting society or the non-state forest owners. The restrictions imposed on all forest owners are not sufficiently supported through budget allocations for state forests or compensation for non-state forests. This forces SFEs to prioritize production before protection and the non-state owners to disregard their forests as an economic/social asset.
- The policy and regulatory framework favors, in generalist and vague terms, ecologically sustainable forest management (C3), but the performance in achieving this goal is rather moderate due to self-financing, inefficient forest management structures. Although seen as the pillar of sustainable forest management in Moldova, FMPs are not properly enforced in all situations due to the need of SFEs for higher revenues. Wood consumption is higher than the official supply, indicating the incapacity of SFEs to satisfy the demand and possible illegal logging incidence.
- The needs for covering the recurrent expenditures and for investing in forest protection functions should stimulate more forest management efficiency, but our study indicates the contrary. SFEs are little technically productive (C4) and little profitable (C5) entities, as well as less innovative for new products and services (C6); however, forest authorities do not seem too concerned about it. Institutional reform that would allow a higher efficiency of SFEs, as well as a more enabling environment for innovative product and service provision, is highly recommended.
- Among all the analyzed SFIs, Moldsilva aspires the most to the role of speaker for forestry and is, in general, accepted as playing such (C7). A mediator role for all interests in forests (C8) is played by it along with SFEs that are quite active at the regional level. However, there are stakeholders that are almost not represented by Moldsilva, though forests are strategic natural resources and deserve more stakeholder engagement than now.

The overall results of the study reveal that Moldovan SFIs are only partially successful in achieving the sustainability policy goals. A more precise and clear formulation of forest policy goals should be seriously considered by the authorities, with solid budgetary support, along with institutional measures aiming at clearer institutional mandates, more efficient forest management structures and a higher concern for non-state forests and society's demands.

Supplementary Materials: The following are available online at <https://www.mdpi.com/1999-4907/12/1/105/s1>. Table S1: Performance of state forest institutions with management tasks: state forest enterprises; Table S2: Performance of state forest institutions with authority tasks: Ministry of Agriculture, Regional Development and Environment, and Moldsilva Agency.

Author Contributions: Conceptualization, N.T., A.F.H. and B.P.; investigation, N.T.; methodology, N.T. and B.P.; supervision, B.P.; writing—original draft, N.T.; writing—review and editing, A.F.H. and B.P. All authors have read and agreed to the published version of the manuscript.

Funding: This research was financed through a doctoral scholarship by the Transilvania University of Braşov.

Acknowledgments: Warm considerations are addressed to Aurel Lozan for his enthusiastic help as well as to the interviewed experts and to Moldsilva and Forest Research and Management Planning Institute for the essential support during the fieldwork.

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

References

1. Lazdinis, M.; Carver, A.; Lazdinis, I.; Paulikas, V. From union to union: Forest governance in a post-soviet political system. *Environ. Sci. Policy* **2009**, *12*, 309–320. [[CrossRef](#)]
2. Abrudan, I.V. A decade of Non-State Administration of Forests in Romania: Achievements and Challenges. *Int. For. Rev.* **2012**, *14*, 275–284. [[CrossRef](#)]
3. Popa, B.; Niţă, M.D.; Hălălişan, A.F. Intentions to engage in forest law enforcement in Romania: An application of the theory of planned behavior. *For. Policy Econ.* **2019**, *100*, 33–43. [[CrossRef](#)]
4. Brukas, V. New World, Old Ideas—A Narrative of the Lithuanian Forestry Transition. *J. Environ. Policy Plan.* **2014**, *17*, 495–515. [[CrossRef](#)]
5. Teder, M.; Mizaraite, D.; Mizaras, S.; Nonic, D.; Nedeljković, J.; Savrašova, Z.; Vilkriste, L.; Zalite, Z.; Weiss, G. Structural Changes of State Forest Management Organisations in Estonia, Latvia, Lithuania, Serbia and Slovakia since 1990. *Balt. For.* **2015**, *21*, 326–339.
6. Bouriaud, L.; Nichiforel, L.; Weiss, G.; Bajraktari, A.; Curovic, M.; Dobsinska, Z.; Glavonjic, P.; Jarsky, V.; Zarvasova, Z.; Teder, M.; et al. Governance of private forests in Eastern and Central Europe: An analysis of forest harvesting and management rights. *Ann. For. Res.* **2013**, *56*, 199–215. [[CrossRef](#)]
7. Weiss, G.; Lawrence, A.; Hujala, T.; Lidestav, G.; Nichiforel, L.; Nybakk, E.; Quiroga, S.; Sarvašová, Z.; Suarez, C.; Živojinović, I. Forest ownership changes in Europe: State of knowledge and conceptual foundations. *For. Policy Econ.* **2019**, *99*, 9–20. [[CrossRef](#)]
8. Drăgoi, M.; Popa, B.; Blujdea, V. Improving communication among stakeholders through ex-post transactional analysis—Case study of Romanian forestry. *For. Policy Econ.* **2011**, *13*, 16–23. [[CrossRef](#)]
9. Ulybina, O. Russian Forest: The path of reform. *For. Policy Econ.* **2014**, *38*, 143–150. [[CrossRef](#)]
10. Scriban, R.E.; Nichiforel, L.; Bouriaud, L.G.; Barnoaiea, I.; Cosofret, V.C.; Barbu, C.O. Governance of the forest restitution process in Romania: An application of DPSIR model. *For. Policy Econ.* **2019**, *99*, 59–67. [[CrossRef](#)]
11. Živojinović, I.; Nedeljkovic, J.; Stojanovski, V.; Japelj, A.; Nonic, D.; Weiss, G.; Ludvig, A. Non-timber forest products in transition economies? Innovation cases in selected SEE countries. *For. Policy Econ.* **2017**, *81*, 18–29. [[CrossRef](#)]
12. Lazdinis, I.; Lazdinis, M.; Carver, A.; Schmithusen, F.; Vilkriste, L. Elite Concerns in Forest Sectors of Estonia, Latvia and Lithuania. *Balt. For.* **2005**, *11*, 97–104.
13. Nichiforel, L.; Keary, K.; Deuffic, P.; Weiss, G.; Thorsen, B.J.; Winkel, G.; Avdibegovic, M.; Dobsinska, Z.; Feliciano, D.; Gatto, P.; et al. How private are Europe’s private forests? A comparative property rights analysis. *Land Use Policy* **2018**, *76*, 535–552. [[CrossRef](#)]
14. Chudy, R.; Stevanov, M.; Krott, M. Strategic options for state forest institutions in Poland: Evaluation by the 3L Model and ways ahead. *Int. For. Rev.* **2016**, *18*, 387–411. [[CrossRef](#)]
15. Stevanov, M.; Krott, M.; Curman, M.; Krajer Ostoić, S.; Stojanovski, V. The (new) role of public forest administration in Western Balkans: Examples from Serbia, Croatia, FYR Macedonia, and Republika Srpska. *Can. J. For. Res.* **2018**, *48*, 898–912. [[CrossRef](#)]
16. Hasnaoui, A.; Krott, M. Optimizing State Forest Institutions for Forest People: A Case Study on Social Sustainability from Tunisia. *Sustainability* **2019**, *11*, 1954. [[CrossRef](#)]
17. Krott, M.; Stevanov, M. Comprehensive comparison of state forest institutions by a causative benchmarking model. *Allgemeine Forst-und Jagdzeitung* **2008**, *179*, 57–64.
18. Mitchell, A.; Capcelea, A.; Rinnerberger, N.; Phillips, H.; Popa, B.; Lozan, A. *Republic of Moldova: Forest Policy Note*; Ştiinţta: Chişinău, Republic of Moldova, 2015; 68p, ISBN 978-9975-67-973-2.
19. Agenţia Moldsilva. Strategia Reformei Instituţionale a Sectorului Forestier din Republica Moldova. Agenţia Moldsilva, Chişinău, Republica Moldova. 2012. Available online: <http://particip.gov.md/proiectview.php?l=ro&idd=386> (accessed on 15 September 2020).
20. Galupa, D.; Munteanu, N.; Rotaru, P.; Plăcintă, M.; Cerescu, A.; Mardari, A. Aspecte economice ale gospodăririi fondului forestier proprietatea statului în Republica Moldova. *Revista Pădurilor* **2018**, *2*, 23–36.
21. Agency for Land Relations and Cadastre of the Republic of Moldova. State land Cadastre (1990–2020). 2020. Available online: <http://arfc.gov.md> (accessed on 16 September 2020).
22. Parliament of the Republic of Moldova. Forest Code of the Republic of Moldova, no. 887-XIII from 21.06.1996. Official Gazette of the Republic of Moldova No. 4-5/36 from 16.01.1997. Available online: <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=311740> (accessed on 16 September 2020).

23. Parliament of the Republic of Moldova. Parliament Decision on approving the National Strategy and the Action Plan on Biodiversity Conservation, no. 350 from 12.07.2001, Official Gazette of the Republic of Moldova No. 133 from 08.11.2001. Available online: <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=308876> (accessed on 17 September 2020).
24. Lozan, A.; Rotaru, A. *Republic of Moldova: Comparative Analysis of the National Forest Legislation with the International Legal Framework for Ensuring an Efficient Management of Forest Resources*; Technical Report; ENPI FLEG II: Chişinău, Republic of Moldova, 2015; 30p. Available online: http://www.enpi-fleg.org/site/assets/files/1875/fleg_moldova_legal_analysis_report_en.pdf (accessed on 18 September 2020).
25. Talpă, N.; Tiță, G.C.; Popa, B. Aplicarea conceptului serviciilor ecosistemice în sectorul forestier al Republicii Moldova. *Revista Pădurilor* **2019**, *143*, 001–056.
26. Agenția Moldsilva. Raport Privind Starea Fondului Forestier și Rezultatele Activității Agenției Moldsilva în Perioada Anilor 2010–2015, Chişinău Republica Moldova. 2016. Available online: https://www.dropbox.com/s/fvhnksirvgmynrp/Raport%20stare%20resurse%20forest_2010-2015_modif.pdf?dl=0 (accessed on 10 September 2020).
27. Transilvania University of Braşov. Evaluation of Forest Ecosystem Services (FES) in the Republic of Moldova. Technical Report for FLEGT. 2015. Available online: http://www.enpi-fleg.org/site/assets/files/1872/fes_moldova_2015_en.pdf (accessed on 12 September 2020).
28. Guvernul Republicii Moldova. Hotărârea Guvernului Republicii Moldova nr. 695 din 30.08.2017 cu privire la organizarea și funcționarea Ministerului Agriculturii, Dezvoltării Regionale și Mediului. Monitorul Oficial al Republicii Moldova nr. 322–328, art nr. 797, din 01.09.2017, cu modificările și completările ulterioare. Available online: <http://lex.justice.md/md/371190/> (accessed on 5 September 2020).
29. Guvernul Republicii Moldova. Hotărârea Guvernului Republicii Moldova nr. 150 din 02.03.2010 pentru aprobarea Regulamentului privind organizarea și funcționarea Agenției Moldsilva, structurii și efectivului-limită ale aparatului central al acesteia. Monitorul Oficial al Republicii Moldova nr. 33, art nr. 204, din 05.03.2010, cu modificările și completările ulterioare. Available online: <http://lex.justice.md/md/333903/> (accessed on 5 September 2020).
30. Guvernul Republicii Moldova. Hotărârea Guvernului Republicii Moldova nr. 549 din 13.06.2018 cu privire la constituirea, organizarea și funcționarea Agenției de Mediu. Monitorul Oficial al Republicii Moldova nr. 210–223, art nr. 603, din 22.06.2018. Available online: <http://lex.justice.md/md/375961/> (accessed on 6 September 2020).
31. Guvernul Republicii Moldova. Hotărârea Guvernului Republicii Moldova nr. 548 din 13.06.2018 cu privire la organizarea și funcționarea Inspectoratului pentru Protecția Mediului. Monitorul Oficial al Republicii Moldova nr. 210–223, art nr. 602, din 22.06.2018, cu modificările și completările ulterioare. Available online: <http://lex.justice.md/md/375960/> (accessed on 9 September 2020).
32. Popa, B.; Hălălișan, F.A.; Abrudan, I.V. Forestry institutional reform strategy and implementation in Republic of Moldova. In Proceedings of the 17th International Symposium: Legal Aspects of European Forest Sustainable Development, Prague, Czech Republic, 18–20 May 2016; pp. 7–17.
33. Proșii, E.; Talmaci, I. Managementul pădurilor comunale din Republica Moldova. *Revista Pădurilor* **2018**, *2*, 14–22.
34. Stevanov, M.; Krott, M. Measuring the success of state forest institutions through the example of Serbia and Croatia. *Int. For. Rev.* **2013**, *15*, 368–386. [CrossRef]
35. da Motta Bustamante, J.; Stevanov, M.; Krott, M.; Ferreira de Carvalho, E. Brazilian State Forest Institutions: Implementation of forestry goals evaluated by the 3L Model. *Land Use Policy* **2018**, *79*, 531–546. [CrossRef]
36. Mălai, M.; Talpă, N.; Popa, B. Evaluarea comparativă a Agenției Moldsilva și a Regiei Naționale a Pădurilor—Romsilva în baza unui model de analiză instituțională. *Revista Pădurilor* **2019**, *134*, 001–050.
37. Guvernul Republicii Moldova. Hotărârea Guvernului Republicii Moldova nr. 274 din 18.05.2015 cu privire la aprobarea Strategiei privind diversitatea biologică a Republicii Moldova pentru anii 2015–2020 și a Planului de acțiuni pentru implementarea acesteia. Monitorul Oficial al Republicii Moldova nr. 131–138, art nr. 321, din 29.05.2015. Available online: <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=358781> (accessed on 8 September 2020).
38. Parliament of the Republic of Moldova. Land Code of the Republic of Moldova, no. 828/1991 from 25.12.1991. Official Gazette of the Republic of Moldova No. 107 Article 817 from 04.09.2001. Available online: https://www.legis.md/cautare/getResults?doc_id=122075&lang=ro# (accessed on 12 September 2020).
39. Popa, B. The Economic Value of Ecosystem Services in Republic of Moldova. GEF/UNDP-GEF Project National Biodiversity Planning to Support the Implementation of the CBD 2011–2020 Strategic Plan in Republic of Moldova. 2013. Available online: http://chm.biodiversitate.md/information/document/Economic_Value_of_Ecosystem_Services.pdf (accessed on 9 September 2020).
40. Talmaci, I.; Proșii, E.; Mardari, A.; Varzari, A.; Galupa, A. Raport tehnic: Pădurile din Republica Moldova: Starea actuală, indicatori calitativi și cantitativi. *Revista Pădurilor* **2018**, *3*, 7–20.
41. Financial statements for the period 01 January–31 December, 2019, Agency Moldsilva. Available online: http://moldsilva.gov.md/public/files/Situatii_financiare_nivel_ramural_2019.PDF (accessed on 15 October 2020).
42. Hapa, M.I. *Evaluation of State Forest Institutions in Romania Based on the 3L Model. Second Cycle, A2E*; Southern Swedish Forest Research Centre: Alnarp, Sweden, 2019.

43. Capcelea, A.; Lozan, A.; Lupu, I.; Botnari, F.; Platon, I.; Rotaru, P.; Cibotaru, V.; Talmaci, I.; Galupa, D.; Șpitoc, L.; et al. *Studiul Analitic Privind Consumul de Masă Lemnoasă în Republica Moldova*; Agenția Moldsilva: Chișinău, Republica Moldova, 2011; 48p, ISBN 978-9975-4298-3-2.
44. Ciobanu, A.; Grati, V.; Talmaci, I.; Chiriță, G.; Gulca, V.; Boaghie, D.; Grubii, G.; Gociu, D.; Andreev, A.; Grițenco, E.; et al. *Norme Tehnice Privind Folosirea, Conservarea Și Dezvoltarea Pădurilor din Republica Moldova*; Print-Caro: Chișinău, Republica Moldova, 2012; 499p, ISBN 978-9975-56-058-0.
45. Săndulescu, E.; Wagner, J.E.; Pailler, S.; Floyd, D.W.; Davis, C.J. Policy analysis of a government-sanctioned management plan for a community owned forest in Romania. *For. Policy Econ.* **2007**, *10*, 14–24. [[CrossRef](#)]
46. Popa, B.; Zubarev, V.; Moșnoi, E.; Lozan, A. Forest Dependence Based on Surveys Conducted in Three Villages of Moldova. National Report Produced by ENPI FLEG II Regional Program. 2014. Available online: http://www.enpi-fleg.org/site/assets/files/1873/fleg_forest_dependency_moldova_en.pdf (accessed on 13 September 2020).