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DEGLI STUDI  
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**Administrative unit: University of Padova**

Department: **Land, Environment, Agriculture and Forestry (TESAF)**

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PhD Program: **Land, Environment, Resources and Health (LERH)**

Batch: XXXVI

**Innovative organisational models in the forest sector**

**A study in the Italian mountain regions**

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**Sede Amministrativa: Università degli Studi di Padova**

**Dipartimento Territorio e Sistemi Agro-Forestali (TESAF)**

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**CORSO DI DOTTORATO DI RICERCA: Land, Environment, Resources, Health (LERH)**

Ciclo: XXXVI

**Modelli organizzativi innovativi nel settore forestale**

**Uno studio sulle aree montane italiane**

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## **Abbreviations and acronyms**

RDP = Rural Development Programme

SNAI = Strategia Nazionale Aree Interne (National Strategy for Inner Areas)

AF = Associative forms

EU = European Union

RD = Royal Decree

PAA – Policy Arrangement Approach

ACP – Actor-Centered Power

SFMOs – State Forest Management Organisations

PFOOs – Private Forest Owners Organisations

CFs – Community Forests

CBFEs - Community-based forest enterprises

SFEs - Social forest enterprises

FEs - Forest enterprises

ENGOS – Environmental Non-Governmental Organisations

PFO – Private Forest Owners

BoD – Board of Directors

## *Abstract*

The forest sector is hit by the global environmental and political crisis and its consequences on the market, characterised by unstable prices and an increase in energy costs that force forest management organisations to seek new forms of competitive advantage and business opportunities, while challenging them to meet the societal demand for environmental services. From another (convergent) perspective, forest management can be vital for socioeconomic development, especially in regions where the use of forest resources represents a relevant opportunity for local communities, as for Italian mountain areas, where more than 65% of the Italian forests can be found. Among the main issues experienced in these areas, land abandonment is a crucial driver (and at the same time a consequence) for the overall socioeconomic depletion, and because of this phenomenon, further critical factors enhance the magnitude of the impacts of climate change. Land ownership fragmentation is an important issue that hinders forest management in many countries especially in southern Europe, and can be indicated within the main reasons that lead to give up management and, in the end, to land abandonment. Management of small parcels is not profitable, many smallholders give it up, and the abandonment of forests accelerates the loss of land value and fosters a vicious cycle that definitively depletes forest-related communities.

Various types of innovation have been supported through, e.g., the EU RDP and CAP funds, to aggregate forest properties or to support forest-related supply chains, in order to encourage forest management, including organisational, institutional, and social innovations. The research is focused on organisational models in the Italian forest sector, looking for innovative solutions addressing those critical management issues, where forest owners/managers are associated among them and/or with other actors. The research is designed to analyse such associative organisational models, to understand whether they can be a viable solution and how they can be implemented, to encourage sustainable forest management in marginalised rural areas. The analysis is focused on how they were inspired and established; what challenges and threats they face and what the successful factors are; what they need to consolidate and scale up in different contexts. Basing on reviews of the literature and of policy documents, then on a survey involving 31 real-world cases, the results show that there are quite a number of solutions in Italy, some displaying appreciable results, while others show critical issues and an uneven and not always coordinated framework of regulatory cases and reference models has been developed. Such models often derive from institutional innovation initiatives; however, also social innovation processes occur involving associative organisational models, eventually overlapping or converging after an initial phase more characterised by one type, and they must be carefully tailored according to actors, their objectives, and the whole socioeconomic context.



Moreover, in general terms, integration of different models and cooperation is needed to overcome challenges and limits, and more accurate monitoring of the underlying problems and of the implementation of these initiatives.

## **Sommario**

Il settore forestale è colpito dalla crisi ambientale e politica globale e dalle sue conseguenze sul mercato, caratterizzate da instabilità dei prezzi e dall'aumento dei costi energetici, che costringono le organizzazioni di gestione forestale a cercare nuove forme di vantaggio competitivo e opportunità di business, sfidandole al contempo a soddisfare la domanda di servizi ambientali che viene dalla società civile. Da un'altra e convergente prospettiva, la gestione forestale può risultare vitale per lo sviluppo socio-economico, soprattutto nelle regioni in cui l'uso delle risorse forestali rappresenta un'opportunità rilevante per le comunità locali, come nel caso delle aree montane italiane, dove si trova oltre il 65% delle foreste italiane. Tra le principali problematiche riscontrate in queste aree, l'abbandono delle terre è un fattore cruciale che porta all'impoverimento socio-economico complessivo (e allo stesso tempo una conseguenza), e a causa di questo fenomeno ulteriori conseguenze critiche aumentano l'entità degli impatti dei cambiamenti climatici. La frammentazione della proprietà terriera è un problema importante che ostacola la gestione forestale in molti Paesi, soprattutto dell'Europa meridionale, e può essere indicata tra le principali ragioni che portano a rinunciare alla gestione e, in ultima analisi, all'abbandono del territorio. La gestione di piccoli appezzamenti non è redditizia, molti piccoli proprietari vi rinunciano e l'abbandono delle foreste accelera la perdita di valore dei terreni e innesca un circolo vizioso che impoverisce definitivamente le comunità legate alle foreste.

Sono stati sostenuti diversi tipi di innovazione, ad esempio attraverso i fondi europei PSR e PAC, per aggregare le proprietà forestali o per sostenere le filiere forestali, al fine di stimolare la gestione forestale, ivi compresi tentativi di innovazione organizzativa, istituzionale e sociale. La ricerca si concentra sui modelli organizzativi del settore forestale italiano, per individuare soluzioni innovative che affrontino le criticità gestionali, laddove i proprietari e/o i gestori forestali sono associati tra loro e/o con altri attori. La ricerca si propone di analizzare tali modelli organizzativi associativi per capire se possono essere una soluzione praticabile e come possono essere implementati, per incoraggiare efficacemente la riattivazione della gestione forestale sostenibile nelle aree rurali marginalizzate. Si analizza e descrive come essi sono stati ispirati e stabiliti; quali sfide e minacce affrontano e quali sono i fattori di successo; cosa hanno bisogno per consolidarsi e scalare in contesti diversi. Sulla base di un'analisi della letteratura e dei documenti politici, e di un'indagine che ha coinvolto 31 casi reali,

è stato possibile valutare l'efficacia dei progetti, i risultati mostrano che in Italia esiste un discreto numero di soluzioni, alcune delle quali mostrano risultati apprezzabili, mentre altre presentano criticità e si è sviluppato un quadro disomogeneo e non sempre coordinato di opzioni sulla base delle norme e dei modelli di riferimento. Tali modelli derivano spesso da iniziative di innovazione istituzionale, ma si verificano anche processi di innovazione sociale che coinvolgono modelli organizzativi associativi, e che eventualmente si sovrappongono o convergono dopo una fase iniziale più caratterizzata da una tipologia. In ogni caso, queste soluzioni devono essere attentamente adattate in base agli attori, ai loro obiettivi e all'intero contesto socioeconomico. Inoltre, in termini generali, è necessaria l'integrazione di diversi modelli e la cooperazione tra essi e con gli altri attori del settore, per superare sfide e limiti, nonché un monitoraggio più accurato dei problemi sottostanti e dell'attuazione di queste iniziative.

## Acknowledgements

This Ph.D. journey has been one of the most challenging for my experience, demanding a really high effort to maintain motivation, improve my capacities and increase self-discipline. For sure, it would not have been possible without significant, often decisive, help and support by other people.

My family is the first pillar for my life, then for my job, bringing sense and joy at the end of every day. Thanks to my wife Giulia who has frequently taken part of my load on her shoulders, when necessary, and tirelessly supported my choice; to my three small blossoms, who gave me all the love needed not to give up. Thanks to Noè for his curiosity always stimulating me at learning more and more, to Sara who shares with me her energy and dedication, and finally to Gioele who arrived in the last year of this journey, and taught me much about paternity, upsetting everything and raising the bar further.

I would like to thank people from the department, that were the scaffolding on which I built the work:

- my supervisors, prof. Laura Secco and Prof. Davide Pettenella, careful, wise and sources of knowledge;
- Prof. Mauro Masiero, dott. Nicola Andrighetto and dott. Giorgia Bottaro, with whom I shared the best part of my work, carrying out a stimulating and helpful cooperative work;
- Dott. Todora Rogelja, for being more than a colleague, for disrupting insightful comments and suggestions, meeting her was a real turning point in my research path, at least twice.
- my colleague Anna Biasin, sharing tears and moans, but also celebrations, coffees and laughs;
- my room-mates Elena and Alessandra, for lively discussions and every-day life sharing;
- my colleagues Cristina Dalla Torre and Giacomo Pagot, passionate examples for me and, partially sharing common research interests, precious in discussing insights and suggestions.

Many people helped the advancement of the research with decisive small contributions, in particular I want to cite and thank prof. Bas Arts, visiting professor, inspiring the solution to the wicked problem (wicked for me, in my brain) of the conceptualisation, otherwise remaining a stagnation, and all the Etifor team working on the LIFE ClimatePositive project: Giulia Cecchinato, MariaGiulia Pelosi and Martina Doppio.

Thanks to the whole company Etifor Srl, a cozy and always stimulating context with whom I cooperated, but most of all I learnt a lot.

Finally, I want to say thanks to all the people from Italian associative organisations that took part to the survey: Luca, Massimo, Fabio, Silvia and Piero, Giuseppe, Marco, Erika, Luca, Elena, Adelmo and Enrico, Valentina, Marco, Luca and Alessandro, Antonio, Mario, Giacomo, Diana and Pietro,

Loris, Andrea, Nevio and Francesca, Alberto, Fabrizio, Massimo, Igor, Gianni, Marina and Alessio, Caterina, Mario, Giovanni, Alessio, Fabrizio, Sonia and Stefano. The research trips across Italian forest regions to meet them was a priceless experience, when I met passionate people carrying out huge and generous efforts, that became solid motivation and definitive inspiration for my job.

# **PART 1 – Introduction, background and research design**

## **1 Introduction**

This Ph.D. thesis is the result of a three-year research journey that began with a challenging work to clearly identify the research problem and define the related objectives, and that was completed through three consequential and interconnected research phases. After an introductory part dedicated to the background and justification for this research, and displaying the overall research design and organisation, the second part of the thesis is structured as a compilation of articles, each written to address one or more specific objectives and corresponding to the three main research phases, and so contributing to the general objective of the research.

In the end, in Chapter 6 some discussions and conclusions are presented, referring back to the general research objective, also highlighting the main limitations of the study, together with some recommendations for future policy design and further research opportunities.

### **1.1 Research background**

This research is about people and nature, investigating how people can organise to manage forests to get the best benefit in terms of ecosystem services, to reduce nature-related risks and to allow communities to thrive, together with nature, in contexts where non-management of forests could, in turn, bring hazards and hard challenges to inhabitants and more in general to human communities.

The results of this research could be of interest to forest administrators and practitioners, as they can address policy interventions but also guide innovation initiatives by the civil society.

People living in mountain areas have always faced with challenging environmental conditions that are now enhanced by climate change and related phenomena. Extreme events, reduced snow coverage periods, increased temperatures and drought conditions are forcing changes and adaptation in traditional production patterns (Brunette et al., 2018). Meanwhile, the rapidly decreasing demographic tendency of these regions is accelerating, resulting in abandonment and lack of management, which become further critical factors for the magnitude of the impacts of climate change (Rodríguez Fernández-Blanco et al., 2022; Spadoni et al., 2023). SDG 15 of the United Nations Agenda 2030 points out the priority of ensuring the conservation of mountain ecosystems, including their biodiversity, recognising their capacity to provide benefits that are essential for sustainable development (Millennium Ecosystem Assessment, 2005). Recognising the importance of mountain

ecosystems, which is strictly connected with their existence and vitality, both at the European and National level there are policies targeting such areas, typically rural, where forests are the most extensive ecosystem. One of the six priorities of the European Agricultural Programme for Rural Development (RDP) is specifically addressed to promote social inclusion, poverty reduction, and economic development in rural areas, which is also one of the main objectives of the Italian “National Strategy for Inner areas” (SNAI). Within this strategy, most Italian mountain areas are considered ‘inner areas’, according to socioeconomic characteristics such as distance from the essential social services such as schools, health & care, mobility (Carrosio, 2016).

According to the legal definition of mountain areas, in Italy more than 54% of the land is mountainous (plus 41,6% are hills, below 600 m), where less than 19% of the population live (ISTAT, 2007). Many of these regions in the last decades have been characterised by a very fast trend of abandonment (Malandra et al., 2019), with the loss of 900,000 inhabitants in the last 60 years, while the whole Italian population, in the same period, increased by 12 Millions (Marcantoni & Cerea, 2016). Meanwhile, in some mountain areas this trend is less dramatic, but growing and critic pressure due to touristic development is experienced (Castellani & Sala, 2012). Although these trends occur, shaping significantly different development directions between regions with similar geographic features, critical events, like those related to climate change, could exacerbate them. Such extreme events may have dramatic impact in terms of magnitude and implications, such as what happened in autumn 2018, when Italian north-eastern Alps were dramatically devastated by the ‘Vaia’ windstorm, which destroyed 8,5M m<sup>3</sup> (about 42500 ha) of forest stands (Chirici, G. et al. 2019), and it was followed by 3 years of intensive bark beetle attacks that damaged approximately the same amount of wood as the one initially devastated by the event. These events can be critical even far from forests, as repeatedly (and relatively frequently) experienced in other Italian regions: to cite only the most recent ones, devastating flooding provoked by unexpected amount of rain concentrated in a few days hit Emilia Romagna in May 2023, and Tuscany in November 2023, involving mountain watersheds characterised by extensive land abandonment. The intensity of such events and the capacity to react to, or prevent them is related to the socio-economic conditions of the regions where they occur, as well as to the conditions of the ecosystems affected (Rogger et al., 2017; Romagnoli, 2023).

### *1.1.1 Italian Forests and mountain areas, in a strict relationship*

Protection and management of forests should always be considered a major issue in local development strategies for Italian inner areas (Pettenella & Romano, 2016), since through the variety of Italian mountains, the presence of forests can be considered a common structural characteristic, with more than 65% of the nearly 11 million hectares of forests located at an altitude above 500 m

(Direzione generale delle Foreste - MIPAAFT, 2017), in regions characterised by depopulation phenomena in recent decades (Amodio, 2022). People living in these regions usually recognise the relevance of forest management, to promote local wood supply chains and new products and services, meaning employment opportunities, but also to ensure ecosystem services and finally to achieve the conservation and promotion of local traditions and culture (Nocentini et al., 2022; Quintas-Soriano et al., 2022).

As mentioned, reduced management activity combined with demographic as well as socio-economic dynamics in marginal areas and the decline in interest (and sometimes convenience) in keeping forest product supply chains active, has favoured, first and foremost, the expansion of forests on marginal lands that in the past were mostly dedicated to agriculture or grazing (Corona et al., 2012). If in the 1950s, in fact, about 5.6 million hectares of forests were censused in Italy (Gasparini & Tabacchi, 2011), in 2015, as already mentioned, the forest area practically doubled, reaching 11.1 million hectares (Gasparini et al., 2022). This is also confirmed by some other data: the percentage of settled forest area (i.e. with a valid detailed forest management plan), which is only 15.5% of the national forest area, while in 37.4% of the forest area no silvicultural intervention was detected, and only 9.5% of coppices (that account for approximately 42% of the Italian tall trees forest) are in the ‘young’ phase and 0.1% are ‘in regeneration’, showing very limited activities. These figures stand out even more considering the substantial obligation to detailed planning on public property stated in Article 130 of the Royal Decree 3267/1923, a regulation approved by the Italian legislator 100 years ago and always considered the first fundamental element for a rationalisation of forest management.

The causes of the decline in active forest management and the consequent expansion of wooded areas are many and often interrelated. Among the most impacting ones, undoubtedly, the orography and morphology of the territory constitute a noteworthy limiting factor. In fact, 84% of Italian forests are located at an altitude of over 300 metres above sea level (57% above 600 m) and more than 41% are on areas with slopes of over 40% (Gasparini et al., 2022). These factors may have an impact on the technical feasibility and, above all, on the economic viability of many silvicultural operations in the areas concerned. Notwithstanding, in addition to the above, ownership structure is recognised as another major limiting factor for forestry activities (Rizzo et al., 2019; Secco et al., 2018).

Italian forests are owned by a majority of private owners (66.35%), with an average size of less than 3 ha, scarcely investigated and known, compared to public forest ownership, which corresponds to 33% of the total (Canton & Pettenella, 2010; Mozzato & Gatto, 2016; Rizzo et al., 2019b, MIPAAF, 2017). Within the private forests, individual ownership is prevalent (78%), while, with some slight differences from region to region, the role of other private entities such as companies (6%) and other

organisations (4%) is more marginal. It is important to note that for about 10% of private forests it is not possible to classify the type of ownership, so that about one tenth of the national private forest area is considered to be of "undefined or unknown private ownership". With reference to the individual regions, the highest percentage of privately owned forest area is found in Liguria (82.3%), Emilia-Romagna (82%) and Tuscany (80%), while, on the contrary, in the Autonomous Province of Trento more than 70% of the forest area is publicly owned.

As for public forests, they are mainly municipal (65.4%) while only 23.5% are state-owned, 8.3% are owned by other public entities and the remaining 2.8% is unknown, with an average size of approximately 770 hectares (Canton & Pettenella, 2010). Although, seemingly, the overall size of the management unit should not be a problem for public owners, it is challenged with capacity issues, since municipal administrations' funding and human resources have been dramatically reduced in the last 15 years, when budget constraints caused by austerity after the 2008 recession have imposed strain on local administrations (Bel & Warner, 2015; Luca & Modrego, 2021). Meanwhile, mountain communities, a broader local level of public administration frequently entrusted with public forest management tasks, have been deeply reformed until 2011 (Amato et al., 2022) and have lost forest management competences.

Among the reasons that limit the economic and social opportunities that could arise from the use of primary resources in these territories, land fragmentation, which characterises most private forest areas, has been recognised as a crucial driver also within recent guiding national forest policies (R. Romano, 2018) as well as for the creation of land banks and other instruments for the reallocation of unused agricultural land (Povellato & Vanni, 2017). In rural mountain areas, land ownership fragmentation and land abandonment, strictly connected, are within the issues that have a major impact on the overall socioeconomic conditions (Dax et al., 2021). Passing from generation to generation, lands have been divided between many heirs, thus resulting in a gradual reduction of size, which brings a proportional reduction of profitability, discouraging owners to use their land e.g. for crops or timber production (Omizzolo, 2015). The forest ownership pattern may constitute a major obstacle to sustainable and active forest management: small or micro parcels are much more difficult to manage, sometimes even to be identified on the ground, then the abandonment of forests and pastures brings an acceleration of land value loss and fosters a vicious cycle that definitively depletes mountain rural communities (Beltramo et al., 2018; Rizzo et al., 2019). In addition to this, a frequent phenomenon is that of absentee owners, physically distant from the forest areas they own (perhaps living in urban areas or even abroad), in some cases not even aware that they are the owners of a land. This is a frequent occurrence in other European countries as well and has led to the coining of a



multiplicity of names, such as nonfarming forest owners, nonresident forest owners, absentee forest owners, urban forest owners, etc. (Ficko et al., 2019; Mozzato & Gatto, 2016; Weiss, Lawrence, Lidestav, et al., 2019)

Notwithstanding all these difficulties, in several inner areas communities are observed organising to use their resources to self-organise local services to mitigate public sector withdrawal and market failures (Bianchi & Vieta, 2019). At the same time, new development trajectories are altering the traditional dynamics and determining paradoxes, in which the marginal areas become attractive in the

INNOVATIVE ORGANIZATIONAL MODELS – The key concept “organisational model” will be clarified further on. Notwithstanding it can be useful, here, to bring a synthetic description of a clear example of innovative organisational model arisen within Italian mountains’ rural communities. The community cooperative “I Briganti del Cerreto” is an interesting experience of a mountain community that organized to create job opportunities based on management of local resources, with the main goal of revitalising the local economy, as a basement for the community to survive and develop. The small population of Cerreto Alpi, a little village in Reggio Emilia province in the Central Apennine mountains, developed a multifunctional business model to produce wood, chestnuts and secondary forest products, to organise touristic and environmental education services.

logic of re- settlement (Corrado, 2016) and a new mountain population seem to be growing, looking for different livelihood, businesses, life style. By one side, resistant (or remaining) communities ask how they could preserve habitability of their territory, that means economic vitality, above all: some of them are developing innovative organisational models to overcome that hard challenge, meanwhile new competences and visions are brought by these new inhabitants of the highlands (Battaglini & Corrado, 2014).

### *1.1.2 Associating forest owners, a possible solution to address land fragmentation*

Land fragmentation and abandonment of mountain territories, together with societal changes that are altering owners’ attitudes on the one hand, and new demands for products and, above all, ecosystem services deriving from forests on the other, suggest the need to identify functional tools to encourage active and responsible forest management. Among these tools, forest associations and cooperatives can represent a key solution, also because they can encourage the adoption of innovative management strategies, suitable to face the new challenges of the sector (Sarvašová et al., 2015; Ivana Živojinović et al., 2015). The different forms of association, while taking into account the peculiarities of each one, can both aggregate forest owners and help increase connections between forest owners and other actors operating inside or outside the sector, such as forest companies, consultants, local authorities and other stakeholders. Possible forms of aggregation between owners can be an important tool both for selling goods (traditional forest products, wood and non-wood) and for providing services (Schraml, 2005).

To fully understand the importance that associative forms may have in the Italian forest sector, it would be important to analyse both the main characteristics and attitudes of forest owners and the reasons that may lead these same owners (public or private) to join aggregative forms. Unfortunately, there is currently a lack of comprehensive studies at the national scale on the characteristics and attitudes of forest owners (Mozzato & Gatto, 2016; Rizzo et al., 2019). The phenomenon of management and land abandonment itself is not precisely identified and framed, beyond the few data already presented. There is a rich literature, especially on a European and international scale, dedicated to the study, analysis and classification of forest owners. This type of analysis, although complex, has the merit of detailing the composition and case histories of owners, offering a more in-depth and finer-grained look than the macro-categories used by the 2015 INFC. In many of these studies, the individual types of owners identified are related to their management choices, to the objectives they set and the individual attitudes towards the management of their forests (Ficko et al., 2019).

Various authors (Ficko et al., 2019; Malovrh et al., 2015; Weiss, Lawrence, Hujala, et al., 2019) agree that, at a European level, certain demographic and socioeconomic characteristics, such as the age of owners, their income and employment, are key elements that can influence the management choices of individual private owners. In addition to these characteristics, the attitudes and objectives of forest owners are often strongly linked to the socio-economic context in which they operate, while economic and social issues related to the complex of services derived from forestry activities are less investigated (Mozzato & Gatto, 2016).

Only very few detailed studies on private forest owners can be found referred to the Italian context, Canton and Pettenella (2010) with reference to a mountain municipality in the Northeast, describe three types of owners in relation to the distance between the forest and the owner's place of residence. In particular, their study identified: (i) 'owners with intangible objectives', who normally live more than 20 km from the property and are strongly attached to the forest because they feel it as a symbol of personal and family identity and therefore prefer to conduct management aimed at conserving and protecting the forest resource; (ii) the "multi-objective owners", who live at a very short distance from the forest and have a significant dependence on the forest, both as a source of income and raw materials; (iii) the "disinterested owners" who, although living at an intermediate distance from the property with respect to the other two groups, are little involved in forest management activities. This last category, which includes 'passive' or 'absentee' owners, represent a common problem for active forest management in many western countries, although it is probably not as pronounced in many of them as in Italy (Mozzato & Gatto, 2016).

Regardless of the type of owners and their different attitudes towards forest properties, small and medium-sized private forest owners are induced to cooperate at a 'larger scale than their individual properties' to foster income generation (Kittredge, 2005). However, in western economies, and therefore also in Italy, economic motivations are not always considered among the most important for the maintenance and management of forests by small private forest owners (Canton & Pettenella, 2010) then other reasons should be found to induce forest owners to join together in associative forms.

Looking at the literature, some categories of motivations that can push forest owners to come together in aggregative models are cited and analysed by different authors (Brun et al., 1998; Kittredge, 2005) referring to:

- Operational functions of internal interest, such as sharing technical and professional capacities, equipment, management plans, joint silvicultural operations, management of road systems and infrastructure, surveillance.
- Operational functions of external interest, such as concentration of forest product supply, joint distribution channels, shared organisation of tourism and recreational activities, joint marketing activities.
- Administrative functions, such as sharing administrative activities, joint participation in calls for tenders,
- Shared organisation of events, such as technical seminars, dissemination meetings, public awareness activities.
- Lobbying actions, in order to increase power in contractual agreements, and increase the political role of forest owners.
- Compliance with national and international regulations and standards, in the context of certifications to differentiate forest products.

### *1.1.3 The policy framework for Associative organisational models, in the Italian forest sector*

In Italy, since 1921 the legislator has encouraged the adoption of associative models, identified as a solution to overcome the issue of high management costs. The Royal Decree-Law 1723/1921 (art. 2) gave the right (and financial resources) to “several municipalities and moral entities”, to form a consortium for “the recruitment of a single director for the technical management of the forest heritage”. The historical Serpieri Law (Royal Decree RD 3267/1923, a milestone of Italian forest policy) extended and reinforced the instrument of “forestry consortia”. Since then, for many decades Italian forest policies have not any more considered associative organisational solutions, whose development remained limited to forestry consortia, involving almost exclusively public forests, which became quite diffused but resulted in not always successful experiences (Brun et al., 1998).

From the 1980s onwards a ‘regionalization’ in the development of forest associations can be observed, in the framework of administrative decentralisation that involved also the forest sector: regional administrations defined the details of associative organisational models in the forest sector, integrating these subjects in the regional forest laws (Baldini & Baldi, 2014; Corona et al., 2023). A push to “associate forms of management” came with the Legislative Decree 227/2001 (art. 3 and 5), after which some Regional laws and funding initiatives explicitly encouraged forest associations, starting from some calls for funding within the 2000-2006 Rural Development Programme (RDP).

Finally, in the last few years, the development of organisational models for associate management arose within the priority solutions to address the issues of low forest management rate, land fragmentation and land abandonment, by the two recent and main acts signed by the Ministry of Agriculture, Food and Forestry (MIPAAF): The National Forest Strategy and the Consolidated Text on Forests and Forestry Supply Chains (Legislative Decree 34/2018, art. 10, c.5). ‘Associated forms of management’ are indicated as one of the strategies to be pursued, in order to increase forest planning, to foster sustainable forest management (Ferrucci, 2018) and to support the development of new cooperative approaches that can support the bioeconomy and the green economy of rural areas (MIPAAF, 2018). In these acts two main objectives were indicated for forest management associations: to aggregate properties to promote more rational and sustainable management and to retrieve abandoned and the so-called ‘silent’ lands, whose owner is unknown or unattainable (Brocca et al., 2023). Linked to these two main new pillars of the Italian forest policy, other initiatives came to introduce new solutions and instruments, or to promote with public finance these addresses, described in detail in the second part of the thesis (paper II).

#### *1.1.4 Pushes for innovation*

In parallel, several other policies are addressing innovation processes as solutions to overcome crisis and socioeconomic challenges and to push forward local development, especially in marginal areas. Innovation is one of the elements that underpins European (rural) development policymaking (Bureau of European Policy Advisers (BEPA), 2011). According to the work of the European Commission, we can recognize four different main categories: product innovation, market innovation, organisational innovation, and social innovation. While the first three types of innovation are well known, social innovation has been conceptualised relatively recently and was defined in many ways in the last two decades. A suitable and comprehensive definition, for the purpose of this study, could be that proposed within the SIMRA project, that considers social innovation as the “reconfiguration of social practices, in response to societal challenges, which seeks to enhance the outcomes on societal well-being and necessarily includes the engagement of civil society actors” (Polman et al., 2017: 7).

When innovation processes occur, especially for the case of social innovation, a major role is played by the actors, that can either be individuals or organisations, eventually networks, involving (or not) institutions. The main drivers for innovation are based upon actors who enthusiastically strive to bring new ideas into practice, and who are willing to take the risks and responsibilities needed to realize change (European Commission, 2013; Ludvig et al., 2020). These people are called, in some studies, the “enablers of social innovation”, that is the individuals who struggle with institutional barriers to change, such as norms, rules and regulations, as well as fragmented ownership structures and powerful states (Slee, B. in Weiss, 2013). Since organisations are made of people and relationships, social innovation can be pushed also by entrepreneurs and enterprises, as well as it can produce entrepreneurial outcomes, as for the case of Italian community cooperatives (Bianchi, 2021). Other key actors can be found within public or semi-public organisations, such as multi-actor networks, interest groups, governmental units as well as research institutes. Social innovation may evolve thanks to the facilitation, for example, of policies building creative environments that encourage creativity and learning (Weiss, 2013).

Organisational models involved in social innovation promote the creation of goods and services from a range of different types of enterprises, including cooperatives, hybrid organisations, for profit companies as well as “pure” non-profit organisations, typically characterised by a new model to create wealth and its redistribution. Organisational innovation can be a major outcome of (social) innovation processes, may involve public sector and hybrid public-private bodies and eventually lead to institutional innovation. Innovation can be a process specifically developed within and towards institutions, that is the case of institutional innovation. Indeed, it should not be surprising if within an innovation system there are relationships between different types of innovation, and that these evolve over time (Buttoud et al., 2011). Social innovation necessarily also involves institutions: they can be promoters and endorse it, or they can be involved as actors, internal or external to organisational models that are first developed by innovation process driven by other sources.

In the forest sector, mutual arrangements and collective action, for example community forestry in some cases in the UK (Lawrence et al., 2020; Ludvig et al., 2018; Zhang et al., 2021), can result in institutional changes also taking the form of altered actors’ arrangements. The inclusion of civil society leads to institutional change that tends to lead to the re-organisation of societal actors (forest owners, forest managers, consumers, producers) and their relationships (Ludvig et al., 2020).

#### *1.1.5 Organisations: looking for a theoretical framework*

Setting a theoretical framework should have been a last introductory step before starting the analysis of organisational models in the forest sector. However, an early literature review on organisations

and organisational models in the forest field resulted very challenging: no systematic study on this topic was found, while there's quite a number of results either presenting specific organisational models or focused on some features and applications, but rarely conceptualised. Therefore, the work had to step back and start with the attempt to reach a suitable conceptualisation of 'organisational model', starting from organisational theories and perspectives from different disciplinary domains: contributions from sociology, law, economics, management and business sciences were studied and resumed first, and only after the research was focused in forest field basing the following studies on this concept. All this work was done through a semi-systematic literature review, a methodology designed for topics that have been conceptualised differently and studied by various groups of researchers within diverse disciplines and that hinder a full systematic review process (Wong et al., 2013). This work led to the identification of numerous theoretical constructs of organisation, varying by the standpoint of the authors and the field of the studies analysed, whose results are resumed in the initial part of Paper I (Chapter 3.2.1).

## **2 Research organisation**

### **2.1 Research purpose, questions and objectives**

While it is recognized that (social and institutional) innovation can be important for the vitality and further development of communities in rural areas, it remains unclear how effective policy measures can be designed to encourage it and what types of support are needed, especially for all the up-scaling stages, when some innovation experiences, more sustainable, succeed whereas others face critical obstacles. Moreover, at the best of our knowledge, only a few studies about innovative organisational models applied to the forest sector are found in literature, even less regarding the peculiar context of the Italian forest sector. Furthermore, though a number of policy initiatives to promote associative models for forest management, such an uneven normative and operational framework is poorly described, no comprehensive assessment of the possible solutions exists, and only some sparse case studies are cited in the literature.

There is a research gap in understanding whether such types of innovation can be effective solutions to foster encourage forest management, which is supposed to be an opportunity for rural development, and it remains unclear how effective policy measures can be designed to adequately support innovation and what types of support are needed, especially for all the up-scaling stages.

The general objective of this research is therefore to analyse organisational models in the Italian forest sector, identifying innovation initiatives and experiences, for understanding whether and how they

can be implemented to encourage sustainable forest management. Figure 1 represents a scheme of specific research questions, objectives and outputs.

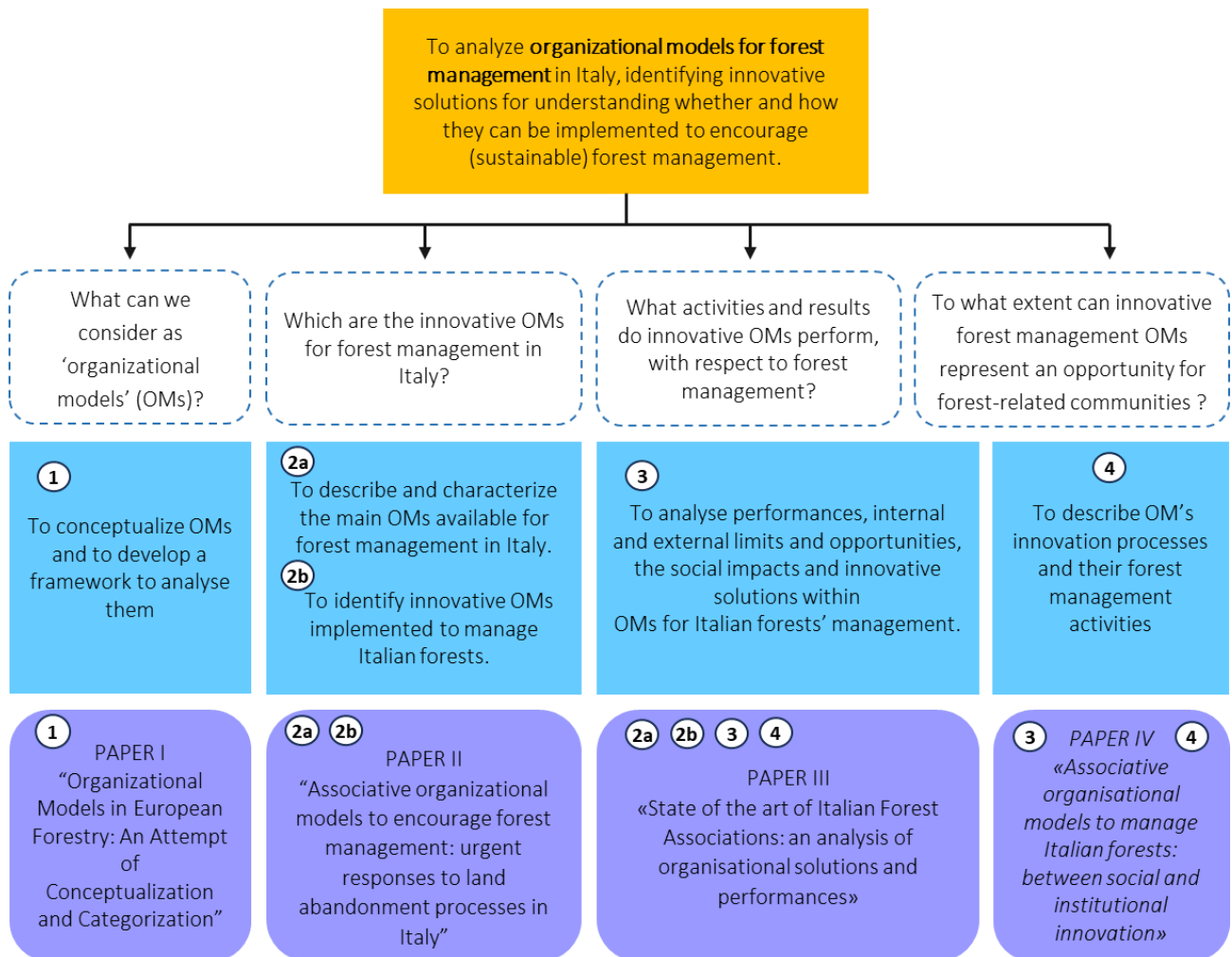


Figure 1 – Research's general (orange boxes) and specific (light-blue boxes) objectives, research questions (white frames) and papers presenting the main results (indigo boxes). Paper IV (*italics*) is not ready, yet, and is not included in this thesis.

## 2.2 Research design and methodology

This research adopted a mixed methods approach, with convergent designs, suitable to rapidly identify and introduce new methods and tools if needed (Creswell & Creswell, 2017). Missing specific literature references, and also a clear conceptualisation of the topic, a complete and precise design was not possible in the early stages of the research. On the contrary, it was evident that the project had to be completed by advancing a little at a time, setting out the various stages, and their methodology, as they were needed, in a step by step process, that came to a comprehensive research design only during the second year of the PhD. Then, it was necessary to modify it again at the beginning of the third year, because the selected case studies were not available anymore, as detailed

in Chapter 6.2, and the general emergent approach, that was characterising the research so far, allowed to set up very rapidly a new methodology to achieve the same objectives. In the end, the final design is represented in Figure 2, and allowed to complete almost all the research objectives even if, because of some delay due to initial challenges and to the unexpected but necessary change in the methodology for the last part of the work, it was not possible to complete the fourth paper, which is in progress, by the final PhD deadline.

The final research plan organises the work into 3 parts:

- A. The first part is based on two literature reviews, to cover conceptualisation and the development of an analytical framework, addressing the first specific objective, whose outputs are necessary for the subsequent work. Paper I is the main outcome of this part of the work.
- B. A second part where specific objectives 2.a and 2.b are carried out contemporarily, focussing on the Italian context of organisations in the forestry sector, to understand and accurately describe it and identify innovative organisational models. Paper II resumes the principal results from this part of the work.
- C. The third part of the research run a broader study, in connection with the LIFE ClimatePositive Project<sup>1</sup>, to analyse and describe in detail associative organisational models in the Italian forest sector, addressing specific objectives 3 and 4. Paper III synthesise this part of the research and Paper IV will present more results, but is not included in this thesis, since it is not complete.

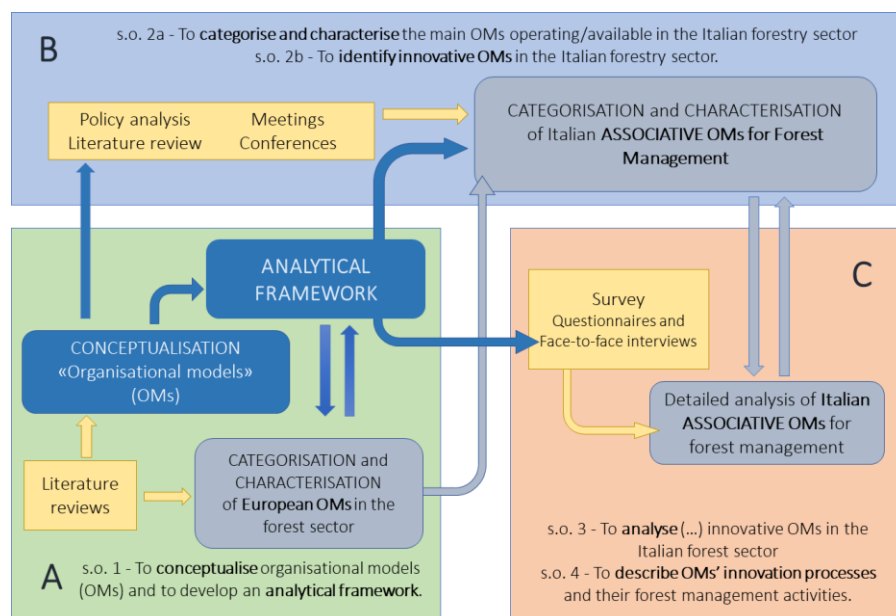


Figure 2 – Scheme of the research design, representing the three main research parts, with correspondent specific objectives, main results (grey boxes) and methodologies (yellow boxes).

<sup>1</sup> project , n. 101074589 – LIFE21-CCM-IT-LIFE ClimatePositive. Website: <https://www.lifeclimatepositive.it/>



## **PART 2 - Results**

This second part of the thesis is structured as a compilation of the following papers, shortlisted here and fully reported in the next chapters.

### **3 Paper I) Organisational Models in European Forestry: An Attempt of Conceptualisation and Categorisation**

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**Abstract:** The changes and challenges that are tackling the forest sector in recent decades have prompted governments and foresters to work hard to find innovative solutions. Research in the forestry domain has focused on product and process innovation, and more recently on business systems and social innovation. In addition, organisational innovation is recognized and documented. However, while consistent conceptualisation work has been conducted for business models and social innovation, the organisational domain in forestry seems less clear, characterized by multiple actors and often overlapping in literature, while a clear framework to describe it is missing. This work proposes a conceptualisation of the “organisational model”, a concept embracing different approaches to build an analytical framework used to describe and characterize organisations in the forestry sector. The framework is drafted referring to existing theories, then tested (and further developed) through a semi-systematic literature review on organisations operating in forest management in Europe that are identified, categorized, and characterized. This exercise confirms that forest management organisations can be described with several diverse arrangements and can be complex entities: a holistic and comprehensive approach is more likely to be used by policy initiatives addressing improvement of forest management.

**Keywords:** organisational model; organisational innovation; forest governance

#### **3.1 Introduction**

In Europe, in the last three decades, the forest sector has faced economic and societal challenges resulting from many concurrent phenomena: fragmentation and abandonment of forest properties, changes in the ownership structure due to restitution processes in former socialist countries (Sonnhoff

et al., 2021; Weiss, Lawrence, Hujala, et al., 2019; Ivana Živojinović et al., 2015), the need for reforestation and to improve nature conservation and the provision of forest ecosystem services (Kittredge, 2005; Referowska-Chodak, 2020), the challenges of climate change (Stanišić et al., 2021), and the growing biomass demand connected to the bioeconomy development (Hansen, 2016; Ludvig et al., 2019). Moreover, the forest sector is also hit by the most recent global political crisis and its consequences on the market, characterized by instable prices and an increase in energy costs. Changes that occurred in recent decades and increasing market competition are important drivers for forest-related companies to seek new forms of competitive advantage or business opportunities (Kajanus et al., 2019), especially when challenged by the increasing societal demand for environmental protection and services. From another (but convergent) perspective, the role of forest management is important for rural and regional development, because forests are often found in disadvantaged rural areas where the use of forest resources represents a significant socio-economic opportunity (Ludvig et al., 2020) and multifunctional forest management is recognized as the most practical means for increasing the forest-related ecosystem services, a request coming also from densely populated regions (Dedeurwaerdere, 2009).

All these reasons have prompted policymakers (governments) and practitioners (forest management companies) to look for innovative solutions and to develop new business opportunities, increasing their organisation's performance (Nybakk et al., 2009) and their competitive advantages (Hansen, 2016; Weiss, 2013). Various types of innovation have been tackled, from products to process, marketing, organisational as well as institutional- and governance-related (Buttoud et al., 2011; Hansen et al., 2014; Weiss et al., 2020). Recently, "social innovation" has been recognized and investigated in relation to forest resources. Social innovation in the forest-related bioeconomy actually includes products, processes, and organisational innovation, which typically also includes social and societal outcomes, while being pushed by initiatives to address social issues (Lawrence, Gatto, et al., 2020; Ludvig et al., 2019; Weiss et al., 2020).

Considerable research has been conducted, in the forest domain, on product and process innovation and innovation strategy, but less has been conducted on business systems innovation [9,11], i.e., on new ways of managing a business, including the creation of new business models (Kajanus et al., 2014). Business model canvas (Osterwalder & Pigneur, 2010) is a very diffused framework used to represent, evaluate, and design business models and was also applied to analyse forest-based businesses (Kajanus et al., 2019). Assuming that this approach can offer reliable solutions to embrace new business goals and aspects that are not only economic, but also related to the social and environmental dimensions (Kajanus et al., 2019), it has been pointed out that many other dimensions

are relevant, such as internal values and motivation, governance processes, ownership and legal forms, attitudes and competences, communication, etc. [7,9]. This spectrum is much wider than the one represented by what is commonly called “business model”, embracing the legal framework and decision-making processes, the characteristics and values of internal and external actors and their relationships, and the overall organisational arrangement of all these aspects together. This approach is also known as “business model thinking”, and it is recognized as a good tool ‘to explore the potential of business innovation’ (Weiss, Lawrence, Hujala, et al., 2019, p. 155). However, also in the forest management domain, this approach mainly applies to traditional entities conducting forest-related business, e.g., logging companies, forest management enterprises, and wood-chain brokers. It does not provide a definition seeming to adequately fit all the new “organisational arrangements” (e.g., more oriented toward public–private partnerships, more flexible in adapting to constantly changing scenarios, more interactive with the needs of civil society needs, sometimes based on informal relations and shared values instead than formalized contractual agreements) that are likely needed to successfully deal with the sustainable management of forests in the perspective of current crises and future challenges. Several inconsistent names can be found to define forest management organisations, focusing on specific perspectives such as forest ownership, role in forest management, and legal organisational type; however, a broad framework to catch the complexity of the organisational domain is missing.

To adequately support innovation in this field and to design and implement useful policy tools, it seems useful to try to clarify the meaning, perimeters, and key features of what could be considered an “organisational model” in the forest business area. Since the scientific research on this topic is fragmented and does not provide a comprehensive and updated conceptualisation, the main goal of this paper is to propose an attempt of comprehensive conceptualisation that is suitable to draw a characterisation of forest management organisations.

With this general goal, this work is based on two main subobjectives: (i) defining an analytical framework that can be used to describe and analyse various types of forest-specific organisational models; and (ii) testing the analytical framework on existing organisational arrangements within forest management organisations in Europe. Results, elaborated into recommendations, are ultimately intended to provide support to policy makers, in the definition of financial and regulatory instruments addressing the purpose of innovating the forestry sector, as well as to practitioners/forest managers and companies, especially in identifying possible areas of improvement and innovative solutions to institutional requirements, financial constraints, or internal blocks.

## 3.2 Approaches, Materials, and Methods

### 3.2.1 Guiding Approaches, Framing, and Concepts

Starting from a semantic definition, in the Cambridge dictionary, <https://dictionary.cambridge.org/dictionary/english/organisational> - accessed on 20 April 2023, the adjective ‘organisational’ can be related to the ability to plan, to belonging to a group (organisation), to the combination of a system to make it work; in any case, it is relative to the verb ‘to organize’, as for the case of the noun ‘organisation’: ‘a group of people who work together in an organized way for a shared purpose’. A model, <https://dictionary.cambridge.org/dictionary/english/model>—accessed on 20 April 2023, can be more easily defined as ‘a representation, a simple description of a system or process’. Combining these two definitions, to characterize an organisational model means answering the following questions: (1) who (are the members of the organisations, i.e., the components of the group of people who work together?) (2) what (does the organisation do?); (3) how (does the work run? i.e., how is the “organized way” of doing the work structured?) and (4) why (do the members work together, i.e., what is the shared purpose?).

Constitutive principles of organisations can be found in diverse fields of study, such as: (i) economy, law, and business management, (ii) social sciences, and (iii) policy sciences. In the following, some key features characterizing organisations and organisational settings are picked up from these fields and are finally combined together to frame a general concept of ‘organisational model’, which we propose to analyse and cluster forest management organisations, as reported in Section 3.

#### 3.2.1.1 Economy, Law, and Business Management

The organisation as a firm based on “nexus of contracts” was introduced in the 1970s by some economists and became a pillar for analysing organisations as entities defined by law (Alchian & Demsetz, 1972; Jensen & Meckling, 1976). This concept describes the way two or more persons coordinate their economic activities by saying that a common approach is that each of these persons enters into a contract with a third party, called a “firm” (i.e., a formal organisation), who undertakes the coordination through design of the separate contracts and, most importantly, through exercise of the discretion given to the third party by those contracts. Productive activity is commonly organized in the form of large nexuses of contracts (Eccles & Williamson, 1987). A firm must generally have two basic legal attributes: well-defined decision-making authority and the ability to bond its contracts credibly, by means of a pool of assets that the firm itself or the firm’s managers can offer as satisfaction for the firm’s obligations toward creditors, while securing the firm itself (its assets) with respect to the personal obligations (H. Hansmann & Kraakman, 2000).

In business sciences, business models were developed to describe what and how an (economic) organisation does. They are defined as a representation of the underlying core logic and strategic choices to create and capture value within a value network (Shafer et al., 2005). The business model influences (and derives from) organisational choices, which include “the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners to create marketing and delivering this value and relationship capital to generate profitable and sustainable revenue streams” (Osterwalder et al., 2005). Therefore, it can be considered part of the whole, with respect to the broader concept of the ‘organisational model’. The variables describe what an organisation does (the value proposition), who is addressing whom (the clients and beneficiaries), and by which means (the key resources and activities).

### *3.2.1.2 Social Sciences*

Richard Scott (Scott, 2003) proposed a classification of organisational theories into three categories: rational, natural, and open systems approaches. According to his categorisation, organisations as rational systems are oriented to the pursuit of specific efficiency goals and exhibit highly formalized structures; the natural systems approach considers organisations as interpretation systems that scan, interpret, and learn while acting in mutual dependencies with their social environment; the open systems approach proposes an understanding of organisations as deeply socially embedded, shaped, supported, and infiltrated by their environments. A group of sociologists focused on the idea that organisations are the result of decisions (Seidl, 2005) and are a social order that is intrinsically dynamic and could be contrasted with more static orders, such as institutions and networks (Ahrne & Brunsson, 2019). They identified five fundamental decisions that determine organized social interaction: (i) decisions on membership define who is a member of the organisation and who is not; (ii) decisions on rules regulate what the members must do and how to do it; (iii) decisions on monitoring allow the participants to observe each other, to control but definitively to know how to operate; (iv) decisions about sanctions (positive and negative) are set to enforce other decisions; and (v) decisions on hierarchy establish who has the initiative and power (for decision making). Furthermore, if a ‘partial organisation’ can exist [29], organisational features can also exist outside the context of formal organisations, when only some of the five fundamental decision levels are (eventually partially) implemented. Adopting a broader institutional lens, organisations are recognized in sociology as basic institutions, with institutions being foundations that make up the social life, “the prescriptions that humans use to organize all forms of repetitive and structured interactions” (Ostrom, 2009), which can be formal or informal, as “socially shared rules, usually unwritten, that are created, communicated, and enforced outside of officially sanctioned channels”

(Helmke & Levitsky, 2012). This allows one to also consider informal and not fully structured organisations and organisational models that can be frequently found in the forest domain (Ludvig et al., 2018; Miyagawa et al., 2018), as relevant for policies and practices. Two more key concepts can be found in the neo-institutional perspective: organisations configure and reconfigure their structures and practices to demonstrate alignment with the goals and values expected within their institutional environment and to gain legitimacy from other actors; isomorphism occurs in organisations when addressing institutional change, through coercive, mimetic, and normative processes (Powell & DiMaggio, 1991). The social (and ecological) context gains much relevance under these perspectives, as the consideration of organisations as dynamic entities whose arrangements change, as the results of internal decisions, to adapt to their environment, sensitive to conflicts, and to social consensus.

### *3.2.1.3 Policy Sciences*

Within the rich literature about policy sciences, a specific approach proposed to describe policy arrangements was acknowledged as particularly inspiring, suggesting a synthetic framework suitable to frame the set of features selected from other disciplinary domains. According to the work of Wiering et al., a “policy arrangement” is defined as “the temporary stabilization of the content and organisation of a policy domain” (Van Tatenhove & Leroy, 2003), to describe the way a certain policy domain is (temporarily) shaped in terms of organisation and substance. On the other hand, institutionalization incorporates the development of structures as a result of actions and behaviors that, in the search for stabilization, in turn are subject to continual change and adjustment (Arts et al., 2006). In these scholars’ work, four analytical dimensions are proposed to understand policy design and practices: discourses, power, rules, and actors, which are inextricably interwoven (Wiering & Arts, 2006). Actors are those who are involved in the policy process, whose power refers to the mobilization and deployment of resources. Rules of the game describe both laws regulating the policy domain and formal or informal procedures for decision making, while discourses refer to ideas, values, views, and narratives of the actors involved. A change to a temporary policy arrangement can result from a change in any of the above-mentioned dimensions, therefore setting up a new stabilization. Turning this approach to organisations, while keeping an institutional perspective, means to accept the idea that it can result as the development of structures from people’s (actors’) choices and behavior that stabilize and change as soon as any of its key dimension changes. In fact, organisations also result as the development and implementation of “rules” to allow a group of “actors”, given a set of “resources and power”, to achieve their “purpose”, according to a system of values (“discourses”) (Arts et al., 2006; Van Tatenhove & Leroy, 2003), being the key dimensions highlighted by the “inverted commas”.

Another interesting contribution to the concept of the organisational model can be found in Krott's actor-centered power (ACP) approach: given the recognition of actors and power as key dimensions of our model, it seems appropriate to consider the definition of power as the "capability of an actor to influence other actors" (Krott et al., 2014). Evidently, this is very relevant in an organisational arrangement, where actors have a central role and power can determine whether many choices are to be implemented or not. Though deepening the theoretical roots of ACP theory is not the scope of this work, the three elements forming the social relation called actor-centered power are recognized as key features of the organisational model's conceptualisation. This means that in analysing organisations, the assessment of power should be based on the recognition of the ability of actors to apply the strategies of coercion, incentives, and dominant information. This assessment was already applied to forest governance to understand how power shifts in governance can influence actors' power relations with respect to their interests in forest ecosystem services (Juerges et al., 2020). The scale of the organisational model is something different from Krott's application to forest policy and governance; nevertheless, power dynamics are hypothesized to be very similar in an organisational context, within and between organisational entities.

#### *3.2.1.4 Framing Variables*

Trying to merge these approaches, organisations can be seen as institutions that are subject to a continue dynamism between stabilization and change, in search of adaptation and innovative solutions to continuously emerging challenges and opportunities, sensitive to their social and ecological context. Inspired by the definition and variables of the policy arrangement approach (PAA) (Arts et al., 2006) definition and variables, we believe that an "organisational arrangement" could be defined as the temporary stabilization of the content and organisation of an organisational domain.

The key dimensions of the PAA framework, slightly revisited, are suitable to group organisational features resulting from the multidisciplinary approach adopted in this first part of the research. The key dimension "actors" addresses the question "who (are the members)"; the key dimensions "rules" and "power and resources" describe "how (the organisation works)"; while the dimension "discourses" is suitable to display "what the organisation does" and why. Furthermore, organisations are settled in a context (frequently cited as "(social) environment" within the neoinstitutional literature.

Twenty basic characteristics (or variables) were identified within the aforementioned approaches to characterize organisations, and—inspired by the PAA's framing—they were grouped into four (plus one) key dimensions: (i) actors, (ii) values and discourses, (iii) rules, and (iv) power and resources, embedded into a context. This latter is considered a fifth key dimension. These four (plus one) key

dimensions constitute upper-level categories and were used to draw an attempt of a comprehensive analytical framework, represented in Figure 3.1, where 20 key features are represented as belonging to one or more key dimensions.

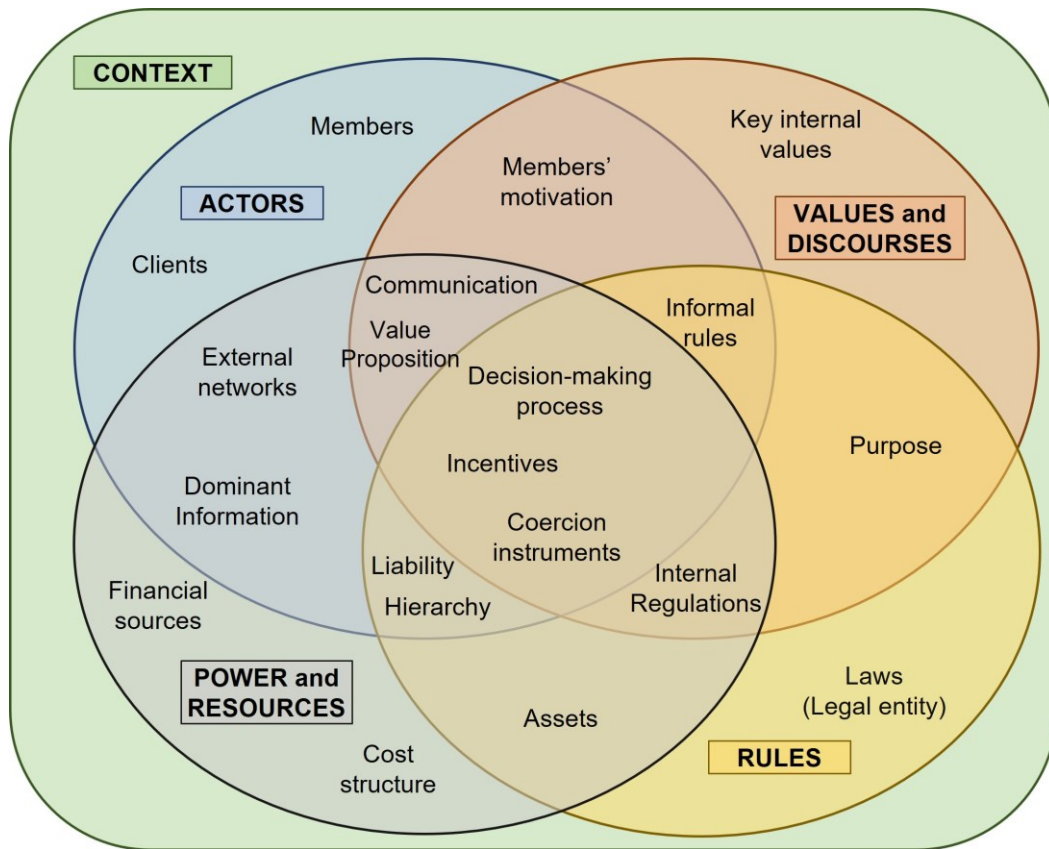


Figure 3.1. Conceptual and analytical framework for the study of organisational models, inspired by and based on the PAA framework (Arts et al., 2006; Wiering & Arts, 2006). Source: own elaboration.

### 3.2.2 Research Plan, Materials, and Methods

At the beginning of this research, the need to clarify the key concept of ‘organisational model’ was identified, which encompasses in some way all the key characteristics that portray an organisational arrangement, which is not intended as a static form, but rather a combination of dynamic variables.

As displayed in Section 2.1, concepts from different theories and disciplinary domains were selected to elaborate our conceptual framework, not necessarily exposing and confronting whole theories nor exploring all the possible approaches to the topic from all the disciplines. Rather, the identification of parts of theories mentioned within the literature reviewed led to a selection of suitable theoretical contributions. This conceptualisation was detailed with 20 key characteristics grouped into 4 (plus 1) key dimensions, represented in Figure 3.1, to compose the analytical framework that was applied for the analysis of forest management organisations within the scientific literature. The characterisation



of such organisations is displayed according to this framework in Section 3, where organisational models detected are clustered into 6 categories.

In the end, the analysis of the literature review addresses two goals at the same time: the characterisation and categorisation of forest management organisations, while testing (and improving) the conceptual framework hypothesized in the first part of this research, which also means to challenge and improve the overall conceptualisation of the ‘organisational model’. The methodology for the literature review and content analysis is described below.

#### *3.2.2.1 Review of the Literature*

A semi-systematic review of the literature was conducted, focusing on organisations and organisational issues in the forest sector. Designed for broad topics that have been studied by various disciplines (Wong et al., 2013), this methodology is suitable for providing an understanding of complex areas, while being transparent and allowing readers to assess whether the arguments for the judgments made were reasonable, both for the chosen topic and methodology (Snyder, 2019). The main steps of this methodology were applied: (1) identification of studies to be included, (2) screening of identified studies, (3) eligibility assessment, (4) full document reading, and (5) data extraction (Page et al., 2021).

This review looks at forest management organisations in Europe, considering the geographic area. Between June and October 2022, 29 query strings were entered on the scientific database Scopus, with an iterative approach through 4 stepwise blocks of searches. The four blocks were built of strings based upon two keywords: “Forest AND organi?ation” plus one or more keywords added using Boolean operators such as W/1, W/2, AND, or OR, chosen within four categories: organisational sciences’ key topics (block 1); synonymous locutions close to the concept of ‘organisational model’ (block 2); types of formal organisations (block 3); synonymous with ‘collaboration’ (block 4). The words ‘timber’ or ‘wood’ were excluded from the keywords’ selection, as they would have produced results about the industrial timber transformation chain rather than forest management. The words ‘organisation’ and ‘organisation’ were both considered, using the ‘?’ character in the query strings. The general strategy of the review process is represented in Figure 3.2, while a complete list of the query strings applied is detailed in Table S3.1, at the end of the manuscript, where the number of articles selected within each search is also reported. The whole process represented in Figure 3.2 was carried out per each block of searches, then was reiterated 4 times (one for each block). After reading the selected articles resulting from each block, the keywords to compose the following block of queries were defined until 4 blocks were completed.

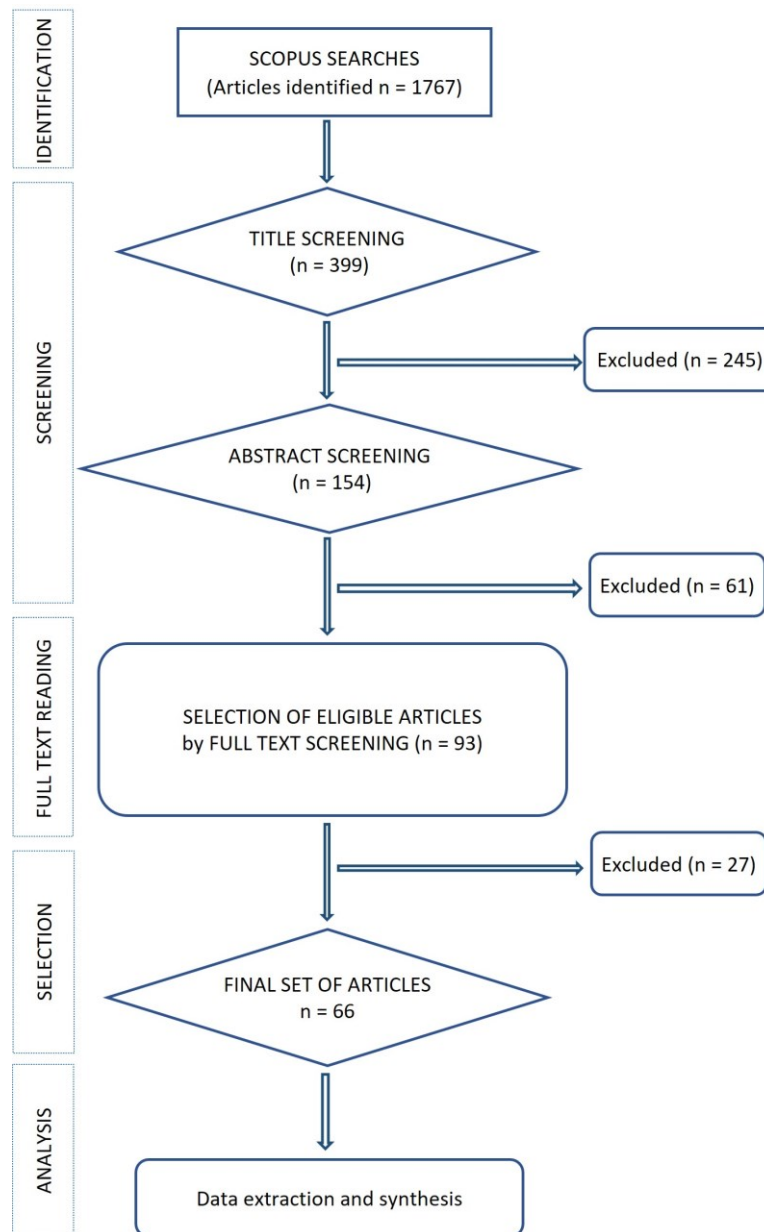


Figure 3.2. Diagram of the research process for the semi-systematic literature review. Source: own elaboration, based on PRISMA flow diagram, adapted from Page et al. [42].

All searches were filtered by subject area, limiting to agricultural and biological sciences, environmental sciences, earth and planetary sciences, social sciences, business management and accounting, decision sciences, engineering, energy, and economics. The results were also sorted by language, selecting only English, and by type of document, limiting only to articles, reports, and reviews.

An initial list of 1767 articles were retrieved in total. After selecting them on the basis of title (only titles explicitly indicating forest-related topics and revealing a reference to organisations or organisational topics were selected), 399 articles were further analysed. After reading the abstracts, 154 articles were selected. Among these, 28 duplicates were deleted, while 33 were excluded after

reading the full text, because they were not consistent with the objectives of the research. Therefore, a list of 93 papers was selected for full reading, and 27 more were excluded because they were not fully consistent or relevant for the purpose of the research, finally resulting in 66 articles to compose the ultimate set of this review of the literature. The detailed list of selected articles is presented in Table S3.2 in the Supplementary materials.

#### 3.2.2.2 *Content Analysis*

The content analysis for data extraction from the ultimate set of articles was carried out applying a meta-ethnographic approach, a method developed to establish a new theory or synthesis and to explain the range of research findings encountered (Britten et al., 2002), which is applicable to literature reviews, too. Thanks to this inductive approach, the textual content of published studies (rather than the original data of each) was reanalysed and compared, first to produce a synthesis of the overall “organisational model” concept suitable for the forestry sector and, secondly, to identify and characterize a selection of categories for forest management organisations displaying similar characteristics. Through meta-ethnography, separate parts are brought together to form a ‘whole’, so that the result is greater than the sum of its parts (Britten et al., 2002; Noblit & Hare, 1988). Following this approach, while reading the selected articles, all data regarding the 20 organisational models’ features, as conceptualised and represented in Figure 1, were identified and copied into a matrix. The matrix was framed by writing in column headers the names of the organisational types described within the articles, while in rows, the concept of the 20 variables composing the organisational model concept (see Figure 1) were described.

While reading and extracting data, two main criteria were recognized as those most frequently determining the definition of an organisational type: i) who the members are and ii) who the forest owners are, the two being either coincident or distinct. These two variables were recognized as the most independent in the framework. Therefore, all the organisational types cited in the articles were clustered until six ultimate categories of forest management organisations were identified according to those two main criteria. Some more typologies resulted, as displayed in Section 3.6 dedicated to “Other organisations”, some of which are surely relevant from a practical and political point of view; nevertheless, they were significantly under-represented in the literature review with respect to others, being cited in not more than two articles. The choice not to complete the full analysis for these organisations was made because only some of the 20 variables of the analytical framework could have been described (as reported in Section 3.6) based on data gathered through the selected methodology. Indeed, to complete the description of all (or nearly all) the 20 features, data were

synthesized from all articles where organisations belonging to that category are cited to obtain the most comprehensive characterisation per each of the six categories.

### 3.3 Results

Based on locutions and definitions found in the literature, similar organisational models applied to forest management activities in Europe were grouped into six categories, plus a miscellanea one (see Table 3.1), named accordingly, and characterized by the main organisational traits emerging from the analysis, based on the framework represented in Figure 3.1. In several cases, similar types are cited in the literature with different names, according to the country-specific legal framework, to different literature streams, or to different perspectives toward similar subjects. For example, “forestry contractors” and “forest enterprises” are used in different articles to indicate the same subject, also cited as “forest harvesters”, and were grouped into a unique category, while in the case of “community forests”, “community forestry”, and “community-based forest enterprises”, a partial overlapping of concepts required a more refined distinction and definition.

<b>Organisational Models as Defined by Authors in the 66 Articles</b>	<b>Aggregative Name Proposed</b>	<b>Description</b>
State forest management organisations State-owned enterprises State forest organisations	State forest management organisations (SFMOs)	A state-owned forest company, enterprise, or agency that performs sustainable forest management and wood production as its major concern; they meet both social and financial objectives, while protecting forests and biodiversity (Liubachyna et al., 2017; Referowska-Chodak, 2020).
Forest owners’ associations Forest owners’ organisation Forest owners’ cooperation Organization of forest owners Forest groups	Private forest owners’ organisations (PFOOs)	Private forest owners constitute members’ controlled organisations with the aim to represent the interests of the members and/or providing forest management services to optimize management costs and overcome issues due to land fragmentation (Pivoriūnas, 2021; Sarvašová et al., 2015).
Common property organisation Community forests “Consorti vicinali”	Community forests (CFs)	Organizations operating forest management based on common ownership rights, management, and use of forests (Bassi & Carestiatto, 2016).
Community forestry Community forestry enterprises Community-based forest enterprises	Community forestry and Community-based forest enterprises (CBFEs)	In community forestry, communities that do not own forests have some involvement in forest management, decision making, and/or governance and gain some benefit from them (Lawrence & Molteno, 2012) CBFEs are companies organized by community members to actively provide forest products and services, with the goal of producing social returns and/or managing assets that benefit those communities (MacQueen, 2008).
Social enterprises Not-for-profit enterprises (Rural) Charities Third-sector organisations	Social forest enterprises (SFEs)	SFEs are companies not acting for profit but are established for social or/and environmental purposes (Zhang et al., 2021). They can be established within a community (forest), but do not necessarily involve forest owners as members.
Forest harvesting entrepreneurs Forestry contractors	Forest enterprises (FEs)	Organizations whose business is based upon forest operations, contracted with public or private forest

Forest enterprises		owners (our elaboration), normally not holding forest planning responsibilities and not owning forest land.
Forest cooperatives		
Environmental organisations		Several more types of organisations were mentioned within the 66 articles, but not described with sufficient data to create a category and carry out the characterisation analysis. Results are reported in Section 3.6
ENGOS		
Certification schemes	Others	
Certification groups		
Model forests		

Table 3.1. Organisational models aggregated and described.

A bit less than 80% of the articles focus on specific types of organisations, while only about 20 % discuss organisational aspects in general terms, and in just a couple of articles, the ‘organisational’ topic explicitly referred to a clear theoretical framework, as in the case of the “business model canvas” applied to analyse forest-related business models in Europe (Kajanus et al., 2019). “Organizational models” were conceptually framed and described to characterize the organisation of private forest owners (PFO) in Austria (Rauch & Gronalt, 2005) and adopted as a framework in a study on PFOs’ capacity to increase wood mobilization In Slovenia and Serbia (Malovrh et al., 2017). While the business model canvas is designed to outline the arrangement of a business with that perspective, with scarce attention to the organisation’s members and to their organisational arrangement, the four organisational models proposed for the analysis of PFOs’ organisations are based on members’ participation in decision-making, management, and on profit allocation. In some articles, “organisational models” were intended to represent the organisation of specific aspects, either governance arrangements in the establishment of systems for the payment of forest environmental services (Gatto et al., 2009) or marketing strategies for the commercialization of non-wood forest products (Secco et al., 2009). In the 66 articles reviewed, the concept of “organisational model” (or similar locutions) was never applied to achieve a complete representation of the organisational arrangement, as hypothesized in Section 2.

Only 8 articles of 66 are not country-specific, while 58 refer to one or more than one country’s cases. A first group of articles (n = 9) refers to countries of Central and Eastern Europe, such as Estonia, Lithuania, Latvia, Poland, the Czech Republic, Slovakia, and Romania; another group is focused on Balkan countries (n = 10); and British (n = 5) and Fennoscandian (n = 15) countries are also well represented, while other European countries are less represented, with only one article dedicated respectively to France, Belgium, Germany, Italy, Austria, and Switzerland, with some more being referred to larger regions, to the whole continent, or to the topic in more general/global terms. The following subsections describe the results in detail, focusing on the four key organisational dimensions that guided our analysis (i.e., actors, discourses, rules, power, and resources). This description is complemented by Table S3.3 in the Supplementary Materials.

### 3.3.1 *State Forest Management Organizations*

Public forests in Europe account for nearly 40% of the total woodland area, with a quite diverse distribution among countries, from less than 25% in Austria, Norway, France, and Slovenia to more than 70% in Croatia, Czech Republic, and Poland, only to cite some examples [56]. Despite these differences, state forest management organisations (SFMOs) have traditionally played a major role in the forest sector in European countries. The state or local public authorities manage their forests through state-owned forest companies, eventually entrusted with public authority (Von Detten & Faber, 2013). In the literature, such organisations were reported within eight articles with several different (even if similar) names (see Table 3.1). The lack of a common terminology could have impeded a deeper understanding of the key role of these organisations in forest management at the regional level.

(A) **Actors.** The state and its decentralized regional or local authorities are the owners of SFMOs. Evidently, significant differences can be found between countries depending on the organisation of the public administration. Forest management can be either assigned to a unique large enterprise, managing all of the state forests, as in the case of Poland, Serbia, and France, or be shared between many smaller local enterprises owned by the regions or the municipalities, as we can observe in Lithuania, Spain, and Italy (Liubachyna et al., 2017; Teder et al., 2015). The smaller the administration (and the forest), the greater the need to optimize the costs of management; therefore, some Italian municipalities, for example, aggregate in forest consortia, which can also include private owners amongst their members (Secco, Favero, et al., 2017). SFMOs sell their forest products and services to other actors of the value chain, such as timber companies and sawmills. They changed significantly in eastern Europe from the 1990s following a wave of privatization and the simultaneous collapse of socialist regimes, induced privatization of the forest industry, the formation of a free timber market with increasing timber imports and exports, as well as new modes of ownership and enterprises (Teder et al., 2015). However, SFMOs remain protagonists in European forest management and are almost all represented under the umbrella of EUSTAFOR, an important second-tier organisation whose members provide employment to more than 100,000 people; its main goal is to support and strengthen state forest management organisations in Europe, helping them to maintain and improve their economically viable, socially beneficial, culturally valuable, and ecologically responsible practices (Referowska-Chodak, 2020).

(B) **Values and Discourses.** The state exercises ownership over its enterprises in the interests of the public. The main purpose of state ownership should be to maximize value for society through efficient use of resources (OECD, 2011). In European forestry, sustainable forest management has provided

the guiding principles for SFMOs since the 1990s, and also, more recent concepts such as ecosystem services have forced them to rethink their management goals and to orientate toward a full integration of their social, economic, and ecological dimensions. Therefore, the purpose is to maintain the main function of production (and economic viability) while guaranteeing the provision of ecosystem services of public utility, such as sequestration of C, biodiversity conservation, landscape maintenance, recreation, and soil and water protection (Gatto et al., 2009; Liubachyna et al., 2017; Referowska-Chodak, 2020; Secco, Favero, et al., 2017). SFMOs can provide forest-related services to private forest owners. In Slovakia and Estonia, SFMOs also manage woodland for absent private owners, and they actively develop new business activities; among the most common are sources of renewable energy, real estate, and recreation activities, but they also develop forest/environmental education, manage forest museums, and nature centers (Liubachyna et al., 2017; Teder et al., 2015). Furthermore, the implementation of the communication process, through education or pure communication campaigns, allows for the reducing of social conflicts and achieving of better compromises in an attempt to find the right balance between production goals and social/environmental purposes (Referowska-Chodak, 2020).

I Rules. SFMOs can assume different legal status, state-owned joint stock companies, pure state enterprises, or other types of profit-making companies. The way SFMOs are organized and managed is often predetermined by the specific conditions of the forest sector in the country; in general terms, their internal governance is typically hierarchical and functions as a private unit, where decision making is often influenced by political power (Liubachyna et al., 2017; Teder et al., 2015) either to lead more commercial-oriented organisations or to provide specific ecosystem services of public interest. In any case, many organisations must integrate all these goals into their development and all SFMOs must follow the rules of sustainable forest management (Liubachyna et al., 2017). In Serbia, the SFMOs 'Srbijasume' and 'Vojvodinasume' give professional and advisory support to private owners to enforce sustainable forest management, according to a law enforced in 2011, if the organisations do not directly employ licensed forest engineer (Milijic et al., 2010).

(D) Power and Resources. Competences and powers over forests are often separated with dedicated agencies for state forest administration, law enforcement, and management enterprises. SFMOs operate on the principle of financial self-sufficiency and cover their costs with their own revenues, with a positive financial result (Liubachyna et al., 2017). Forest management is held internally by bigger SFMOs, whereas smaller organisations involve external forest consultants. In any case, rationalization and privatization processes, often under pressure for public funding cuts, push the transfer of many forest operations to private contractors, from harvesting to transport and, less

frequently, to forest protection services (Secco, Favero, et al., 2017; Teder et al., 2015). Increasing outsourcing of activities corresponds to a consequent reduction of SFMO personnel (Liubachyna et al., 2017). Many SFMOs stipulate long-term contracts with loggers or timber companies, which participate in tenders, while in the case of smaller SMFOs, logs are sold in smaller quantities through auctions. In countries where there is only one large SFMO, the state's role in stabilizing the local timber market is evident, especially during economic crisis or natural disasters; contrarily, in countries where SFMOs are many and smaller, their (low) power is limited to their own forest land and resources (Secco, Favero, et al., 2017; Teder et al., 2015).

### *3.3.2 Private Forest Owners' Organizations*

The PFOOs are the protagonists of 18 articles. Private land fragmentation, along with the lack of organisation and insufficient motivation of private owners for harvesting, are cited as some of the most important problems affecting the forest sector in many European countries (European Commission, 2008). The Confederation of European Forest Owners, the European umbrella organisation of major national private forest owner associations, advocates the practice of joining cooperatives or associated organisations for forest owners as a good and efficient tool to mobilize the management of unmanaged private forest resources, enabling owners to be well-informed and actively participate in the wood market, while providing a reliable source for the representation of members' interests (Pivoriūnas, 2021). These cooperation-based organisations are highly dependent on membership growth (Pivoriūnas, 2021) and are often encouraged by governments and promoted by foresters [60]. Increasing the participation rate of private forest owners is important to address the long-term requirements of the market and to fulfil effective representation of interests [63].

(A) Actors. Nonindustrial private forest owners are the main actor of this typology. In Europe, 56% of the total forest area is private, of which almost 77% is owned by "individuals and families", while an even higher share of the holdings, 88%, is smaller than 10 hectares [56]. Private forest owners' organisations are diffused in most European countries, with relevant differences. In the Fennoscandian countries, PFOOs have a long tradition: in Sweden, many organisations were founded in the early twentieth century between family forest owners, which own almost half (48%) of the Swedish forest land (Kronholm et al., 2021); they follow cooperative principles of member ownership (Kittredge, 2003), and in 2013, they handled 50% of the volume cut by family forest owners, corresponding to approximately 25% of Sweden's annual cutting rate (Kronholm, 2016). In Norway, already in the early 2000s,  $\frac{3}{4}$  of timber sales were made by associations of forest owners associations (Størdal, 2004), while some Finnish cooperatives, whose members are small private forest owners, are today among the largest forest companies in the world (Tuominen et al., 2008). In these models,



owners are members but act much more like shareholders; rather than directly participating in management activities, they could even be completely absent, thus establishing pure ‘dividend’ models where they are involved only to make very general decisions and to share profits (Rauch & Gronalt, 2005). When adopting a more ‘cooperative’ model, PFOOs are associations of active owners directly involved in forest management and operations, while the organisation sells assortments, completes contracts, and sorts invoices (R. Hansmann et al., 2016; Malovrh et al., 2017). The French CNPF—Centre National de la Propriété Forestière—is a singular case that is worth mentioning, being a central public institution with 11 regional delegations, grouping approximately 3.5 million private forest owners, thus revealing almost all of the 75% of the French private forests, with some of them being members of PFOOs while others are not (Ivana Živojinović et al., 2015). Very small and fragmented forest properties, which cannot offer significant economic benefits and characterize many European countries, currently represent one of the reasons for establishing organisations but also a limit for owners to be interested in joining. Some research has shown that PFOOs cannot be established or succeed everywhere, as reported in some studies in the Balkan area or in the Baltic republics (Milijic et al., 2010; Pöllumäe et al., 2016). Not all joint activities, knowledge exchange, and cooperation in general must take place in a particular organisational form. Nonmembers of an organisation still might successfully cooperate with other forest owners despite their individualistic approach and indecision toward associations, eventually purchasing services from PFOOs. An upper level is represented by “umbrella organisations”, which are larger organisations whose members are PFOOs, such as the Confederation of European Forest Owners (CEPF), at the European level, but several others exist at the national level: they are an important player in the external network of PFOOs to achieve one of their main goals, which is the representation of the interests of members in policy advising (Malovrh et al., 2017).

(B) Values and Discourses. According to some works (Pivoriūnas, 2021; Sarvašová et al., 2015; Weiss, Lawrence, Lidestav, et al., 2019), PFOOs can be divided into two main typologies based on their main purpose: organisations focused on gaining political influence and organisations aimed at improving management, logistics, marketing, and general technical and administrative support. PFOOs often start to achieve one of those two main goals, but after some time they often encompass both, after they grow up, as for the case of PFOOs in the Balkans and in Baltic republics, where they were first intended to give the opportunity to forest owners to be represented in the land restitution process occurring in these countries since 1990 and then gained more competency and importance not only in influencing forest policymaking, but also in offering services to their members (Milijic et al., 2010; Nonic et al., 2011; Sarvašová et al., 2015). Moreover, PFOOs whose mission is to provide services and commercial opportunities to owners who are members can also implement their business

strategy and sell the same services to other nonmember owners. In general terms, PFOOs can succeed if they have clear objectives to attract members and produce benefits for existing members by reducing the membership costs via doing so (Pivoriūnas, 2021). However, many forest owners are described as still reluctant to join such organisations, despite cooperation being encouraged by policy to enforce the sustainable management of private forests, yet only a small share of private forest owners joined an association. Their resistance seems to be mainly due to the legacy of bad experiences with imposed cooperatives in the communist period. These results highlight the fundamental role of trust as a key value that can be enforced with repeated and positive interactions between people (the owners) and learning about the outcomes (the activities) to increase membership of PFOOs (Pöllumäe et al., 2016, 2019; Sarvašová et al., 2015).

(C) Rules. PFOOs can be associations or cooperatives, both legal forms characterized by limited liability and democratic governance structures (Kittredge, 2003). Cooperatives are enterprises typically characterized by the principle “one man, one vote”, independently of the forest area owned (Dedeurwaerdere, 2009), while associations are not enterprises. They may be nonprofit actors primarily acting as lobbyists and financed via membership (Pivoriūnas, 2021) or enterprises where administrative and technical support is given to specialized professionals, eventually employed by the organisations, or purchased as consultants. In any case, no ownership rights are transferred to organisations, and forest owners democratically participate at some stage of decision-making (R. Hansmann et al., 2016) that could be only episodic (shareholder-type of governance) or continuous (cooperative-type of governance). Involvement of members in the governance structure also depends on their personal interest: active owners can be fully or partially engaged in management activities but are surely part of the decision-making process, while “absent owners”, those who live far away and have no contact with their forest property and are only interested in the forest as a family asset, also delegate to organisations most of the decision making (Kronholm, 2016; Malovrh et al., 2017).

(D) Power and Resources. We can observe different distribution of forest management responsibilities, once again according to participation of members, as suggested by some studies, from which four major models can be identified (R. Hansmann et al., 2016; Malovrh et al., 2017; Rauch & Gronalt, 2005): (a) active owners fully engaged in their forest activities, predominantly oriented to timber harvesting, which is performed by each member, who also transports material to the industry, while the organisation performs the arrangement of timber sales, measurement and quality assessment, and invoicing and payment, and ensures the contract-fixed price of wood; (b) almost the same as model (a), with the difference that transportation is also entrusted to contractors; (c) organisations of “multi-objective” owners, whose main source of income is not related to forestry,

and they spend little time performing activities in their forests, while most activities are left to the PFOOs; and, finally, (d) is the case of “absent owners”, those who live far away and have no contact with their forest property and appoint organisations to carry out management, sales, administrative tasks, and all activities. When owners are fully involved in the management of their forests, professional skills can be found between them, inside the organisation, to carry out forest operations; more frequently, external foresters are designated as technically responsible for forest management, and forest operations are contracted to external entities. The French CNPF supports PFOOs and even individual owners with consulting and training to steer their forest management toward sustainability [74] and finally evaluates the forest management plans that are mandatory for forests bigger than 25 hectares, while other easier documents are sufficient to orient (sustainable) forest management in smaller forests (Bottaro et al., n.d.; CNPF, 2021). In many cases, the constitution of forest owners’ organisations is financially supported by public funds: national, regional, or eventually derived from the Rural Development Programs (R. Hansmann et al., 2016; Kajanus et al., 2019; Põllumäe et al., 2019; Sarvašová et al., 2015), and some articles report that many owners believe that their organisations will survive in the long term only if permanently financed by public funds (R. Hansmann et al., 2016; Milijic et al., 2010). On the other hand, they should not rely exclusively on public financial sources, but rather gain direct economic returns from forest management and simultaneously deliver and value different value-added services (Pivoriūnas, 2021).

### 3.3.3 *Commonly Managed Forests*

Organizational aspects of community forests, community forestry, and community-based forest enterprises are cited in 24 articles. Although there is some overlap, substantial differences, such as the allocation of forest property rights and the purpose, suggest separating these categories.

#### 3.3.3.1 *Community Forests*

CFs are not properly a specific organisational model, rather an ownership typology; the allocation of land property rights to the community generally leads to the formation of endogenous organisations (Bissonnette et al., 2018) that could have various forms. Therefore, CFs do not present a single organisational model or a homogeneous group of organisations, but different models can be found in different countries and even in diverse regions of the same country, because common goods’ (eventually called ‘commons’) management organisations have typically been established in the past and have a strong traditional legacy. Common ownership rights, management, and use of natural resources (in our case, forests) are the characterizing traits of this category.

(A) Actors. Common property is a third ownership option beyond the well-known forms, namely, private and public property. Many European forests are owned by communities, even if the overall area covers a small share in the total European forests (a bit more than 2% (United Nations (UN) & Food and Agriculture Organization of the United Nations (FAO), 2019)) in various forms: from traditional rural commons dating back to premodern times, typically in Spain, Italy, France, Austria, Slovenia, and Romania, to relatively more recent community-owned or -managed forests, established, for example, in Sweden, the UK, Czech Republic, Slovakia, Poland, and Hungary (Neumeier, 2011; Weiss, Lawrence, Hujala, et al., 2019; Ivana Živojinović et al., 2015). Members of traditional commons are typically local families, for example, in the Alps, who have inalienable and indivisible rights (Bassi & Carestiato, 2016), while in more recent community forests, outsiders could eventually have access to the common property (a share of it), so that today Swedish forest commons, for example, are owned by people, companies, the church, and even the state. The access to the common is a crucial aspect, strongly related to inheritance and, in some cases, to the possibility of buying the farm/household on which the commons' share is based. In some community forests, in the last few decades, the original actors have gradually disappeared and are being replaced by new actors who can have different demands on the resource (Carlsson, 1999). CFs often involve forms of collaboration with exogenous political and economic actors that can be found in the same local context (Bissonnette et al., 2018). As for private forest owners' associations, the importance of second-tier organisations is cited for CFs, too. These organisations work to represent members politically, but also share information and generate coordination, could pool resources, and provide capacity-building projects (Butler & Current, 2021). In addition, CFs can be a key actor in local networks, thanks to their ability to deal with the market and work with other players in their territory and within the value chain and cultivate strong partnerships with local governments. From the literature, the case of Mersey Forest emerged in this sense, described (Miyagawa et al., 2018) as a community forest recently established in the UK to lead a network of local governments, government organisations, landowners, private companies, and the community in implementing landscape changes.

(B) Values and Discourses. Communities that own and manage local natural resources are organized first of all to regulate the use and management of common resources. However, CFs do not limit themselves to forest management practices alone, but incorporate a broader set of goals, often involving diverse local stakeholders, again presenting elements and characteristics from private, public, and nonprofit organisations. Communities that own forests maintain a decisive role in the stewardship of the rural area in which they are rooted (Bassi & Carestiato, 2016); they can successfully set other purposes such as landscape conservation and restoration or the preservation of

biodiversity (Carlsson, 1999; Miyagawa et al., 2018). Multipurpose management capacity, together with the ability to work in partnership with other local actors, may allow CFs not only to achieve their primary objectives, but also to become a community-driven organisation, as described again for the case of Mersey Forest in the UK (Miyagawa et al., 2018). Trust, reciprocity, solidarity, and information sharing are indicated as key values for CFs that create capital on a level with natural, physical, financial, human, and political capital, representing a powerful instrument for building these other forms of capital (Bassi & Carestiato, 2016; Neumeier, 2011). In a local context, the collective action tends to develop with higher levels of social capital, defined as shared knowledge, understanding, norms, rules, and expectations about the patterns of interactions that groups of individuals bring to a recurrent activity (Agrawal & Ostrom, 2001).

(C) Rules. Some CFs' organisations are shaped like private enterprises (collectively owned). Some others have different organisational models, also depending on special state laws that regulate them. CFs' enterprises can operate as associations, employee-owned businesses, cooperatives, indigenous enterprises, not-for-profit societies, and firms owned by towns and municipalities (Siegener et al., 2021). Common property is a model of resource management that creates rules for the use of common property resources, defining who is and who is not eligible to benefit from the use of these resources (Agrawal et al., 2013), therefore in some ways defining who are members of a community, for the purposes of resource management. These models underpin the notion of 'decentralization', or 'devolution', of forest rights in that they leave it up to forest-dependent communities to govern local forest resources in ways that protect resource utilization and sustenance for collective goals (Agrawal & Ostrom, 2001). CFs' enterprises are characteristically hybrid organisations, integrating public and private interests, objectives, and organisational elements, from the governance structures to the generation and sharing of profits (Ludvig et al., 2018; Siegener et al., 2021; Vega & Keenan, 2014). Internal governance involves a decision-making body (a board) elected by the members' assembly, which is responsible for the management and economy and for the collective goals monitored by the assembly (Bissonnette et al., 2018; Carlsson, 1999).

(D) Power and Resources. Hybridity seems to bring some relevant organisational challenges to CFs' enterprises: how to meet hybrid goals in an international marketplace and ask them to participate, in some way, in a complex global business network. Relevant governance challenges have been detected, as community members are responsible for technical, business, and administrative decisions but could not be sufficiently trained or skilled, and the governance structure is not always adequately designed to gain lacking competences and capacities (Siegener et al., 2021). Some authors underline the importance of distinguishing the roles and responsibilities of the enterprise members, staff, and

board members. Decision-making roles and power shall be distinguished between the board of directors and the administrative staff (Antinori & Bray, 2005; MacQueen, 2013). In the Swedish model for CFs, for example, the shareholders' assembly elects a board, which is responsible for the management and the economy, but also, according to the law, a professional forest manager must be contracted or employed and is directly responsible for the forest management (Carlsson, 1999).

### 3.3.3.2 *Community Forestry and Community-Based Forest Enterprises*

Articles presenting community forestry are all about experiences from the UK and clearly distinguish them from the previous category (community forests), also proposing a sharp definition for community-based forest enterprises (CBFEs).

(A) Actors. Community forestry is broadly defined as those situations where communities are involved in the governance, decision-making, or management of forest and forest resources and gain some benefit from them (Lawrence & Molteno, 2012). Some groups could eventually own or lease their forests, and others manage them in partnership with another organisation, usually the landowner, through a management agreement. It is noteworthy that, though in the literature we found the locution “community forestry” to indicate these experiences, in the UK, communities organized for community forestry are called “woodland communities” or “woodland groups”. This is also the name used by their two main second-tier organisations: the Community Woodland Association (in Scotland) and Llais y Goedwig (in Wales), which are self-organizing associations, initiated by the groups themselves for mutual support and to represent their interests to policy makers (Lawrence, Wong, et al., 2020). Community forestry can be further organized in enterprises, namely, “Community-based forest enterprises” (CBFEs), more closely defined as experiences in which community members are organized into a company to actively produce goods and services in response to market demands, generating income, social returns, and other assets benefitting those communities (MacQueen, 2008).

(B) Values and Discourses. The main purpose is typically to produce direct or indirect benefit for a community through the management of forest resources. Enterprise and trading are not always primary objectives (Lawrence & Molteno, 2012), though there are CBFEs strongly relying on trading. The aim may be to maximize profits to generate funds for the community.

(C) Rules. The major difference with CFs, described in the former subsection, lies in the fact that land ownership is not a prerequisite in community forestry and in CBFEs, since they can be carried out also contracting with private or public forest owners. Community forestry can be organized as community interest companies, cooperatives, or companies limited by guarantee (which are the options for CBFEs), but also as unincorporated associations and charities (Ambrose-Oji et al., 2015; Ludvig et al., 2018;

Siegner et al., 2021). Communities are involved in the governance of forest land and directly in decision-making bodies, and they are always the first beneficiary, whatever the legal form of the CBFEs, that can be both for profit or nonprofit. Liability can change, according to the legal form, from a personal obligation of members in the case of unincorporated associations to limited liability in cooperatives and companies limited by guarantee. Consequently, a very broad set of governance arrangements can be found with very different degrees of community involvement. Decision making in companies is performed by directors or trustees, or by named post holders in unincorporated groups (Ambrose-Oji et al., 2015).

(D) Power and Resources. Forest management can be carried out by communities, as for the case of CBFEs, or contracted to third-party enterprises, securing them time-bound legal rights that may even exclude community use of woodland, which is the case of community-governed concessions, a relatively emergent typology. Community forestry financing can be based upon trading, upon contracting with third parties who pay leases, or can be significantly based on grants, as for the case of charities and most social enterprises (Ambrose-Oji et al., 2015; Ludvig et al., 2018; Macqueen, 2013). The positive impact of community forestry, typically focused on producing public benefits for the community, e.g., conservation and landscape values, allows us to look at this management solution as a viable option to realize the potential of forests in sustainable development (Ambrose-Oji et al., 2015; Siegner et al., 2021), and growing case-based evidence can be found that community forestry delivers public benefits at a local scale and improves the sustainability of forest resources around the world (Erbaugh et al., 2020).

#### 3.3.4 *Social Forest Enterprises*

Although not yet a universally framed concept, social enterprises are growing in Europe and can be defined as entrepreneurial activities that do not trade for profit but are rather established for a social or environmental purpose; however, significant differences are reported between laws of the countries. SFEs are cited among six articles, and their best description was found in articles settled in the UK, where evidently there is a stronger tradition for this kind of organisation involved in forest management. SFEs can be community-based forest enterprises and may also be chosen as an organisational model for CFs; anyway, they shall not be confused with the two former categories nor with the more general concepts of community forestry or nonprofit organisations. SFEs could not have a specific correspondence with a community and do not necessarily involve forest owners as members.

(A) Actors. Social entrepreneurs can be individuals, groups of people, or eventually entire communities when social enterprises are established for community forestry or to manage community

forests. Social innovation can be a process for the creation of SFEs, defined as the “reconfiguring of social practices, in response to societal challenges, which seeks to enhance outcomes on societal well-being and necessarily includes the engagement of civil society actors” (Polman et al., 2017). This definition suggests the key role that “civil society actors” have that can be easily recognized in the figure of founders (individuals or groups) who start the enterprise and frequently continue to lead it, in collaboration with family, friends, and trustees. The substantial work of volunteers is decisive in SFEs, but cooperation with other organisations is also an important factor, in particular with other social enterprises in the first region, that can be the SFEs’ network of clients and providers (Lawrence, Wong, et al., 2020; Ludvig et al., 2018).

(B) Values and Discourses. SFEs are often “hybrid organisations”, since they try to combine the goals and cultures of both for-profit and nonprofit businesses; in forest-based SFEs, a triple dimension of hybridity can be seen, merging social, environmental, and financial goals, which can complement or compete with each other (Lawrence, Wong, et al., 2020). In any case, the purposes of the company are sustained by the key values of its members, which are typically solidarity, trust, care, and cooperation (Siegner et al., 2021; Zhang et al., 2021). SFEs’ value propositions can be based on trading forest products along the value chain, while in other cases, they mainly offer forest-based services, such as forest education and training, sustainable tourism, and recreation. Therefore, the forest can represent only a therapeutic setting or a venue for events. Another group of forest-based SFEs offers forest management services to other landowners, such as forest management consultancy or timber harvesting, while some enterprises developed a mixed income strategy (Ambrose-Oji et al., 2015; Ludvig et al., 2018; Zhang et al., 2021).

(C) Rules. The UK laws define social enterprise by the purpose of a business, with primarily social objectives, that can be carried out by unincorporated and various incorporated forms of social enterprise, which include limited companies, community interest companies, industrial and provident societies, and limited liability partnerships. They are nonprofit organisations, meaning that surplus is reinvested into the enterprise, to maximize social and environmental objectives, rather than providing returns to owners and shareholders. SFEs can be built based on community engagement (Ludvig et al., 2018), which is the case when this model is adopted within community forests and forestry, but they could also be independent of the community and do not necessarily include it in governance or woodland management. Forests, the main asset for forest-based SFEs, can be held by third parties and contracted or made accessible by the owner (Ambrose-Oji et al., 2015). Specific governance structures are often used to manage the forest resource and business, the ethics and livelihood choices inherent in the business, and the integrated way in which they cooperate with other organisations



within the region. Moreover, in addition to their social and environmental goals, they must combine with a set of business-like financial and managerial systems to meet their commercial objectives that are needed to cover their operational costs (Ludvig et al., 2018; Zhang et al., 2021). Managers of SFEs must consider all of these diverse goals and conduct their business on a challenging multiple-objective basis, considering the multiple interests of different stakeholders involved (such as participants, staff members, funders, partner organisations) while balancing the social, economic, and environmental dimensions of the SFEs.

(D) Power and Resources. Some SFEs depend to a considerable extent on volunteer work and grants (Ludvig et al., 2018), but others developed sufficient commercial activity sufficient to be financially independent. However, financial security is often reported to be the external factor that causes SFEs to crumble, also because funding mechanisms appear to have fallen short of fully assessing their performance, with long-term social and environmental effects largely neglected, so that monetizing ecosystem services provided by SFEs remains difficult, while related costs are tangible (Ludvig et al., 2018; Zhang et al., 2021). SFEs with strong asset ownership (forests) have access to a wider variety of income sources and can use land as capital against which to raise loans (Ambrose-Oji et al., 2015). Although challenged by insecure financial performance, an increasing connection with rural development is reported for forest-based SFEs (Zhang et al., 2021).

### 3.3.5 *Forestry Enterprises*

Another set of articles (n = 16) deals with “forestry enterprises”, “forestry companies”, “forestry contractors”, “forest harvesters”, or “forest workers cooperatives”. General conclusions could be misleading when talking about this category, being quite broad in terms of possible legal forms and characteristics that forestry enterprises (FEs) can assume. No matter the name or legal form, “forestry enterprises” are forest workers’ organisations whose business is based on forest management operations, contracted with either public or private forest owners.

(A) Actors. Members of FEs are forest workers, such as timber loggers and forestry machinery operators. Until some decades ago, forestry workers were mostly employed by big forest companies, where existing, or by the state and local administrations. Many harvesting enterprises began their activity in northern Europe (and in North America) when large-scale forest companies, starting from the 1980s and early 1990s, decided to outsource most of their harvesting operations, often offering to sell their machinery to selected machine operators who could then continue to work as independent contractors (Ambrušová & Marttila, 2012; Eriksson et al., 2015; Kronholm et al., 2021). Similarly, some years later, in some European countries, such as Slovenia, Finland, and Baltic republics, SFMOs also started to outsource harvesting, transport, and reforestation (Ambrušová & Marttila, 2012; Teder

et al., 2015). In Finland, contractors' size can determine their "position" in the network of forestry operations: the largest companies often act as prime contractors for industrial buyers and then use subcontractors to perform some of the work, which seems to be a profitable strategy (Jylhä et al., 2020). In countries with strong forest industries, FEs are often considered by other stakeholders as an extension of their clients' operations and, in some cases, this is also their own self-perception (Drolet & LeBel, 2010).

(B) Values and Discourses. The original purpose of this category was somehow inspired by third parties that pushed for the development of FEs: large-scale forest companies in the 1980s and early 1990s, and, later, public forest owners and managers outsourced most of their harvesting operations, as a consequence of reform processes aimed basically at improving efficiency by reducing costs and improving the productivity of forest operations, but also to gain greater capacity flexibility and reduce the bounded capital in expensive machinery (Ambrušová & Marttila, 2012; Eriksson et al., 2015; Teder et al., 2015). Although efficiency was gained by large forest companies and state organisations, a general issue of low profitability afflicts FEs. Some of these enterprises react by innovating their business model, starting from the value proposition, as they begin to carry out other activities complementary to forestry, such as land maintenance works, tree climbing, transport for third parties, or high-value and small-scale timber processing (Šporčić et al., 2017; Ungerböck et al., 2015). According to some studies, the successful business strategy of FEs is based on increasing knowledge through learning orientation, enabling continuous understanding of the surrounding environment and the attitude of innovation, together with strengthening organisational capacity, which is specifically referred to as the effort to operate in the most rational way as to reduce costs (Blanc et al., 2019; Sikora et al., 2016). Interestingly, a study revealed that FEs exhibit a "clan corporate culture", which can be summarized with the use of team thinking, the implementation of individual development programs for employees, and the focus on creating a friendly work environment (Lorincová et al., 2020). Cooperative FEs are based on further values such as mutual help, self-responsibility, democracy, equality (one member-one vote principle), equity, and solidarity and can therefore be inclined to other ethical values of honesty, openness, social responsibility, and caring for others (Tuominen et al., 2008).

(C) Rules. FEs can normally be described as micro and small–medium enterprises (MMEs and SMEs). These categories, introduced by EU recommendation 2003/361, are broad: many different legal forms can belong to them, and FEs can be companies with limited or full liability of the owners. FEs can be organized as cooperatives, a model characterized by involving the workers as members, i.e., simultaneously owners, controllers, and economic participants of the enterprise, whose activity

is conducted with a prominent mutualistic scope (Hicks et al., 2007; Trigkas et al., 2020). Cooperative FEs have more structured internal governance, with decision-making authority assigned to a board, or eventually delegated to a CEO, and operational roles for other workers, whereas smaller FEs seem to have a simplified governance structure, where the owner(s) could be at the same time a worker and the team leader in the field.

(D) Power and Resources. FEs' performance is mainly oriented toward productivity improvement and technical and operational efficiency to achieve cost reduction. Small FEs must struggle with low profitability, originating from the frequent use of tendering by their customers, which creates tough price competition, especially because each contractor's radius of operations is limited to a few customers in the region (Eriksson et al., 2015; Jylhä et al., 2020), but also because they have limited power to negotiate for favourable contract terms and worksites with the large forest companies. Harvesting companies' activities are subject to weather conditions, strive for high investment costs for machinery, and often have limited internal business skills (Hull & Ashton, 2008; Kronholm et al., 2021; Trigkas et al., 2020). However, other authors describe FEs with high adaptation capacity, due to learning orientation and organisational capacity, that allow them to precede competitors with new ideas and encourage business development and diversification, also thanks to adequate structures, capital, and skills to carry out activities complementary to forestry (Blanc et al., 2019; Sikora et al., 2016; Ungerböck et al., 2015).

Looking beyond their primary profit goal, from a more general socio-economic perspective, especially in disadvantaged rural areas, small forest enterprises can play a key role in the development of multiple dimensions of economic, environmental, and social prosperity at the local level (Sanchez Badini et al., 2018), they significantly contribute to guaranteeing employment and managing land with positive environmental effects, including hydrogeological protection, biodiversity, and carbon storage (Blanc et al., 2019).

### *3.3.6 Other Organizations*

Some other organisational categories were detected within the 66 articles; however, it was impossible to complete their description, following the analytical framework, because of too scarce data reported in those papers, where they were just cited without deepening their characteristics. In this subsection, some information extracted from the reviewed articles on those other categories are reported.

ENGOS were found in two articles, focusing on their role and organisational adaptation, following changes in forest governance and policy. The role is recognized in participatory processes, established to address the diversity of interests among forest stakeholders that increased as the forest management

objectives expanded in the last twenty years (at least), with the implementation of the sustainable forest management concept (Lindstad, 2018). ENGOs typically have a role in forest management as key stakeholders that can challenge forest managers and policy makers; however, they can also assume a direct role in forest management, being designated by forest owners (private, normally) to carry on management projects typically oriented to nature protection. Interest groups such as ENGOs developed a multilevel structure to improve democracy while increasing their ability to face multilevel governance characterizing the European forest sector, eventually structuring federations or participating in umbrella organisations (Juerges & Newig, 2015).

Model forests is another organisational model, described in one article, mainly characterized by a governance arrangement that, associating a broad range of stakeholders among which consensus is established, works to ensure the sustainable development of the community on a territory characterized by forests, where forest management is carried out with highly participative decision-making processes. The organisational aspect is seen as the formation of mechanisms for sustainable forest management and for the improvement of the forest planning system, combining knowledge, resources, and experience for research in the field of forestry, introducing new methods of balanced forest management, and taking into account their own and public interests and features of a particular region (Cherchyk et al., 2019). Innovative organisational and business models are described in a study, in Austria and the UK, where very small, even one-man, companies develop new forest-related offers, mostly based on NWFP, which are sold not for their sole utility, but as carriers for an experience which is demanded by the customers. These businesses succeed by riding the wave of new interest in personal interaction in the use of NWFPs and reveal new opportunities and ways of using goods coming from the forest (I. Živojinović et al., 2020), embedded in very flexible and intersectoral organisational and business models, basically relying upon contracts between these small entities and other actors (i.e., public authorities, other local organisations).

Although certification schemes, such as FSC and PEFC, have a consolidated and unquestionable role in forest management in Europe, surprisingly, none of the 66 articles mentioned them clearly focusing on organisational characteristics related to them or to organisations certified according to their standards, apart from a work in which the arrangement for forest certification groups was described. In Lithuania, the “Group certification manager” was legally recognized as a non-profit nongovernment organisation under the Law of Public Institutions, promoted by five wood processing firms that needed certified timber. Today, more than 180 individuals and legal persons have joined the group, all representing 90,000 ha of managed private forestland. The manager, who is not allowed to participate in any political debate related to forests, is appointed for sustainable forest management,

advising forest managers on the implementation of certification requirements and developing cooperation between PFOs themselves, forest managers, and industries (Pivoriūnas, 2021).

### 3.4 Discussion

Organizational adaptation and development can be recognized within the literature as responses to some of the challenges that occurred in the forestry sector in the last decades, either as necessary evolutions in response to drastic changes or as strategic choices for innovation and growth. Some dynamics are more recognisable and described in the literature, such as the development of PFOOs following the privatization of forests in former Soviet republics and Balkan countries; the establishment and development of FEs following outsourcing of forest operations by large forestry companies, or the establishment of umbrella organisations, first at the national level, then at the European level, for policy influencing. Others followed different development paths: the development of CFs, CFEs, and CBFEs in the United Kingdom; the evolution and reorganisation of ENGOs, adapting to changes in forest governance; the evolution of SFMOs toward multifunctional management models; the growth and diversification of FEs.

Organizations change over time, adapting to external changes and reshaping themselves to better suit new needs and purposes, through a process that is called organisational learning (Dedeurwaerdere, 2009). Powell and DiMaggio (Powell & DiMaggio, 1991) theorized that isomorphism is the reason why organisations change, through normative, coercion, or mimetic processes. This work did not explore these concepts and dynamics, but they are emerging from the literature review as fundamental aspects to be considered and further investigated.

A multitude of organisational types (names) were observed within the literature for forest management organisations. After a deeper analysis of their characteristics, a categorisation has been proposed based mainly on the identification of the members and on the relationship of the organisation with forest owners, and also subsequently on the purpose (e.g., to distinguish some SEs from FEs). Finally, at least three “axes” emerge to qualify the actors and the purpose on which a categorisation can be based, apparently dichotomously:

- The legal nature of actors, with two relevant sub-dimensions:
  - The distinction between public, private, and third sector (private, but oriented to public utility);
  - The distinction between legally recognized ‘formal’ organisations and informal organisations which have no legal recognition (e.g., households, certification groups).

- The relationship with forest owners, which may be internal to the organisation (members) or external (partner/client/contractor);
- The purpose, between the profit/not-for-profit dichotomy.

It is difficult to establish a priority among these criteria for a categorisation; rather, it seems useful to emphasize the importance of considering them all, at least to correctly characterize the categories identified.

As anticipated in Section 2.2.2, some more organisational ‘typologies’ were detected within the 66 articles, but the results were too poor to allow a complete analysis to describe their organisational model according to the framework and to present one or more additional categories. The proposed categorisation is far from being a complete representation of the organisational models for forest management organisations in Europe, missing some surely relevant typologies such as those cited in Section 3.6, namely, ENGOs, Model Forests, and certification groups, and probably some more that did not even result within the literature review. Another missing category could be defined as “umbrella organisations”, but that includes quite a variety of organisations. Some examples were cited within the articles and reported in Section 3, when related to the analysed categories; however, it could be worth recognizing them as a category, encompassing umbrella organisations that connect forest owners/managers and other local forest organisations for supporting the members in relation to their general interests (as forest owners: CEPF, EUSTAFOR, USSE, FECOF, ...); or in specific fields of policy action such as certification (FSC, PEFC, Plockhugget, Naturland, ...); research and innovation policy (Forest-based Sector Technology Platform, Innovawood, European Wood Policy Platform); or environmental protection (FERN, Forest Movement Europe), Taiga Rescue Network, Association Internationale Forêts Méditerranéennes, ...).

Even the choice of the categories proposed was surely determined (and limited) by the results of the semi-systematic literature review, and some shortcomings were accepted in this work. The SFEs category, for example, is very specific, recognized within six articles, presenting enterprises legally recognized as nonprofit, operating forest management, and established for social or/and environmental purposes. However, in this review, no mention was found for “B-corps”, a typology that is growingly interesting also for the forest sector, which would share the same characteristics of SFEs, apart from not being necessarily nonprofit, since also for-profit companies can obtain the certification ‘B-corp’. Similarly, some environmental organisations could assume forest management responsibilities, therefore being very close to the SFE concept, but they are not enterprises; hence, another category for nonentrepreneurial forest management organisations should be recognized, but none of them was detected within this review.

However, the objective of this categorisation was to test the application of the conceptual framework of “organisational model” to propose it for a comprehensive representation of an organisational arrangement, rather than complete a full assessment of all the organisations involved in forest management throughout Europe. Therefore, some considerations on the framework, detailed per each of its four (plus one) key dimensions, are displayed.

### *3.4.1 Actors*

Within the four key internal analytical dimensions of the conceptual framework, “actors” have a central position. The six categories of forestry-related organisations were identified according first of all to two main criteria: who the members are and who the forest owners are, the two being sometimes coincident, as for the case of SFMOs, PFOOs, and CFs, and otherwise being separate, as for CBFs, SEs, and FEs. These two variables are independent in the framework, while most of the others depend on members’ choices, apart from laws, that are determined by the external context. Forest ownership is a major matter of concern in the field (Sarvašová et al., 2015; United Nations (UN) & Food and Agriculture Organization of the United Nations (FAO), 2019; Weiss, Lawrence, Hujala, et al., 2019; Ivana Živojinović et al., 2015), and a first distinction is due between public, private, and collective actors. Beyond the motivation of the members, which was identified as a key feature already in the first part of this research, forest owners’ attitude toward the organisation is also another important trait, sometimes separated from the former. Forest owners can assume different roles and have an important influence depending on their direct participation in the organisation or not and on their interest toward their forest property and management. These latter range from active owners fully engaged in forest management and operations to owners participating only in the organisation’s governance, to absent owners only interested in holding their property rights, eventually earning some profits deriving from a delegated management. External networks and partnerships, formalized or not, are also frequently indicated as a very relevant variable regarding “actors”, and are in some cases a critical one to achieve the organisation goals, thus influencing an organisation’s power, such as the case of “umbrella” (or second-tier) organisations of PFOOs aiming to influence policy making. Clearly, for organisations establishing external business activities, i.e., selling products and services, clients assume a key role. Communication, which is closely related to organisational values and discourses, is a key feature in any case to empower a selling strategy, to achieve educational objectives (Liubachyna et al., 2017), and to improve reputation (Referowska-Chodak, 2020), therefore also influencing organisational power, especially with respect to external actors. Nevertheless, only a few articles focused on these two features that result quite neglected: this could

be misleading, especially considering harsh conflicts often rising around forest management activities that could be better addressed with proper communication strategies.

### 3.4.2 *Values and Discourses*

Variables describing this key dimension are extensively detected in the literature. The reasons why an organisation exists and its members work together, are often highlighted as a key aspect and represented the third criterion to establish the categories proposed, the first and second being, respectively, the identification of members and forest ownership. The ultimate purpose of an organisation can be categorized between profit or nonprofit; however, such a sharp and simple definition misses the relevant research for multiple purposes that are typical, for example, of CFs and SEs, but also of SFMOs (Liubachyna et al., 2017; Referowska-Chodak, 2020; Siegner et al., 2021; Vega & Keenan, 2014; Zhang et al., 2021). The purpose of organisations is based on the personal values of their members (of the founders at least) and participating in the effort for their achievement is a fundamental choice of individual members, resulting in a value proposition for the organisation's clients and stakeholders.

“Internal key values” are a distinctive variable (grouped into the “discourses” dimension) established by the organisation, which are very important for PFOOs (R. Hansmann et al., 2016; Malovrh et al., 2017; Põllumäe et al., 2019; Rauch & Gronalt, 2005), CFs (Bassi & Carestiato, 2016; Lawrence, Gatto, et al., 2020), and SEs (Siegner et al., 2021; Zhang et al., 2021). These values have a strong influence on internal informal rules, another key variable that is very important for CFs and CBFs, but also in SEs, i.e., those categories evidently characterized by decision-making strongly reliant on values.

Business strategy is another characteristic emerging from the analysis, regarding not only the products and services offered (the value proposition), but also about the organisation's decisions to improve performance or for developing the business (Blanc et al., 2019; Pivoriūnas, 2021; Teder et al., 2015). It seems appropriate to add this variable to the framework, belonging to the dimension “values and discourses”, but also to the “power and resources” (since it is intentionally determined by the decision makers of the organisation) and “actors” (which are typically client-oriented) key dimensions.

### 3.4.3 *Rules*

Most of the articles simply describe the specific organisational subject mainly referring to a legal entity, according to specific national laws, somehow assuming that the legal definition is implicitly and completely representing the whole arrangement and it is enough to explain everything of an organisational model. Laws define how organisations can acquire a legal status and partially regulate



the organisational process. The legal framework unquestionably influences the organisational processes of formal organisations, starting from their constitutive operating decision and lasting throughout their life, demanding compliance with several general and specific norms. Nevertheless, it also indirectly influences informal organisations, for instance, because they are not allowed to conduct what is established to be prerogative of legally recognized entities. The legal perspective may bring about a precise identification of some key features of an organisation, such as liability for the entity itself and for its members. However, the sole legal definition seems an insufficient criterion to define and describe organisations since it does not represent who the key actors are, but rather only partially indicates what is the purpose, how it works, and why it exists. Despite these gaps, the formal identification of an entity, its property rights, and assets, which are typically legal features, is essential also for organisations in the field of forest resources management, where informal entities are relevant, though. In Europe, especially in some countries, there are huge forests managed only at a household level, while others are abandoned by owners, in forest contexts characterized by fragmented and reduced size, which cannot be properly managed with an entrepreneurial approach (European Commission, 2008). This basic problem is often addressed with normative initiatives for the adoption of organisational models that group small owners to encourage more organized and effective management (Malovrh et al., 2017; Pivoriūnas, 2021).

However, variables related to the dimension “rules” are not only those defining the mere legal form, but they also frequently refer to governance structures, often meaning internal governance arrangements. These are the “means by which to infuse order, thereby to mitigate conflict and realize mutual gains” (Williamson, 2003), to define decision-making processes and roles and distribute power and responsibilities (Butler & Current, 2021) in a continuum of solutions between hierarchical and democratic governance structures, thus originating vertical vs. horizontal distribution of responsibilities. Formalized internal rules and regulations can be a very important feature, as reported for CFs (Agrawal & Ostrom, 2001; Bassi & Carestiato, 2016), including disincentives and coercion (sanctions) as enforcement tools; meanwhile, positive incentives can be effective tools to motivate people and organisations, as an alternative to hierarchies (Vega & Keenan, 2014).

#### *3.4.4 Power and Resources*

Forest management responsibility emerges in all categories analysed as a key variable influencing the power distribution, that is, first, who is responsible for planning and second, who is designated to carry out forest operations. This specific feature was not included in the initial framework, but looking at the results it seems appropriate to integrate within the key dimension of “power and resources”. Financial sources (and performances), even if it could seem obvious, is cited as a critical feature in

many articles (Blanc et al., 2019; Drolet & LeBel, 2010; Kajanus et al., 2019; Liubachyna et al., 2017; Macqueen, 2013; Teder et al., 2015), basically influencing the possibility to carry out actions and operations. Similarly, the structure is a key aspect, highlighted within all the categories analysed, most of which are struggling with cost reduction as a primary strategy. A dichotomous representation of the “costs structure” as either capital- or labour-intensive organisations results from the literature on forest management organisations. Incentives are frequently mentioned as fundamental tools to support forest management organisations, sometimes even as triggering factors for the formation of some associations, as in the case of PFOOs (Milijic et al., 2010; Sarvašová et al., 2015). With the exception of a work specifically analysing power in forest governance (Juerges et al., 2020), the three constitutive elements of power proposed within the ACP approach, namely, coercion, (dis)incentives, and dominant information, were rarely cited, revealing a scarcity of studies on power dynamics, both in terms of internal organisational dynamics, and with respect to interactions between forest management organisations.

Decision-making power, in contrast, was a frequently reported feature, mostly related to internal governance structures, that is, the assignment of roles and responsibilities, in articles discussing PFOOs, where sharing (or not) decision-making power with forest owners is a key choice that shapes the organisational model (Dedeurwaerdere, 2009; R. Hansmann et al., 2016). In CFs, the allocation of decision-making power is a constitutive trait to empower communities that recognize their right to administer their land (forests) administration (Ambrose-Oji et al., 2015; Bassi & Carestiato, 2016; Bissonnette et al., 2018; Siegner et al., 2021).

#### *3.4.5 Other Key Variables*

Many articles discuss (or even cite) business models as a key topic for forest management organisations, intending to describe “the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners to create marketing, and deliver this value and relationship capital, to generate profitable and sustainable revenue streams” (Osterwalder et al., 2005). The business model is a separate concept from “organisational model”, though it is based on organisational choices and, according to the broad conceptualisation proposed, it could be considered a part of the whole, with respect to the concept of the “organisational model”. The business model is a representation from another perspective; however, its variables describe what an organisation does (the value proposition, nested in the “discourses” dimension of the framework), addressing who (the clients and beneficiaries, which is a characterizing variable within the “actors” domain) and by which means (these latter refer to the key dimension of “power and resources”), finally focusing on revenues and costs, which in turn are a measure of output and inputs of an

organisation's activity. It should be noted that considering the mixed economic nature of forest ecosystem services, encompassing many nonmarketable services, forest management organisations' business should not only be analysed as "traditional" capitalistic businesses (that is certainly the case of many FEs). The business model concept should also be extended to social business and civil society-oriented business, where the word "business" is brought somewhere further from its traditional semantic domain, as in the case, once again, of some community forests and of some innovative forest-based activities carried out, for example, by charities, SEs, and CBFs in the UK (Ludvig et al., 2018; Miyagawa et al., 2018; Zhang et al., 2021) but also by SFMOs (Gatto et al., 2009; Liubachyna et al., 2017; Referowska-Chodak, 2020). The wider perspective of the organisational model seems to better capture this complexity, where an organisation's business is built on the values and choices, not only upon a mere profit purpose, but more research should probably be conducted on this.

As hypothesized in the conceptualisation, organisational forms are very sensitive to their context and coevolve with changes in their environment (Lewin et al., 1999). Therefore, the literature review confirms that the conceptualisation of the "organisational model" must be framed in a larger (and even more complex) dimension, which is the context: legislation and governance, social norms, and other actors and relationships, but also natural resources, global, and local environmental issues (Partelow, 2018). Into this frame, accepting a very general simplification, at least two more variables should be added, to describe this fifth key dimension: influences and impacts. In addition to the influence of context on organisations, their activities have an impact on the context: positive and negative impacts of forest management on the context can be recognized as another key variable of the framework. The capacity to provide multiple forest ecosystem services, together with the main value proposition, is counterposed to models that achieve one or a few ecosystem services, ultimately limiting the provision of some others. We can observe a differentiation between the identified categories: SFMOs manage forests to maximize many ecosystem services, that is, conservation of nature, protection of water and soil, cultural services, together with provisioning services (Liubachyna et al., 2017; Referowska-Chodak, 2020). Landscape conservation and cultural services are often management objectives for CFs (Bassi & Carestiato, 2016; Lawrence, Gatto, et al., 2020; Siegner et al., 2021) that frequently have positive social impacts, the latter explicitly addressed by SFEs (Siegner et al., 2021; Zhang et al., 2021), but cited also for CBFs and FEs (Ambrose-Oji et al., 2015; Blanc et al., 2019). Despite financial challenges, community-based (CFs and CBFs) and social-oriented (SFEs) models are reported to be definitely promising organisational solutions to manage and govern natural resources in ways that improve the lives of local communities and promote resource conservation, bridging forests (ecosystem services provider) and society (ecosystem services

receiver), thus expected to sustain a broad set of forest ecosystem services (Siegener et al., 2021; Zhang et al., 2021).

Ultimately, we identified five more variables that might be relevant for a comprehensive analysis of organisational models (Figure 3). The complete framework is represented in Figure 3.3, where organisational variables are assigned to each of the four inter-related key dimensions, framed into the context.

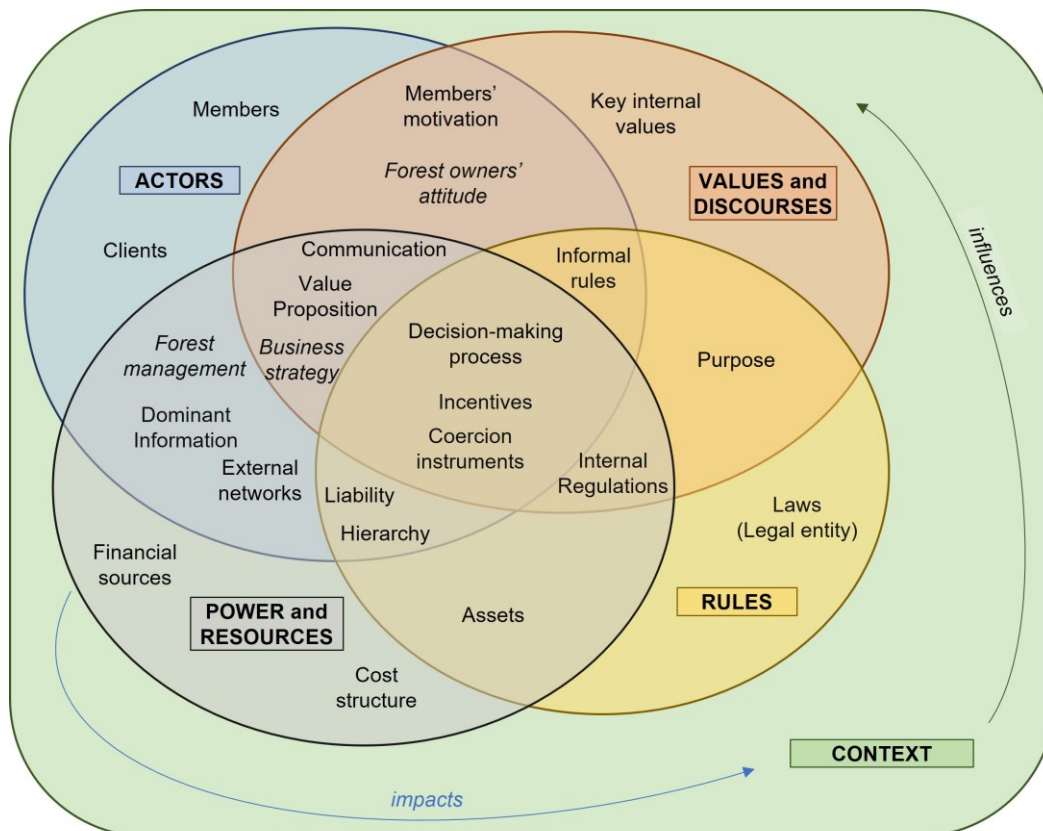


Figure 3.3. A refined conceptual framework to represent and analyse organisational models in the forestry sector (inspired by Arts et al. (Arts et al., 2006)).

### 3.5 Conclusions and Recommendations

As expected, no uniform conceptualisation of the “organisational model” was found in relation to the forest management domain in Europe. This paper is an attempt to clarify the foundations while embracing the complexity of organisational arrangements in this specific domain. “Organizational model” is conceptualised as a representation of the way one or more “actors” establish internal and external relationships, set order (“rules”), manage responsibilities (“power and resources”), to achieve their purpose (“discourses”), influenced by a “context” that, in turn, is impacted by their activity. Twenty-five variables were used to describe the various and diverse organisational models within European forest management organisations. Despite the fact that the word “model” could suggest the

search for a replicable representation, complexity is the major trait emerging from this conceptualisation, so generalization should be avoided. Organizations are complex entities, and considering them under a single perspective (e.g., the legal aspects or the business model) could be misleading if not acknowledging this incompleteness. It seems more appropriate to encourage a holistic approach, where the ability to assess, to develop, and to harmonize the multiple dimensions is the priority, rather than directly incentivizing the establishment or the replication of apparently successful organisational types and business models. A more open approach could also allow the recognition of innovation opportunities hidden within informal organisations.

Finally, the categorisation proposed is far from being a complete representation of the organisational models for forest management organisations in Europe; however, this analysis enabled an overlook of many different organisations, often indicated in the literature with different names, providing some (about twenty) detailed characteristics per each of them.

Many more topics related to organisational models were mentioned in the text, suggesting the opportunity for further research to be developed in this field. Meanwhile, some shortcomings of this research must be acknowledged: the first part dedicated to conceptualisation is based on quite a rapid and general design relying only on some of the existing theories. Synthesizing from all available theories, to structure a more solid new organisational theory was not the scope of this work; therefore, our conceptualisation is built just on portions of some theories. However, the semi-systematic approach was chosen to review the literature, whereas a full systematic review could better suit the goal of evaluating and classifying all the forest management organisations. Again, this was not the purpose of this research; rather, it is dedicated to proposing an attempt of comprehensive conceptualisation, suitable to draw a characterisation of forest management organisations, and other methodologies could improve both the conceptualisation and the categorisation.

**Supplementary Materials:** The following Supplementary materials are available after references: Table S3.1. Searches and results for the semi-systematic Literature review; Table S3.2. List of eligible articles selected at the end of the semi-systematic literature review process; Table S3.3 Categorization and analysis of organisational models identified through semi-systematic literature review in the European forestry sector.

**Author Contributions:** Conceptualization: F.L., L.S., D.P.; Methodology: F.L., L.S.; Formal analysis and Data curation: F.L.; Writing- draft: F.L., L.S.; Writing - review: F.L., L.S. D.P.; Visualization: F.L.; Supervision: L.S., D.P.. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was developed within the PhD program at the LERH (Land, Environment, Resources, and Health) School, financed by the University of Padova, and did not receive external funding.

**Conflicts of Interest:** The authors declare they have no conflict of interest.

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### 3.7 Supplementary materials

Table S3.1. Searches and results for the semisystematic Literature review.

Search "blocks"	Query string	Date	Filtered results	n° selected by Title	n° selected by Abstract	Duplicates	n° Full reading	n° ELIGIBLE ARTICLES
Block 1	Organi?ation W/3 model AND forest	13-lug-21	73	18	10	0	10	6
Block 1	Forest AND actor* OR stakeholder* W/1 organi?ation	16-lug-21	181	26	12	0	8	6
Block 1	forest AND business W/1 ecosystem*	21-lug-21	158	20	7	0	4	4
Block 1	Forest AND company OR firm OR enterprise OR business W/1 organi?ation	05-ago-21	55	16	6	1	4	2
Block 1	forest* AND organi?ation* AND review AND actors OR firm OR com pan* OR enterprise	24-ago-21	91	9	9	1	8	5
Block 2	Forest* AND organi?ation* W/1 model	20-set-21	33	13	5	3	0	0
Block 2	forest* AND organi?ation* W/1 form	20-set-21	37	11	4	0	3	2
Block 2	forest* AND organi?ation* W/1 type	20-set-21	29	10	6	1	3	2
Block 2	forest* AND organi?ation* W/1 governance	21-set-21	15	8	1	0	0	0
Block 2	Forest AND governance W/1 structure	24-ago-21	153	24	5	2	1	1
Block 2	forest* AND business W/1 model	21-set-21	129	48	27	2	9	9
Block 3	forest* AND owner* W/1 organi?ation OR association	22-set-21	74	17	12	3	9	6
Block 3	model W/1 forest* AND organi?ation	22-set-21	128	14	2	0	2	1
Block 3	Community W/1 forest AND organi?ation	22-set-21	93	14	2	1	1	1
Block 3	Forest AND Social W/1 enterprise AND organi?ation	22-set-21	10	6	3	2	1	1
Block 3	Forest W/1 enterprise AND organi?ation	22-set-21	77	20	12	6	6	3
Block 3	Forest W/1 harvest* AND organi?ation	22-set-21	62	4	2	1	1	1
Block 3	Forest W/1 firm AND organi?ation	22-set-21	18	6	3	0	3	2
Block 3	Forest W/1 common* AND organi?ation	22-set-21	42	6	1	0	1	1
Block 3	Forest W/1 cooperative* AND organi?ation	22-set-21	21	14	5	1	4	3
Block 3	Forest W/1 ENGO* AND organi?ation	27-mar-22	2	1	1	0	1	1
Block 3	Forest W/2 consorti* AND organi?ation	22-set-21	1	1	1	0	1	1
Block 4	Forest W/2 contract* AND organi?ation	22-ott-21	14	5	0	0	0	0
Block 4	Forest W/2 network* AND organi?ation	22-ott-21	53	15	6	1	4	4
Block 4	Forest W/2 partnership* AND organi?ation	22-ott-21	26	17	4	2	2	1
Block 4	Forest AND collaboration AND organi?ation	27-ott-21	171	41	4	1	3	2
Block 4	Forest W/1 alliance* AND organi?ation	22-ott-21	6	4	0	0	0	0
Block 4	Forest W/1 agreement* AND organi?ation	15-dic-21	13	9	3	0	3	0
Block 4	forest* AND supply W/1 chain W/1 organi?ation	22-set-21	2	2	1	0	1	1
<i>TOTAL number of articles resulting after search and selections</i>			1767	399	154	28	93	66

Table S3.2. List of eligible articles selected at the end of the semisystematic literature review process.

Search block	Title	Journal	First Author	Year	ORG Categories found	Study area
1	Common property organisations as actors in rural development: A case study of a mountain area in Italy	International Journal of the Commons	Bassi, I.	2016	CFs	Italy
1	Comparing polycentric configuration for adaptive governance within community forests: Case studies in Eastern North America	International Journal of the Commons	Bissonnette, J.F.	2018	CFs	Eastern North America + General
1	Evolution of Community-Based Enterprise Governance Over Time: Lessons Learned from the Maya Biosphere Reserve	Small-Scale Forestry	Butler, M.	2021	CFs	World
1	Hybridity and integration in local collective action: an analytical framework	International Review of Administrative Sciences	Divay, G.	2018	n.e.	General
1	Forest harvesting entrepreneurs, perception of their business status and its influence on performance evaluation	Forest Policy and Economics	Drolet, S.	2010	FEs	Canada
1	'Sharing the space' in the agricultural knowledge and innovation system: multi-actor innovation partnerships with farmers and foresters in Europe	Journal of Agricultural Education and Extension	Fieldsend, A.F.	2021	n.e.	EU
1	Payments for forest environmental services: Organisational models and related experiences in Italy	I Forest	Gatto, P.	2009	Others	Italy
1	What can we learn from business models in the European forest sector: Exploring the key elements of new business model designs	Forest Policy and Economics	Kajanus, M.	2019	n.e.	General
1	Management Goals and Performance: Clustering State Forest Management Organizations in Europe with Multivariate Statistics	Forestry	Liubachyna, A.	2017	SFMOs	Europe
1	Social innovation in the Welsh Woodlands: Community based forestry as collective third-sector engagement	Forest Policy and Economics	Ludvig, A.	2018	SFEs	Wales
1	Different organisational models of private forest owners as a possibility to increase wood mobilization in Slovenia and Serbia	Croatian Journal of Forest Engineering	Malovrh, Š.P.	2017	PFOOs	Slovenia and Serbia
1	Organization of private forest sector in Timok forest area	Annals of Forest Research	Milijic, V.	2010	PFOOs	Serbia
1	The organisation of nature conservation in state-owned forests in poland and expectations of polish stakeholders	Forests	Referowska-Chodak, E.	2020	SFMOs	Poland
1	Coopetition Strategy—When is it Successful? Empirical Evidence on Innovation and Market Performance	British Journal of management	Ritala, P.	2012	Forest firm	Finland
1	Critical success factors for small and medium forest enterprises: A review	Forest Policy and Economics	Sanchez Badini, O.	2018	FEs	General (Developing countries)
1	Failures of political decentralization in promoting network governance in the forest sector: Observations from Italy	Land Use Policy	Secco, L.	2017	SFMOs	Italy
1	Net-system' models versus traditional models in NWFP marketing: The case of mushrooms	Small-Scale Forestry	Secco, L.	2009	Others	Italy
1	The effect of entrepreneurial and learning orientations on financial performance in a transition economy: evidence from forest contracting firms in southern Poland	Scandinavian Journal of Forest Research	Sikora, A.	2016	FEs	Poland
1	Current Status and Perspectives of Forestry Entrepreneurship in Croatia	South-East European Forestry	Šporčić, M.	2017	FEs	Croatia
1	Climate change governance in forestry and nature conservation in selected forest regions in Serbia: Stakeholders classification and collaboration	International Review of Administrative sciences	Stanišić, M.	2021	n.e.	Serbia
1	Organization types and corporate social responsibility reporting in Finnish forest industry	Social Responsibility Journal	Tuominen, P.	2008	FEs	Finland
1	Transaction cost theory of the firm and community forestry enterprises	Forest Policy and Economics	Vega, D.C.	2014	CFs	Mexico + General
1	Innovation governance in the forest sector: Reviewing concepts, trends and gaps	Forest Policy and Economics	Weiss, G.	2021	n.e.	General

2	Supporting changes in the Slovenian wood sector by introducing timber logistics centers	International Journal of Globalization and Small Business	Cvathe, T.	2015	FEs	Slovenia
2	The Effects of Regional Forest Owner Organizations on Forest Management in the Swiss Canton of Lucerne	Small-Scale Forestry	Hansmann, R.	2016	PFOOs	Switzerland
2	How interest groups adapt to the changing forest governance landscape in the EU: A case study from Germany	Forest Policy and Economics	Juerges, N.	2015	Others	General
2	Characterization of forestry contractors' business models and profitability in Northern Sweden	Scandinavian Journal of Forest Research	Kronholm, T.	2021	FEs	Sweden
2	Community forest governance: a rapid evidence review	Report Pub. from Forest Research—the Forestry Commission	Lawrence, A.	2012	CFsry	UK
2	Back-casting for desirable futures in Finnish forest-based firms	Foresight	Näyhä, A.	2021	Forest firm	Finland
2	Finnish forest-based companies in transition to the circular bioeconomy - drivers, organisational resources and innovations	Forest Policy and Economics	Näyhä, A.	2020	Forest firm	Finland
2	Forms of cooperation of Lithuanian forest owners: A case review	Baltic Forestry	Pivoriūnas, A.	2021	PFOOs	Lithuania
2	Empirical accounting of adaptation to environmental change: Organizational competencies and biodiversity in Finnish forest management	Ecology and Society	Primmer, E.	2009	n.e.	Finland
2	Reengineering the Romanian timber supply chain from a process management perspective	Croatian Journal of Forest Engineering	Rauch, P.	2020	Supply chain	Romania
2	Forest Owners Associations in the Central and Eastern European Region	Small-Scale Forestry	Sarvašová, Z.	2015	PFOOs	Czech Rep., Latvia, Estonia, Hungary, Lithuania, Romania, Slovakia
2	Community forest enterprises and social enterprises: the confluence of two streams of literatures for sustainable natural resource management	Social Enterprise Journal	Siegner, M.	2021	CFsry	World
2	Business model for developing strategies of forest cooperatives. Evidence from an emerging business environment in Greece	Journal of Sustainable Forestry	Trigkas, M.	2020	FEs	Greece
2	Experiencing forest products – An innovation trend by rural entrepreneurs	Land Use Policy	Živojinović, I.	2020	Others	Austria, UK
3	Interactions between organisations and networks in common-pool resource governance	Environmental Science and Policy	Agrawal, A.	2013	CFs	India
3	Community based forest enterprises in Britain: Two organizing typologies	Forest Policy and Economics	Ambrose-Oji, B.	2015	CFsry	UK
3	Actors' Potential for Change in Slovenian Forest Owner Associations	Small-Scale Forestry	Aurenhammer, P.K.	2018	PFOOs	Slovenia
3	Performance analysis of logging enterprises operating in the western Italian alps	Quality Access to Success	Blanc, S.	2019	FEs	Italy
3	Still going strong, community forests in Sweden	Forestry	Carlsson, L.	1999	CFs	Sweden
3	Social learning as a basis for cooperative small-scale forest management	Small-Scale Forestry	Dedeurwaerdere, T.	2009	PFOOs	Belgium
3	Private forestland owners in Sweden: Large-scale cooperation in action	Journal of Forestry	Kittredge, D.	2003	PFOOs	Sweden
3	How are Swedish Forest Owners' Associations Adapting to the Needs of Current and Future Members and Their Organizations?	Small-Scale Forestry	Kronholm, T.	2016	PFOOs	Sweden
3	Influence of organisational culture on firm efficiency: competing values framework in Croatian forestry	Scandinavian Journal of Forest Research	Landekić, M.	2015	FEs	Croatia
3	'What's in it for me?' — Contrasting environmental organisations and forest owner participation as policies evolve	Forest Policy and Economics	Lindstad, B. H.	2018	ENGO	Norway
3	Defining the differences in corporate culture in wood-processing and forest enterprises	BioResources	Lorincová, S.	2020	FEs	Slovakia
3	Private Forest Owner Typologies in Slovenia and Serbia: Targeting Private Forest Owner Groups for Policy Implementation	Small-Scale Forestry	Malovrh, Š.P.	2015	PFOOs	Slovenia and Serbia

3	Strategic change in the forest industry towards the biorefining business	Technological Forecasting and Social Change	Näyhä, A.	2014	Consortium	Scandinavia + North America
3	Forest-owner support for their cooperative's provision of public goods	Forest Policy and Economics	Nilsson, J.	2020	PFOOs	Sweden
3	Challenges of Organizing Private Forest Owners in Serbia	Small-Scale Forestry	Nonic, D.	2011	PFOOs	Serbia
3	Institutional barriers in forest owners' cooperation: The case of Estonia	Forest Policy and Economics	Pöllumäe, P.	2016	PFOOs	Estonia
3	Reflections of active forest owners to the public-private forestry support system in Estonia	Forestry Studies	Pöllumäe, P.	2019	PFOOs	Estonia
3	Forest Management Cooperatives and Their Development Under Uncertain Conditions: A Comprehensive Analysis Using an Actor-Centered Institutionalism Approach	Small-Scale Forestry	Sonnhoff, M.	2021	PFOOs	Germany
3	The social networks of Irish private forest owners: An exploratory study	Forest Policy and Economics	Stoettner, E.M.	2019	PFOOs	Ireland
3	Structural changes of state forest management organisations in Estonia, Latvia, Lithuania, Serbia and Slovakia since 1990	Baltic Forestry	Teder, M.	2015	SFMOs	Estonia, Lithuania, Latvia, Serbia, Slovakia
3	Sustaining Forest Ecosystem Services Through Social Enterprises: Motivations and Challenges from a Case Study in Scotland	Small-Scale Forestry	Zhang, S.	2021	SFEs	Scotland
4	Optimization of the regional energy supply network: a multiobjective analysis in the province of Florence (Italy)	International Journal of Sustainable Energy	Bernetti, I.	2014	Supply chain	Italy
4	Management of outsourced forest harvesting operations for better	Forest Policy and Economics	Eriksson, M.	2015	FEs	Sweden
4	Fostering social enterprise in woodlands: Challenges for partnerships supporting social innovation	Forest Policy and Economics	Lawrence, A.	2020	SFEs	UK
4	Lessons and achievements from the Mersey Forest by networking partnership for twenty years	International Journal of GEOMATE	Miyagawa, T.	2018	CFs	UK
4	Evaluating organisational designs in the forestry wood supply chain to support Forest Owners' Cooperations	Small-Scale Forestry	Rauch, P.	2005	PFOOs	Switzerland
4	Efficient timber pricing and purchasing behavior in forest owners' associations	Journal of Forest Economics	Størdal, S.	2004	PFOOs	Norway
4	Forestry Organization Network in Northern Finland	Scandinavian Journal of Forest Research	Tikkanen, J.	2003	others	Finland
4	Looking beyond timber: Empirical evidence for the diversification of forest enterprises and the profitability of auxiliary activities in Austria	Forest Policy and Economics	Ungerböck, E.	2015	FEs	Austria

Table S3.3. (Part 1)—Categorization and analysis of organisational models identified through a semisystematic literature review in the European forestry sector.

Analytical dimensions	Variables	ORGANIZATIONAL MODEL'S CATEGORIES		
		SFMOs	PFOOs	Community forests
ACTORS	Members	The state, regional, and local administration	Nonindustrial private forest owners	Local communities
	Owners' attitude	Ownership in the interests of the public	Active forest owners (cooperative model) OR absent forest owners (shareholders' model)	Active in governance
	Formal external network	Other local administrations; SFMOs; 2 <sup>nd</sup> -tier <b>organisations</b> (EUSTAFOR)	<b>Umbrella organisations</b>	Second-tier <b>organisations</b> of community forests
	Clients	Timber and logging enterprises; sawmills	Sawmills	Not found (n.f.)
DISCOURSES	Purpose	To maximize forest ecosystem services' value for society through an efficient use of resources	Political influence/interest representation AND/OR improvement of/support to forest management	To benefit from the use of the common resources + stewardship of the rural area in which they are rooted
	Members' motivations	Politically addressed	Valuing ownership	Sustainably use collective resources to obtain personal benefit
	The value proposition	Timber and NTFP, commercial services (recreation, education) + (environmental) services without market	INTERNAL—Services for members (to guide and advise); EXTERNAL—Timber (raw material)	Forest products
	Communication	Implemented to reduce conflicts and inform people about services' provision	n.f.	n.f.
	Business strategy	Developing new business activities + outsourcing activities (reduction of costs)	Costs reduction (efficiency) + enhancement of marketing/contracting capacity	Direct use of the resources for internal needs and selling of the surplus
Key (internal) values	Public interest; efficiency	Trust	Resources and landscape conservation; tradition	
RULES	Legal entity	Joint stock companies; state agencies	Cooperatives or associations	Decentralization/devolution of forest rights to rural communities (special laws)
	Liability profile	Guarantee by shares	Limited	n.f.
	Governance structure	Hierarchical	Democratic (cooperative principles)	Endogenous <b>organisations</b>
	Decision-making	Influenced by political power	Cooperative-type (active owners) OR assigned to managers (delegating owners)	Not always clearly distinguished between BoD and the administrative staff
POWER/ RESOURCES	Assets (key resources)	Nature centers	Manager (Forester); employees	n.f.
	Cost structure	Tends to efficiency and reduction (outsourcing of many activities)	Oriented to costs reduction	n.f.
	Forest management responsibilities	Internal. FM plans developed by external consultants in smaller SFMOs	Individual owners directly plan and manage OR joint management (internal or external professionals)	Internal, but not clearly distinguished between members, employees, and board members
	Financial sources	Revenues from sale of products and services	Financial support from public funds + membership fees + revenues from selling of services	Revenues from selling of forest products (and services) outside the community
	Financial performances	Financially self-sufficient. Different performances among different countries and SFMOs	Not always financially self-sufficient	Financially self-sufficient
	Impacts and externalities	Providers of ecosystem services through effective sustainable forest management	Possible enhancement of FESs' provision + Contribution to sustainable regional development	Landscape conservation; open green spaces for the community; community empowerment

Table S3.3. (Part 2)—Categorization and analysis of organisational models identified through a semisystematic literature review in the European forestry sector.

Analytical dimensions	Variables	ORGANIZATIONAL MODEL'S CATEGORIES		
		Community forestry and CBE	Social enterprises	Forest enterprises
<i>ACTORS</i>	Members	Communities; communities with entrepreneurs	Social entrepreneurs; communities; groups of people sharing common values and vision	Forest workers
	Owners' attitude	n.f.	Attempting to bridge forests (ecosystem services provider) and society (ecosystem services receiver)	Often considered as an extension of their clients' operations. Profit-oriented
	Formal external network	n.f.	Forest owners	Second-tier <b>organisations</b>
	Clients	Other forest-based firms (for timber); retail customers, organisations, or individuals (for services)	Retail customers (depending on products and services produced); organisations, individuals	Bigger forest firms, forest owners (public and private)
<i>DISCOURSES</i>	Purpose	To produce benefit for a community by the management of forest resources	Multiple objectives: primary objective is to achieve social and/or environmental benefit	Productivity improvement, cost reduction, and technical and operational efficiency
	Members' motivations	n.f.	n.f.	n.f.
	The value proposition	Forest products; forest services; mixed	Forest services; forest products; mixed	Forestry operations (logging, transport) for third parties
	Communication	n.f.	n.f.	n.f.
	Business strategy	n.f.	Diversification: multiple-objective business: balancing social, environmental, and economical dimensions	Diversification + increasing performance through learning orientation and strengthening organisational capacity
	Key (internal) values	Care; cooperation; engagement	Solidarity; trust; care; cooperation	n.f.
<i>RULES</i>	Legal entity	Various. Small–medium enterprises, different company types	Charities, not-for-profit/social enterprises, cooperatives	Micro and small–medium enterprises (MMEs and SMEs), different company types according to national laws; cooperatives.
	Liability profile	Depending on the legal form: limited or unlimited	Limited	Depending on the legal form: limited or unlimited
	Governance structure	Democratic (participatory)	Structured with a board, frequently "flat" internal hierarchies	Very simple in MMEs: head (owner) of the company and workers. More structured (democratic) in cooperatives
	Decision-making	Assigned to managers/BoD with community involved	Assigned to a board/managers	In cooperatives, assigned to the board
<i>POWER/ RESOURCES</i>	Assets (key resources)	n.f.	Volunteers	Timber-harvesting machineries
	Cost structure	n.f.	High transaction costs (multiobjective strategy brings high costs)	Machineries' costs very relevant
	Forest management responsibilities	Internal, employing foresters, or contracting external professionals	The manager is responsible for considering the multiple interests of different stakeholders and balancing the objectives	Operational. Contracted by third parties only for forestry operations. Limited power to negotiate for favorable contract terms and worksites
	Financial sources	Revenues from selling of products and services	Commercial revenues + grants (financial security is a critical factor)	Tenders for contracts, paid by forest owners or by forest firms
	Financial performances	Financially self-sufficient	Not always financially self-sufficient	Financially self-sufficient, but afflicted by low profitability
	Impacts and externalities	Forest management activities focused on producing public benefits for the community (conservation, landscape values, recreation opportunities)	Able to effectively bridge forests (ecosystem services provider) and society (ecosystem services receiver); the social enterprise may enhance people's access to forest ecosystem services and safeguard the continuity of its provision	Potential role for local development (employment opportunity); key contribution to FM's positive environmental effects, such as hydrogeological protection, biodiversity, and carbon storage

## 4 Paper II) Associative organisational models to encourage forest management: urgent responses to land abandonment processes in Italy

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**ABSTRACT:** This paper investigates associative organisational models as possible governance solutions to contrast the problem of land abandonment. Land fragmentation, poor or missing management are recognised major issues that hinder forest stability and resilience in many countries, especially in Southern Europe, while land abandonment is a related critical factor that increases exposure to risks related to climate change, such as forest fires. After an overview of the European context, the paper focusses on Italy, where this problem is particularly relevant. Based on a qualitative content analysis of literature and policy documents, the paper describes solutions available to encourage active forest management through associations, according to indications by the Italian forest law. Several types of association and instruments to regulate partnerships exist, also thanks to recent policy initiatives, though poor data on land abandonment and forest ownership, especially private, hamper effective implementation and monitoring, as well as research on this topic.

**Key words:** fragmentation, associative solutions, associate forest management, private forest owners, governance, South Europe, Mediterranean countries.

### 4.1 Introduction

Land abandonment and ownership fragmentation, often accompanied by uncertainty about landownership, are important and related issues that hinder active forest management in some parts of Central East-Europe and in Mediterranean Europe (Lawrence, Gatto, et al., 2020), exacerbating the magnitude of impacts and risks of climate change, e.g. forest fires (Rodríguez Fernández-Blanco et al., 2022). Since in the most cases management of very small parcels is not profitable, many smallholders give it up, and the abandonment of secondary forests accelerates the loss of land value and fosters a vicious cycle that definitively depletes forest-related socio-ecological communities. Furthermore, an ideological polarisation between different visions of forests, often corresponding to urban vs. rural points of view, eventually contesting science and influenced by mass media, can

represent a further obstacle for the active management of forest landscapes (Pecurul-Botines et al., 2023). Various types of innovation have been supported through, for example, the EU RDP and CAP funds, to aggregate forest properties or to support forest-related supply chains and networks, in order to encourage more active forest management, including organisational, institutional, and social innovations. However, due to high management costs, difficult market conditions, adverse events, and more and more ‘absent’ forest owners (Mozzato & Gatto, 2016), these solutions have been as effective as expected in reaching the intended goals, and in certain countries such as Italy, the trend of land abandonment and fragmentation has continued over the decades despite the introduction of governance and policy tools.

This paper provides an update overview of institutional and contractual associative solutions proposed for the aim of reactivating forest management, with a focus on the Italian context, where this issue is recognised as a priority and, recently, some important political actions have been undertaken to address it.

#### 4.1.1 *An insight into the Italian context*

Italian forests are characterised by a majority of private owners (ca. 66%), with an average size of less than 3 ha/owner, scarcely investigated and known, compared to public forest ownership (Canton & Pettenella, 2010; Mozzato & Gatto, 2016; Rizzo et al., 2019). While 65% of the 34% of the public properties are municipal forests, only 24% of them are state-owned (or regional-owned) forests. More than 60% of Italian forests are located at an altitude above 500 metres, that is, in hilly and mountainous territories that have been characterised by heavy depopulation phenomena in recent decades (Amodio, 2022). Among the reasons that limit the economic and social opportunities that could arise from the use of the primary resources in these territories, the high land fragmentation has been recognised as a crucial driver (Rizzo et al., 2019; Secco et al., 2018). Frequently, land fragmentation means that management costs are higher than revenues that may be obtained by agricultural, agro-pastoral and forestry businesses, leading private owners to the choice of abandonment, which in turn brings a change in the ecosystem services provided by meadows, pastures, and forests (Beltramo et al., 2018).

Missing precise quantification, some statistical proxies can help to get an overall idea of the dimension of the problem. According to the 2022 ISTAT Agriculture Census, the Utilised Agricultural Area (UAA) decreased by -26.4% in the last 38 years (passing from 15.8 M ha in 1982 to 12.5 M ha in 2020) (ISTAT, 2022). In the total amount of agricultural land, Wooded Areas (WA) have always been an important function for traditional farming models, witnessing an integration between land cultivation activities and hydrogeological protection, use of timber for energy purposes,



production of pole wood, and occasionally of timber for own consumption and for sale. The available data show that, gradually, this farming model is disappearing, with a reduction in absolute and relative terms of WA (-8%): compared to the 1980s, when the WA covered 25%, in the 2020 it covers only 17% of the total agricultural land in active farms.

Data from the National Forest Inventory (Gasparini et al., 2022) complement the ISTAT Agriculture Census with more specific forest-related information. Looking at these data, a relevant gap emerges between the 9.0 million ha of ‘high forests’ reported in 2015 and the 2.9 million ha of WA in active farms estimated in 2020. This large gap (67%) between the agricultural census data and the data of the Forest Inventory is mainly due to the presence of ‘pure’ forest holdings, i.e. forest owners who do not have a farm, which have been excluded from the Census sample until 2010, thus eliminating one of the main (and few) sources of information on private owned forests (Mozzato & Gatto, 2016). However, even comparing WA data in the previous period (before 2010), the difference remains huge: 4.5 M ha according to the 2000 Census and 8.75 M ha according to the Forest Inventory (the closest available data refers to 2005). Other indicators confirm that a significant part of the national forest heritage is not managed or is managed in very extensive, occasional, unplanned terms: only 9.5% of coppices (that account for approximately 42% of the Italian tall trees forest) are in the ‘young’ phase and 0.1% are ‘in regeneration’, showing very limited activities; in 37.4% of the forest area no silvicultural intervention was detected and only 15.5% of the total forest area has a valid management plan (MIPAAFT, 2017; Gasparini et al., 2022).

In Italy, the land abandonment issue, together with the need for redistribution of abandoned farmland, was a ‘strong’ theme of rural development policies already since the first post-war decades (from the 1950s), culminating in Law No. 440 of 4 August 1978, which dictated rules for the use of uncultivated, abandoned, or insufficiently cultivated land. However, these policy instruments have not been effective in stopping or reversing the phenomenon, and land abandonment driven by urbanisation and industrialisation have continued, coupled with an increasing fragmentation of the ownership due to the heritage system. Therefore, more recently, lively regional legislation has tried to revive the theme with the recourse to governance and policy instruments. One example is the creation of land banks and other instruments for the reallocation of unused agricultural land (Povellato & Vanni, 2017), also for the purpose of boosting employment in rural areas, especially among young people. Though diverse initiatives exist, in general terms land banking policies are implemented by 13 countries in EU, such as the Portuguese Land Bank (*Bolsa Nacional de Terras*), established by the Government in 2012 (UN & FAO, 2019), meaning that an institution was given the mandate to acquire and sell agricultural land parcels from and to private landowners on the land market

(Hartvigsen et al., 2021). Another example of policy intervention to encourage the management of too highly fragmented forest holdings is the support to the establishment of forest owners associations, as in the Italian forest law L. 34/2018, where associated management is indicated as a way to aggregate fragmented properties and reactivate management of abandoned lands thanks to rationalisation of management costs (Brocca et al., 2023). The pulverisation of land, poor or missing hereditary transcripts, increase enormously the costs to aggregate an area suitable for management, with the consequence that the current market of forestland is substantially static. Costs are charged for identifying owners, contacting and obtaining their consent, negotiating prices, for taxes, while the sole notary and deed registration fees are often higher than the land market value. Furthermore, in recent decades, many “new” forests are growing on abandoned agricultural land (in mountain regions, many former pastures), mainly privately owned and characterised by pioneer shrub and tree species (FOREST EUROPE, FAO, 2020); the abandonment of land involves processes of forest ageing, growth of stocks, including death wood and natural spread of new species. Often, abandonment may be followed by fires (Spadoni et al., 2023) and increased vulnerability to pests and adverse weather events, such as the case of Vaia windstorm in 2018 in northern Italy and recent bark beetle attacks in several European countries.

## 4.2 Methods

Two separate methodologies, schematised in Figure 4.1, were used, respectively, to identify the main associative organisational solutions diffused in Europe to encourage forest management, and then for a deeper analysis carried out in the Italian context.

Initially, a rapid semi-systematic screening of the scientific literature was carried out to build an overview of the situation at the European level, following the PRISMA scheme (Page et al., 2021). The applied steps of this first methodology were: (1) identification of studies to be included, (2) selection of identified studies, (3) eligibility assessment, (4) full document reading, and (5) data extraction.

Between January and April 2023, 9 query strings for literature searches were selected and run into the scientific database Scopus, based on two keywords: “Forest AND organi?ation” plus some keywords added using the Boolean operator W/1 after “Forest” and linked with OR: “actor\*”, “owner\*”, “association\*”, “model forest\*”, “communit\*”, “cooperative\*”, “consortium”, “agreement\*”, “network\*”. Articles found were then screened according to three criteria, i.e. they had to: i) be focused on organisations associating forest owners; ii) be present within the text at least some organisational details about the legal form and iii) be present within the text at least some details on the internal governance arrangement. Only articles where all the three criteria were satisfied were

selected as relevant, then a deeper content analysis was carried out to identify and characterise different types of associative forest management organisations. The text reading and data extraction were based on a previously developed analytical framework that considers four key dimensions (Loreggian et al., 2023): i) actors: who the members are; ii) purposes: which objectives they aim to reach; iii) rules: the legal/formal framework; iv) distribution of power and resources (governance arrangements are considered within this dimension). Then, the identified types have been clustered into three (plus one) main categories: i) forest associations, ii) forest cooperatives and iii) other models for associate management of forest.

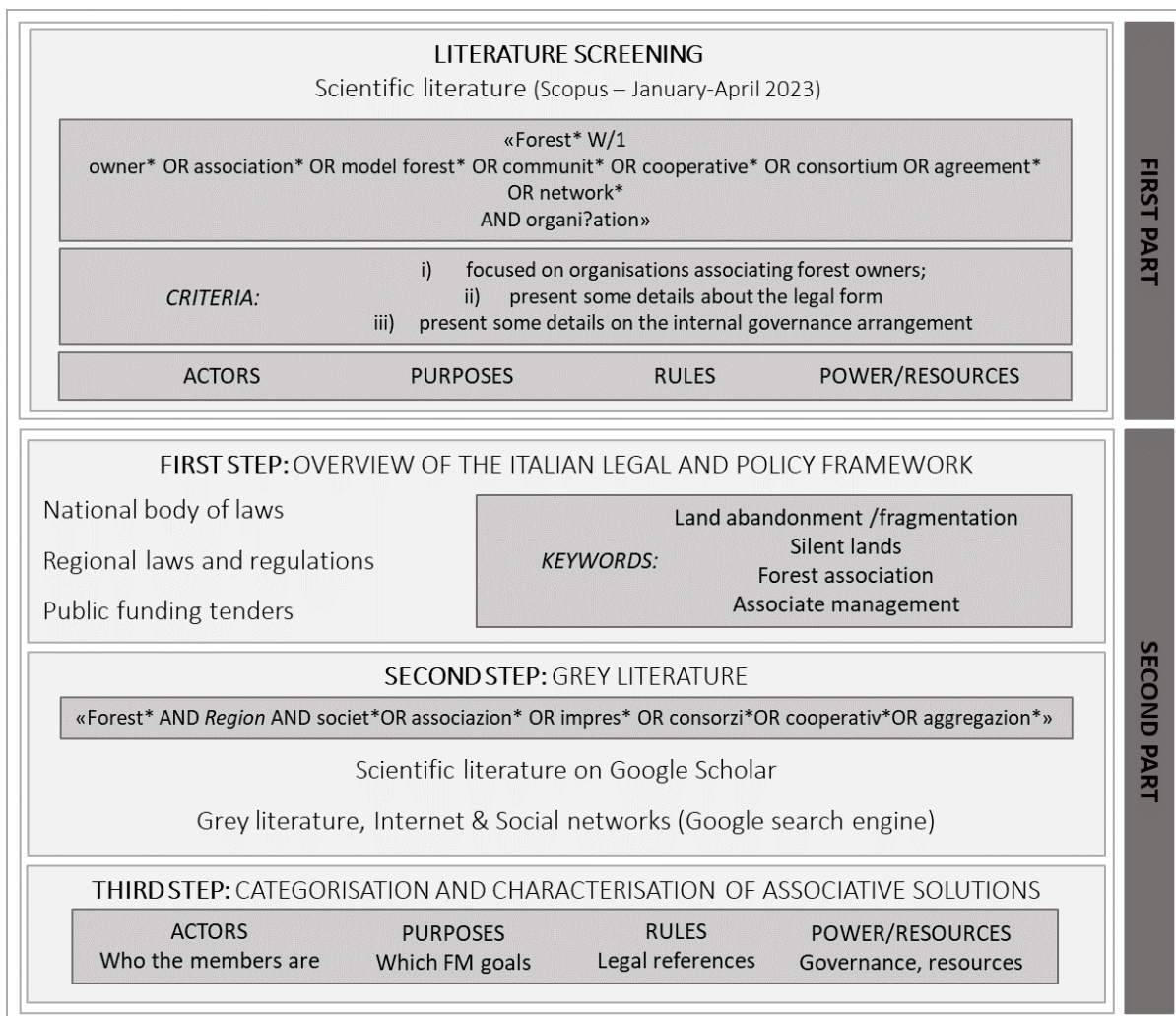


Figure 4.1. Scheme of the methodology (our elaboration).

The deep analysis carried out on the Italian context was based on a hybrid methodology, due to the scarcity of scientific literature available on organisational solutions in the forest sector in this country. In particular, the focus on Italy included three steps (schematised in Figure 4.1): first, a content analysis of the current Italian policy and legislation documents; secondly, a review of both scientific (but searched only on Google Scholar) and grey literature, including Internet sources, conferences,

reports of public events, newspaper's articles; finally, a categorisation and characterisation of existing forms of association of forest owners.

In the first step, references to the words “land abandonment”, “land fragmentation”, “silent lands”<sup>2</sup>, “association/associated” were searched, then documents were analysed to build a set of six keywords selected to drive the following literature review. In the second step, keywords resulting from step 1 (both Italian words and their translation) were searched within the scientific literature (Google Scholar) and the grey literature (Google search engine). In the third step, existing organisational solutions detected during the previous steps were categorised and characterised, according to the same analytical framework cited above (Loreggian et al. 2023), then basing on: i) actors; ii) purposes; iii) rules; iv) distribution of power and resources. In particular, two principal characteristics within each of the four key dimensions were assessed, respectively: members and forest owners (actors); legal form and internal governance structure (rules); purpose and value proposition (purposes); Forest management responsibilities and financial sources (power and resources). Finally, some general traits of the socio-ecological contexts were highlighted.

### 4.3 Results

The literature review resulted in the identification of 528 articles, of which 103 sorted by title and 30 after reading abstracts. Only 22 were considered eligible to carry out the deep content analysis. The results of the analysis are illustrated hereafter.

#### 4.3.1 *An overview of the problem and suggested policy and governance solutions in the European context*

Private land fragmentation, poor organisation, and insufficient motivation by private owners are indicated between the major issues affecting the forest sector in many European countries, at least until 15 years ago (European Commission, 2008; Pecurul-Botines et al., 2023). In Europe, 56% of the total forest area is private, of which ‘individuals and families’ own almost 77%. A high share of the holdings, 88%, is less than 10 hectares (UN & FAO, 2019). Diverse organisational models and roles played by land owners can be found, ranging from those with full engagement of active forest owners, carrying out forest operations in their own forest, to those where owners are just shareholders and the association is entrusted with full management responsibilities (R. Hansmann et al., 2016; Malovrh et al., 2017; Rauch & Gronalt, 2005). Peculiar and country-specific types are not detailed in this work, rather they have been clustered into three main categories, whose main characteristics are

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<sup>2</sup> ‘Silent lands’ are defined by the national forest law as lands whose owner is unknown, or unavailable after a proper search was carried out (D.Lgs. 24/2018, art. 3 and 12).

described in the following paragraphs: i) forest owners cooperatives; ii) forest owners associations; iii) community forests and other associative solutions.

#### *4.3.1.1 European forest owners cooperatives*

Forest owners cooperatives are diffused in northern European countries, such as Finland and Sweden, where some cooperatives are among the largest forest companies in the world (Tuominen et al., 2008), but can also be found in Baltic countries (Pivoriūnas, 2021). They are established as forest management companies with democratic governance based on the classic principle of ‘one member, one vote’, independently of the forest area (Dedeurwaerdere, 2009). Members are typically small private forest owners, and are involved either paying an entry fee to constitute the capital needed to start up the business and get financial return proportional to their participation (Hull & Ashton, 2008) or entrusting the cooperative with full management responsibilities, while they sign a long-term agreement and receive a payment for the expected production (Kittredge, 2005). In this second case, members act like shareholders; they could even be completely absent, thus establishing pure ‘dividend’ models where they are involved only in the assembly (Rauch & Gronalt, 2005). In other cooperatives, members are active owners directly involved in forest management and operations, while the organisation maintains some tasks such as marketing and sales, contracting, and administration (R. Hansmann et al., 2016; Malovrh et al., 2017).

#### *4.3.1.2 European forest owners associations*

Forest owners’ associations are spread in many European countries; they differ from cooperatives first of all because they are not companies, and two main types can be recognised, characterised by different purposes: i) associations established to support forest management and ii) associations established to represent members’ interests and for lobbying (Pivoriūnas, 2021; Pöllumäe et al., 2016; Sarvašová et al., 2015). Some start to achieve one of those two main goals, but after some time they encompass both, after they grow up. The constitution of forest owners’ associations is often financially supported by public funds: national, regional, or derived from the Rural Development Programs (Kajanus et al., 2019; Pöllumäe et al., 2019), and many owners believe that their associations can survive in the long term only if permanently financed by public funds (R. Hansmann et al., 2016; Milijic et al., 2010). Associations which provide administrative and technical support to their members (typically private forest owners) for their management activities, hire specialized professionals, who can be employed by the organisations, or purchased as consultants. In any case, no ownership rights are transferred to organizations, and forest owners democratically participate at some stage of decision-making (R. Hansmann et al., 2016). A peculiar type of association is that of the French CNPF - Centre National de la Propriété Forestière – created as a central public institution

with 11 regional delegations, it involves about 3.5 million of private forest owners, thus encompassing almost all of the 75% of the French private forests (Ivana Živojinović et al., 2015).

An upper level is represented by “umbrella organizations”, which are larger organizations whose members are forest associations, such as the Confederation of European Forest Owners (CEPF), at the European level, but several others exist at the national level: they promote cooperatives and associations of forest owners as an efficient solution to activate forest management; most of all, they represent associations’ interests toward the market and policy makers (Malovrh et al., 2015; Pivoriūnas, 2021).

#### *4.3.1.3 Other European associative organisational models*

Communities managing forests are rather diffused in Europe, with two main typologies of solutions: i) community forests, where the allocation of land property rights to the community generally leads to the formation of endogenous organisations (Bissonnette et al., 2018) that could have various forms; ii) community-based forest enterprises, in which community members are organised into a company to actively produce goods and services in response to market demands, generating income, social returns and other assets benefitting those communities (MacQueen, 2008), not necessarily being forest owners. This second category includes several types of organisations, ranging from social enterprises to community-benefit enterprises, community groups, and community-governed concessions (Ambrose-Oji et al., 2015). Community forests also implement different organisational models in different countries and even in diverse regions of the same country, since such types of organisations for the management of natural resources as common goods are typically a historical legacy, based on local traditions (Bassi & Carestiato, 2016). However, for the purpose of this study, commons are not considered within associative solutions, because they manage a single property, usually not fragmented, therefore their purpose is not to aggregate multiple forest owners/actors.

#### *4.3.2 Associative forest management solutions to land abandonment and fragmentation in the Italian context: legislation and experiences*

As mentioned in the Introduction, in Italy, for over a century, the legislator has encouraged the adoption of various forms of associations, recognised as the first solution to optimise management costs. Royal Decree 3267/1923 (art. 155) gave the right (and financial resources) to “several municipalities and moral entities”, to form a consortium for “the recruitment of a single director for the technical management of the forest heritage”. After this very old national regulatory intervention, from the 1980s onwards a ‘regionalization’ in the development of forest associations can be observed, in the framework of administrative decentralisation that also involved the forest sector (Secco,

Favero, et al., 2017): regional public administrations have defined the details of associative organisational models in the forest sector, integrating these subjects into regional forest laws and programmes (Baldini & Baldi, 2014; Corona et al., 2023). This did not change significantly after the (national) Legislative Decree 227/2001, still encouraging associated management (Art. 5 c.3). This decree urged regions and local authorities to promote forms of association, to foster a more rational and efficient management of forest stands. Several Italian regions, such as Piedmont, Lombardy, Friuli Venezia-Giulia, and Tuscany, have integrated in this perspective regional forest laws, explicitly recognising the strategic role of different types of associative forest management that can be promoted by the regional authority also through incentives and dedicated funding calls, within the framework of rural development plans. Finally, a clear remark to this topic can be found in the two recent and main acts signed by the Ministry of Agriculture, Food and Forestry (MIPAAF): the Consolidated Text on Forests and Forestry Supply Chains (Legislative Decree 34/2018, art. 10, c.5) indicated “associated forms of management” as one of the strategies to be pursued, in order to increase forest planning to promote sustainable forest management (Ferrucci, 2018), and the recent National Forest Strategy, approved in February 2022, confirmed this orientation. In these policy documents two main objectives were indicated for forest management associations, addressing, respectively, fragmentation and abandonment issues: to aggregate properties to promote more rational, cost effective and sustainability-orientated management, and to retrieve abandoned and the so-called ‘silent’ lands, whose owner is unknown or unattainable (Brocca et al., 2023).

In addition to these, three other significant measures can be found in recent years, confirming the relevance of this issue in recent Italian forest-related policies and strategies. In chronological order, starting from the oldest: (i) the call for the selection of project proposals for the establishment and/or the promotion of associative entities for the management of forestry-pastoral areas in 2020, (ii) the so-called ‘forest agreements’ included in a specific article (35 bis) in the previously mentioned Legislative Decree 77/2021, and (iii) the call for funding ‘Forest Supply Chain contracts’ in April 2023. The first is a financial measure, with a total amount of 5 million euros allocated directly by the Ministry to support the creation or consolidation of eligible associative forms. The second measure is a regulatory intervention, which introduces a new type of contract specifically designed for the purpose of aggregating both public and private owned areas dedicated to agro-sylvo-pastoral activities, especially for the conservation and provision of ecosystem services. Finally, the third measure recently introduced in the Italian context is again a financial one: a call for funding (10 million euros allocated from the National Recovery and Resilience Fund) supporting initiatives of innovation and development of the domestic forest supply chains that must be proposed by interregional (temporary) associations of actors. In addition to the above-mentioned recent national

measures, in the last 10 years several other legislative initiatives have introduced, at regional level, various and sometimes peculiar solutions for associated forms of forest management.

Clustering similar solutions into fewer categories, they can be resumed as: (i) structural solutions, i.e. adopting formal associative structures, and/or (ii) contractual solutions, i.e. the formalisation of cooperation agreements between two or more actors (Table 1). This categorisation is based mainly on the legal framework defining the entity or the agreement. Peculiarities can be found in both typologies, some originated from regulatory initiatives introduced by the public (regional) authorities, others from innovative ideas developed by the civil society, without any specific regulatory framework and direction, finally composing a multitude of solutions that can be combined in various ways.

Table 4.1 – Main solutions to associate forest owners and/or carry out associated management in Italy.

<b>(i) Structural solutions</b>	<b>(ii) Contractual solutions</b>
Formal organisational structures that constitute new entities associating various actors.	Agreements between two or more actors (the parties to the contract) that produce legal effects.
<ul style="list-style-type: none"> <li>• Consortia</li> <li>• Associations</li> <li>• Cooperatives</li> <li>• Foundations</li> <li>• Forest condominiums</li> </ul>	<ul style="list-style-type: none"> <li>• Concessions</li> <li>• Business networks</li> <li>• Forest agreements</li> <li>• Value chain contracts</li> <li>• Long-term private multi-year sales of forest plots</li> <li>• Free loan contracts</li> </ul>

It is worth to note that the reference to ‘associative models’, indicated as strategic solutions for the activation of forest management in the most recent Consolidated Forest Act (34/2018), considers ‘association’ in its broader semantic meaning, including various types of associations such as consortiums, cooperatives and others. Here we believe that each of these types has peculiarities that merit to be described separately, as they imply different procedures, different financial commitments and consequently different effectiveness – as shown by the empirical cases found in Italy.

Some structural solutions, such as foundations and the forest condominium, are still very sporadic and are not detailed here. To cite a couple of examples, the “Italian Forest Fund” is a foundation created to manage forests for pure nature conservation goals, openly criticising other management purposes. It differs substantially from other associative models because members are not forest owners, and the ownership is rather given to the foundation, mainly by external donors. The forest condominium is an attempt (only one case is known) to manage small private forest ownerships with a ‘central administration’ service offered by a professional forester, supporting a group of private landowners within a mid-term agreement.



Some contractual solutions, like concessions, private sales contracts and free loan contracts are merely used to regulate agreements between two parties, therefore they are not detailed in the following section, where a more detailed description and some examples are reported for the main types.

#### 4.3.3 *A deeper view on possible solutions to forest abandonment and fragmentation based on empirical cases identified in the Italian context*

The three main structural solutions and the most innovative contractual solutions are depicted in detail in the next paragraphs and summarised in Table 4.2, according to eight (plus one) characteristics belonging to the four key dimensions of the analytical framework developed within the first part of the study (see fig. 3.3), as introduced in the methodology section (Chapter 4.2).

Table 4.2 – Summary of the three main structural solutions for associated forest management considered and described in this paper.

CHARACTERISTICS	CONSORTIA	ASSOCIATIONS	COMMUNITY COOPERATIVES
<b>Members</b>	Public forest owners (municipalities) and Forest entrepreneurs (private)	Forest owners (private and public) + other actors	Members of a local community
<b>Forest ownership</b>	Shareholders. Big areas (>3000 ha)	Members. Very small areas (50÷500 ha)*	Contractor. Mid-small areas (~200 ha)
<b>Legal form</b>	Contract → Enterprise. (artt. 2602-2616 cc) RD 3267/1923	Associations (artt. 14-42 cc) + Regional laws	Cooperative (labour model) Regional laws
<b>Internal Governance structure</b>	Democratic but centralised. Vertical	Democratic and participative Horizontal	Democratic and participative. Vertical
<b>Purpose</b>	For profit Efficiency (cost optimization) Land management	Not-for-profit. Activation of management (care for the territory) and land care.	Mutualism. Socio-economic development of a local community, creating employment opportunities.
<b>Value proposition</b>	Timber and regulation forest ecosystem services	Forest management plans, Support for administration, marketing and logistics.	Any valuable forest ecosystem services
<b>Forest management</b>	Management responsibility given to the consortium by contract	Management responsibility given to the association by bylaws (unclear legal definition)	Management responsibility given to the cooperative by contract
<b>Financial sources</b>	Commercial revenues and public funds (RD funds, ...)	Targeted (regional) grants + financing from public tenders (RD funds)	Commercial revenues, financing from public tenders (RD funds, etc.)
<b>CONTEXT</b>	Areas where public entities (municipalities) have extended forest ownership	Abandoned areas, with fragmentation of private land and/or small public properties	'Inner' rural areas (low-altitude mountain regions)

\*Model Forests were not considered in this average calculation, because they represent very particular outliers, since they encompass entire valleys, upon which forest management is limited to some areas.

#### 4.3.3.1 *Italian Forest consortia.*

The consortium is the first legal entity for implementing associated forest management adopted in Italy, it has been developed mostly to associate public forest owners (municipalities, above all) and remains a very peculiar Italian typology. The ‘Consorzio Boschi Carnici’, founded in the North-East Italian region of Friuli Venezia-Giulia in 1874 by 19 municipalities, is probably the oldest case, while forest consortia were promoted and regulated much later by the Royal Decree 1723/21, further expanded by the Royal Decree 3267/23. This Laws mentioned consortia as the reference model for associating forest owners, even if they were addressed mostly to public owners, namely municipalities, mountain communities, parks. When controlled by public members, consortia can be considered as public enterprises. The consortium is, in fact, an organisational form regulated by the Civil Code (Art. 2602), to which only entrepreneurial subjects can adhere or, in the special case of forest consortium, also public subjects, whereas private non-entrepreneur individuals cannot be involved as members. The consortium can either be based on a simple contract (‘consortia for internal activities’, simply regulating internal deals between members) or become a company itself, with limited liability for its individual members, able to manage forests while the ownership is kept by each member, with the purpose to produce and share profit. Furthermore, a forest consortium often takes care of other public functions in the territory, such as hydro-geological safety, and it can be responsible for maintaining tourism infrastructures, like footpaths, trails, vie ferrate, mountain huts, and pic-nic areas. Forest consortia seem to be the best solution, so far, to develop solid business models, based on commercial activities but able to obtain finance from Rural Development or other European funds. In some Italian regions (e.g., Lombardy) their public relevance is legally recognised, thus allowing them to get public funding for the provision of ‘environmental services’ (i.e., ecosystem services). Consortia can act as legal entities intitled to sign contracts and agreements and participate in other societies or associations.

#### 4.3.3.2 *Italian forest associations.*

Associations are defined in articles 14 to 42 of the Civil Code, as one of the key figures of the Italian legal system: collective organisations whose purpose is the pursuit of ‘non-economic goals’, i.e. they’re not-for-profit. This latter is a key distinctive feature between associations and companies whose purpose, on the contrary, is to make profit by means of the resources of their members, as already highlighted in section 3.1, introducing European forest associations. Various calls for financial support and normative interventions can be found, shaping specific types of association, at a regional level. They include, for example, the ‘Forest Associations’ in Veneto, Molise and Sicily; the ‘Land Associations’ in Piedmont or the ‘Woodland Communities’ in Tuscany. Associations can

be legally recognised or not, depending on the choice of the members (which is expressed in the statute, and, in the case of recognised associations, only acquire legal status following registration in the Register of Legal Persons). However, in the Italian regulatory framework, associations have important limitations in conducting their management activities and using their financial resources compared to consortiums, as they are not allowed to make profits, and a more complex governance, as it is necessarily based on participative internal mechanisms for decision making.

Piedmont's land associations are framed into the Regional Law 21/2016 and are characterised by a membership limited to owners of agricultural, forest, or pastoral lands. These associations, also thanks to (almost) annual public contributions by the Region, are required to get a unitary management plan for the associated properties, in which the best technical and economic solutions are identified, according to objectives of agricultural and forestry production, while guaranteeing environmental and landscape conservation. Ownership rights are not altered, nor lands can be subject to usucapion; the land can be managed (according to the plan, commonly agreed) directly by the association, or can be entrusted to individual members or third parties (through lease contracts). A further important provision introduced by the Piedmont regional law is the possibility for land associations to be assigned abandoned, uncultivated, or silent lands, by municipalities.

Finally, a special mention should be made for the 'Woodland Communities' and the 'Model Forests'. The 'Woodland Community' was introduced in Tuscany by the Regional Law 11/2018 (Art. 5, which modifies and integrates the Regional Law 39/2000), to characterise "the set of public and private subjects that, in agreement, provide for the active management of forest areas". It is a subject that, evidently, has an associative nature, and in fact the only Woodland Community established in Tuscany to date is the so called 'Comunità del bosco di Monte Pisano' associating 5 municipalities, 130 private citizens, 15 companies, and 11 third sector organisations, sharing the purpose of preserving and enhancing Monte Pisano hilly area (between the cities of Pisa and Lucca) and preventing disastrous fires like the one occurring in 2018, that has triggered the creation of the association as a tool to actively manage the forests and reduce the risks of similar disturbances in future. Model Forests, spread all around the world, are a model promoted by an international network started in Canada in 1992, with two cases in Italy: the 'Model Forest of Montagne Fiorentine', in Tuscany, active since 2012, and the 'Model Forest Valle dell'Aterno', in Abruzzo, established in 2021 (and recognized within the International Model Forests Network in 2023). These peculiar associative models, diffused also in other European countries, set the purpose to maximise forest ecosystem services, based on a democratic and participatory governance that involves a broad range of stakeholders, both private and public, organised in committees with a strong commitment to planning

and sharing, to ensure sustainable development of the community through commonly agreed forest management, based on highly participative decision-making processes (Cherchyk et al., 2019).

#### 4.3.3.3 *Italian forestry- and community-cooperatives*

The cooperative model represents a well-known possibility of aggregating actors in a structured corporate form, with a consolidated tradition in forestry across Europe. Though in northern Europe forest owners cooperatives thrive (Hull & Ashton, 2008; Kajanus et al., 2019), in southern Europe the cooperative model is more applied to organise forest workers' enterprises (Trigkas et al., 2020). In Italy, cooperatives are very well developed in other sectors, such as agriculture (between landowners, too), tourism, health and care, logistics, and third sector, however no examples can be found within forest owners. As for other southern European countries, the cooperative model in the sector is implemented by many forest workers' companies, especially in central and north-western Italian regions, but these latter are not relevant for the purpose of this study, since they do not associate owners but merely carry out forestry operations on third parties' properties.

Rather, it's worth to mention the innovative experience of community cooperatives, which first appeared, in Italy, about 30 years ago; some of these cooperatives are significantly involved in the management of forest lands, otherwise at risk of abandonment. Community cooperatives are generally operating in a multitude of sectors with the general purpose of responding to urgent needs of local communities; typically, in mountain rural areas, the presence of a minimum level of commercial and welfare activities, mobility, and assistance to vulnerable groups such as elders. However, their potential in forest management is quite intuitive, as Italian forests are between the most important natural resources in mountain regions, both Apennine and Alpine. The long tradition of collective forms of ownership, particularly common in mountain regions, shows how forests represent a valuable resource for highlands' communities. However, land ownership is not a typical characteristic of community cooperatives which rather find other solutions to manage forests. The community cooperative 'I briganti di Cerreto' in Emilia-Romagna region (Centre of Italy), founded in 2003, was one of the first to offer, in addition to tourism services, forest management services from more traditional timber logging activities to more innovative forest therapy sessions. Another, more recent, example was found in Biccari, in Apulia region (South of Italy), where a local forestry company (cooperative) had a key role in the founding phase of the local community cooperative, also based on the valorisation of the municipal forest, where many activities have been developed ranging from the traditional management of forest resources, to innovative experiences of hospitality in the forest with wood houses suspended among the branches or 'bubbles' (a kind of transparent tents) installed in the forest, adventure park, and, again, forest therapy. The community cooperative

‘Ecosistema comunale di Castell’Azzara’, in Tuscany, signed a ‘forest agreement’ with three private forest owners, assuming responsibility for forest management, using a contractual instrument that could also be used for public properties management. Regional laws identify community cooperatives as ‘potential beneficiaries for concessions of public properties’, a relevant indication to address public-private cooperation agreements for forest management involving this type of organisations.

#### *4.3.3.4 Innovative contractual solutions, in the Italian forest sector*

Furthermore, there are several conventional contractual instruments that can be used to support the establishment of associated forest management solutions, allowing a landowner to entrust the management of forest resources or some of their services to third parties (e.g., free loan contracts against land investments, concession contracts, contracts for multi-year sales of forest plots, contracts for cost and profit sharing in the management of economic activities, etc.). While all these remain useful instruments to regulate agreements for associated management of forests, here we are interested in illustrating an innovative contractual solution, that is expected to solve some of the constraints and limited effectiveness of previously existing solutions. The so-called ‘forest agreements’ were defined by the national law 108/2021, with an article that integrates 4 new paragraphs into Art. 3 of Law 33/2009 (regulating business networks). In the first lines of the new law, forest agreements are explicitly framed as a "tool for the development of business networks in the forestry sector". The additional purpose of "enhancing public and private areas with an agro-silvo-pastoral vocation, as well as for the conservation and provision of ecosystem services provided by forests" precludes to one of the innovative and distinctive features of these new types of agreement, compared to the business network contract, since it is not necessary for all the contractors to be entrepreneurs. Participation of forest owners (or subjects holding rights in rem of forest property) is a characteristic requirement of the forest agreement, either at least 50% of signers, or otherwise at least one association of forest owners. Forest agreements seem very suitable to aggregate different actors, public and private, even from different sectors, around the purpose of enhancing private and public areas with an agro-silvo-pastoral vocation as well as for ensuring the conservation and delivery of ecosystem services, while respecting biodiversity and forest landscapes. Within the few very recent agreements signed, a variety of applications have been detected: public landowners assigning forest management responsibilities to a third public administration, private owners entrusting a community cooperative (private entity, not owner) to manage their lands, and even agreements between public and private forest owners, involving further actors, both public and private, with different roles in a management framework that brings together public with private interests.

Another interesting contractual type is the business network ('rete di imprese'). Not as recent as the former, but barely applied for forest management, it is a contract that can be signed by enterprises sharing one or more common objectives and some of the resources to achieve them (Secco, Abatangelo, et al., 2017). They can either be simply agreements about business strategies or become an independent entity whose members keep acting independently, while the business networks carry on specific activities/objectives. Some small business networks were created to develop small local supply chains, typically to produce energy from wood biomasses. There are some interesting cases of local horizontal integration between timber companies (for instance 'Foresta Oro Veneto' to promote local wood and timber-based products, in the North-East of Italy), but without involving (significantly) forest owners, and rarer examples of vertical integration, such as "Si parte dal bosco" (a business network involving forest owners, forestry enterprises, sawmills, wood-based house constructors and retail sellers, in the North- west of Italy).

Finally, a mention should be done to long-term concessions of forests; it is an apparently simple, but very uncommon solution, with some sparse cases identified, that are experimenting such type of contracts, such as those of the forestry cooperative "Ecolforest" in Southern Italy, or the cooperative "Silva" in Piedmont, entrusted with a multi-year management of municipal forests. Small forest enterprises, as well as larger forest associations, can benefit from such contracts that would allow them to invest in innovating machinery and technologies, otherwise too expensive. Public forest owners are the main typology of landowners that could offer concessions of forests whose size may make it profitable to develop management activities: they also would in turn benefit from long-term agreements because they get more careful interventions, but also investments in infrastructure (forest roads) that could also be done thanks to funds for rural development, and eventually other ecosystem services that could be regulated by the contract, in addition to profit from the mere sale of the timber plot (S. Romano et al., 2014).

#### **4.4 Discussion and conclusions**

Although the monitoring process is discontinuous, sporadic, and with uncertain and different outcomes depending on the sources of information, the biggest change in national land use patterns in the last decades in Italy probably consists in the abandonment of agricultural and forest land management. As a general indicator of this trend, driven by intensive urbanisation and industrialisation processes that occurred especially after the 2nd World War, the expansion of forest cover can be used, which doubled in 50 years, now reaching ca. 11 million hectares and representing 36% of the total land in the country, according to the last National Forest Inventory. However, other specific indicators can be used to show that this phenomenon is still ongoing: i) according to the

Agriculture Census, both the Utilised Agricultural Area and the Wooded Area in active farms have progressively and significantly decreased in the last decades; ii) according to the last available data, only a small portion of Italian forests are actively (and responsibly) managed (e.g., only 9-10% is certified according to FSC and/or PEFC standards; and only ca 15% has an approved and updated forest management plan). It is recognised that the abandonment of many forest stands has significant environmental and social consequences, as it can expose forests to causes of degradation with the reduction of their ability to frequency of extreme events, an increase in average temperature, and instability in the availability of water resources (Spadoni et al., 2023). On the one hand, especially in mountain regions, forests provide services to regulate ecosystem and support sociocultural cycles (Bussola et al., 2021; R. Romano, 2017); furthermore, an increased vulnerability of forests can be observed, pushed by a higher context, and active forest management would be useful primarily for maintaining a flow of forest ecosystem services, especially those that can be classified as public goods, with an approach which is instrumental to the needs of human-centred communities. On the other hand, a (responsible and sustainable) active forest management can help secondary forests in better coping with external, climate-induced disturbances and their effects.

Despite the evidence that the problem is persisting or worsening, associating forest owners (and especially private and small owners) is still considered by national policy makers one of the preferred solutions to tackle with land fragmentation and abandonment. As illustrated in this paper, in the last years many new policy initiatives (starting from the last Consolidated Forest Law 34/2018 - Ferrucci, 2018; Romano, 2018) have been launched in Italy, e.g. specifically financial resources allocated to create new aggregations, or innovative structural and contractual settings. Interestingly, the creation of associative forms for the forest management of private-owned forest lands seems not being a priority within the EU Forest Strategy 2030, where collaboration is mentioned mainly in relation to initiatives for reinforcing skills and knowledge of forest actors. The focus given to networks and associated management seems mirroring the relevant role assigned by the Italian authorities in charge for the sector (namely, the Ministry of Agriculture, Food Sovereignty and Forestry) to domestic forests, mainly intended as key assets for rural development and revitalisation of local supply chains, thus supporting local economies and maintaining employment opportunities in rural areas while guaranteeing the maintenance of tourism-attractive landscapes and the protection against soil erosion and hydrogeological instability. However, as mentioned, a robust, regular and complete monitoring and evaluation process about the on-the-ground effectiveness of the various policy instruments introduced in the past for stimulating forms of aggregation among private forest owners has not been established yet. The overall uncertain situation is emphasised by an uneven framework developed within the 21 different Italian Regions and Autonomous Provinces, attempting to support forest

associations with not coordinated regional-specific norms and fundings, while civil matters remain the exclusive competence of the state.

A deeper knowledge of the overall framework is needed, from the national level to the regional ones, because any solution, either structural or contractual, should be implemented with the right actors, given well-defined purposes, complying with existing laws, based on case-specific appropriate governance arrangements and – above all – subject to a regular monitoring and evaluation process that can assist policy makers and practitioners in having evidence-based information to guide their decisions. All the solutions have some limitations, though they can be complemented by integrating other instruments, to overcome specific issues or eventually to collaborate with other (associative) actors. Moreover, associations are indicated in the Consolidated Forest Law 34/2018 as a strategic subject to reactivate the management of silent lands (Art. 12, c.3), but the same law assign to the Regions and Autonomous Provinces the competence to define how this process should be completed, and no clear procedures have been set to date.

Despite the uncertainty of the data about the quality of these policy and governance instruments in terms of their design and/or potential effects based on the amount of the allocated financial resources, we believe that one of the main problems for their on-the-ground effectiveness remains the difficulty in identifying landowners, i.e. the main beneficiaries and/or targets of associative measures. This is due to the combination of hard bureaucracy and data privacy protection measures, as well as to continuous migration of many people from rural (mountain) to urban areas or to other countries, thus resulting very difficult to inform about the opportunities and activate them to take actions. Furthermore, understanding who forest owners are, what are their characteristics, motivation, and attitude would be a key step for policy makers and practitioners to select the most effective instruments to be implemented in different cases (Malovrh et al., 2015). This is another relevant research gap: a characterisation of private forest owners in Italy, based on socio-economics features of them, is missing (Mozzato & Gatto, 2016). There are a few general and only one detailed recent study focused on Trento province, which concludes that forest management within small private holdings is to a large degree voluntary, and depends on forest owners' values and objectives (Rizzo et al., 2019). This is consistent with the conclusions of a similar and broader study referring to Slovenian and Serbian private forest owners' behaviour. The understanding of owners' behaviour is important for the success of policy initiatives aimed at promoting forest management, either in individual or collective forms, and it is essential to target owners with a tailor-made mix of policy instruments (Malovrh et al., 2015, 2017). If we look at the category of 'silent owners' or 'absent owners', who are not farmers anymore, we also suggest that more attention should be given in the



policy instruments design to new types of land owners, shifting from the traditional role assigned to farmers in the rural development funding programs to innovative profiles of civil society-driven groups of potential owners and managers who are more and more interested in taking care of forests, mainly for nature conservation purposes.

To conclude, we believe that this paper, offering an update overview of the policy instruments introduced in the Italian context to stimulate associated forest management, can support old and new interested forest owners in taking action to reverse the abandonment of forests, and policy makers in adjusting and improving the existing instruments to better tailoring them.

**Author Contributions:** Conceptualisation: F.L., D.P., N.A.; Methodology: G.B., F.L.; Formal analysis and Data curation: G.B., F.L.; Writing- draft: F.L., D.P.; Writing - review: F.L., N.A., G.B., L.S.; Visualization: F.L.; Supervision: L.S., D.P. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was developed within the PhD program at the LERH (Land, Environment, Resources, and Health) School, financed by the University of Padova, and did not receive external funding.

**Conflicts of Interest:** The authors declare they have no conflict of interest.

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## 5 Paper III) State of the art of Italian Forest Associations: an analysis of organisational solutions and performances

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**Abstract:** The climate and biodiversity crises as well as their impacts in the long- and medium-short-term require a rethinking of natural resource management, including forest resources. In such a perspective, reorganising governance aspects, starting from land ownership and networking, as well as synergy-building capacity among landowners and other actors, is key to ensure the resilience of socioecological systems and a flow of ecosystem services and benefits associated with them. Land fragmentation is a critical issue in several Mediterranean countries, and in Italy it has been recognised as a substantial barrier to active and responsible forest management. In the last years, various initiatives have arisen, both at a national and regional scale, for promoting associative forms to overcome this criticism, through different models. Among them, forest consortia, forest associations, land associations and forest agreements are the most common ones. However, the overall picture of these models remains patchy and a bit inhomogeneous, missing appropriate coordination at a national level. This research is part of the LIFE ClimatePositive project and provides an overview of the state-of-the-art of the most relevant associative models currently applied in the forest sector in Italy. Through a questionnaire filled out by managers of various organizations, the survey highlighted the organisational arrangements, activities, performances, and some limitations and opportunities of the different associative models. Results show how some aggregation models, such as forest associations, are more suitable to act as local "organisers and animators", while consortia and cooperatives are more targeted at business activities, and contractual solutions can be seen as key linking instruments between different actors.

**Keywords:** Land fragmentation, associate forest management, private forest owners, forest governance.

**Statements and Declarations:** no competing financial nor non-financial interests are related to this work submitted for publication.

**Acknowledgements:** This research was part of work package 2 of the project, n. 101074589 – LIFE21-CCM-IT-LIFE ClimatePositive.



## 5.1 Introduction

An increasing body of policies, both at the global and European levels, addresses the restoration and/or protection of natural areas to support rewilding as well as enhancing and conserving biodiversity (de Jong et al., 2021; Winkel et al., 2021). Natural forest expansion, registered in several European countries, can fit the goals of these policies well, however, it often occurs as a consequence of lack of management and land abandonment (H. M. Pereira & Navarro, 2015). Indeed, the expansion of European forests in terms of both area and stock in several European countries (Frei et al., 2023), especially in southern Europe, is interlinked with demographic and socioeconomic dynamics. Depopulation, population ageing, depletion of rural areas are growing, as 34% of the rural population in Europe declined since 1950 (FAOSTAT, 2023) and some mountain areas have lost more than half of their population (E. Pereira et al., 2005). This ultimately reflects on reduced land management or land abandonment, with ceasing farming, grazing and forestry activities (Dax et al., 2021; Perpiña Castillo et al., 2018) often resulting in the expansion of secondary forest through natural succession on non-forest land (Frei et al., 2023). While these trends are considered positive by certain narratives on nature conservation (Jørgensen, 2015; H. M. Pereira & Navarro, 2015), the lack of management practices diverges from the bioeconomy paradigm, which narratives call for a transition from a fossil-based to a bio-based and decarbonised economy, emphasizing the role of biomass production as source of renewable energy and the rural development paradigm, which narratives call for a renovated role of forests as key natural assets for supporting local economies and vibrant communities in rural areas. According to these visions, abandonment might expose natural areas and people to more severe risks associated with the increasing frequency of extreme events, e.g., large wildfires, droughts, floodings, windstorms, pest outbreaks, etc. (Rodríguez Fernández-Blanco et al., 2022; Spadoni et al., 2023). These dynamics may have dramatical impacts at human-nature interface areas, as experienced in Italy for the case of the Vaia storm that destroyed 42,500 ha in the north-east of Italy in 2018 (Chirici et al., 2019), but can be critical even in areas that are far away from forests, as repeatedly (and relatively frequently) experienced in other Italian regions, as for Emilia Romagna in May 2023, or in Tuscany in November 2023, to cite only the most recent ones.

According to data from the Third National Inventory of Forests and Forest Carbon Pools (INFC, 2015), in Italy forests and 'other wooded lands' (i.e., shrublands, thickets, and sparse formations) occupy a total area of just over 11 million hectares, equivalent to almost 37% of the national territory. Forests in Italy have historically represented an asset closely linked to local traditions, cultural-social aspects, and a key resource for the economy of many rural communities, especially in mountainous areas. About 57% of the Italian forests can be found above the altitude set to define “mountains” in

Italy (600 m a.s.l.), however also forests in hilly regions should fairly be considered, since many of these regions undergo the same socio-ecological dynamics (Carrosio, 2016), thus including also forests above 300 m a.s.l., the share increases to 84%. Following a similar trend observed also in other European countries, many of the most forested regions in Italy have experienced population ageing and depopulation. While the Italian population has grown by about 12 million people in the last 60 years, mountain areas have lost about 900,000 inhabitants (Amodio, 2022; Marcantoni & Cerea, 2016). The progressive depopulation of these areas has contributed to the abandonment of land and forest management, resulting in the expansion of the Italian forest area, which has more than doubled since World War II. Reduced management activities combined with demographic and socioeconomic negative dynamics in marginal areas and the decline in interest (and sometimes convenience) in maintaining forest products supply chains active have, first and foremost, unintendedly favoured the expansion of forests on marginal lands that in the past were mostly dedicated to agriculture or grazing (Corona et al., 2012). This is also confirmed by the figure for the percentage of forest areas settled (i.e., with a valid and active detailed forest management plan in place), which is only 15.5% of the total inventoried forest area (Gasparini et al., 2022).

On the top of the above-mentioned structural demographic and socioeconomic changes, other causes of the decline in active forest management are many and often interrelated. For sure, the orography and morphology of the territory constitute a notable limiting factor, since more than 80% of Italian forests are located at an altitude of over 300 metres above sea level and more than 41% are in areas with slopes of over 40% (Gasparini et al., 2022).

Moreover, as recognised also by recent national policies, land ownership and tenure structure is a crucial factor affecting the active management of rural and marginal areas (Rizzo et al., 2019; Secco et al., 2018). According to INFC 2015 data, 63.5% of the total forest area in Italy is private, 32% is public and the remaining 4.5% is unclassified. Private ownership is dominated (78%) by single individual owners and within the last century it has experienced an increasing fragmentation. The main reasons for this lie in inheritance processes (from a single owner to several heirs), as well as in some land redistribution programmes of the last century, which have led to the division of large estates into several smaller private properties (Omizzolo, 2015). Due to these dynamics, the average size of private forest properties does not exceed 3 ha (Direzione generale delle Foreste - MIPAAFT, 2017), but in most cases it is even much smaller: detailed data are available only for the Trento province, one of the regions with the strongest and healthier forest sector in Italy, where the mean size for small private forest properties is 0.89 ha, the median being 0.33 ha (Rizzo et al., 2019). While these data are quite old, which is also an indicator of a knowledge gap on this topic, to the best of our

knowledge the agricultural and forest land market is static in the country, and a part from a few, sparse and punctual initiatives for lands aggregating (such as the creation of “bank lands” to facilitate the supply-demand of lands available for being managed) any relevant initiative has been implemented in recent years which was able to change the forest ownership distribution or its average sizes.

In addition to this, a frequent phenomenon is that of absentee owners, physically distant from the forest areas they own (e.g. living in urban areas or even abroad), in some cases not even aware that they own forest-lands. This is a frequent occurrence also in other European countries and has led to the coining of a multiplicity of names, such as non-farming forest owners, non-resident forest owners, absentee forest owners, urban forest owners, etc. (Koch and Maier, in Živojinović et al. 2015). Besides physical distance from forests they own, these owners often show a variety of attitudes towards forest management vis-a-vis the changing societal demand for forest-based products and services (e.g., Canton and Pettenella 2010; Mozzato and Gatto 2016).

As for public forests, they are mainly municipal (65%, while only 23% are state-owned), with an average size of approximately 770 hectares (Canton and Pettenella 2010). Although, seemingly, the overall size of the management unit should not be a problem for public owners, it is challenged with capacity issues, since municipal administrations’ funding and human resources have been dramatically reduced in the last 15 years, when budget constraints caused by austerity after the 2008 recession have imposed strain on local administrations (Bel and Warner 2015; Luca and Modrego 2021). Meanwhile, mountain communities, a broader local level of public administration frequently entrusted with public forest management tasks, have been deeply reformed until 2011 (Amato et al. 2022) and have lost forest management competences. Land fragmentation can also affect efficient land use and planning, including for public administration, especially under budget constraints (Bel & Warner, 2015), therefore identifying solutions and tools to overcome fragmentation and encourage active and responsible forest management, while ensuring management efficiency and a variety of forest-based services/goods (Luca & Modrego, 2021) seems to be a keystone in Italian forest policies. Among the solutions proposed, forest associations and cooperatives are prominent ones, also because they can encourage the adoption of innovative management strategies potentially suitable to face the new challenges of the sector (Sarvašová et al., 2015). Despite their peculiarities and differences, the various forms of association can both aggregate forest owners and help increase connections between forest owners and other actors operating in the sector, such as forest companies, consultants, local authorities, and other stakeholders. Possible forms of aggregation between owners can be an important tool both for the sale of goods (traditional forest products, wood and non-wood ones) and for the provision of intangible services (Schraml, 2005).

Developed within the framework of the project, n. 101074589 – LIFE21-CCM-IT-LIFE ClimatePositive<sup>3</sup>, this research aims to provide a snapshot of associative forest entities - namely associations, cooperatives and consortia - in Italy through the identification of existing experiences and an in-depth analysis of governance aspects, internal organization solutions, membership mechanisms, activities, financial sources, as well as limiting factors and opportunities for a selected sample across different Italian regions.

To allow a better framing and understanding of the topic, an historical perspective and background information on policy and normative aspects concerning forest association in Italy are first provided (section 2). Then methodological details about the research are presented (section 3) followed by results (section 4) and their discussion (section 5). Finally, conclusions are drawn in section 6, providing insights to inform both policy makers and practitioners. The paper is complemented by additional materials, including a copy of the questionnaire used for the survey.

## 5.2 The policy framework

Although a detailed analysis of the policy framework for forest associations in Italy is beyond the scope of this study, as it has been already addressed in Loreggian et al. (*under review*), an overview of the most influential policy initiatives in this field can be useful in framing this work.

As summarised in Table 5.1, in recent years various policy initiatives have recognised the importance of aggregative forms to encourage active forest management and ensure positive impacts for local communities. Some forms of association among forest owners were first proposed in the form of 'forest consortia' by the Royal Decree 3267/1923. However, while consortia have spread considerably as a tool for public property management, albeit with ups and downs and not always successful examples, the diffusion of associative forms among private owners has not been very supported in the 20<sup>th</sup> century (Brun et al., 1998). Associated forest management was pointed out as a key strategy in 2001, by Decree-Law 227/2001, where regional (i.e., subnational) administrations - including 19 regions and 2 autonomous provinces - were invited to “*promote forms of association in the forest sector, to foster a more rational and efficient management of forest stands*”. Some of the regional administrations (8 out of 21) responded to this stimulus with specific normative and funding initiatives (Table 5.1), which led to the establishment of some associations in the respective regional contexts.

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<sup>3</sup> The LIFE ClimatePositive project (<https://www.lifeclimatepositive.it/>) addresses the lack of management in Italian forests, mainly due to land fragmentation of private and public properties, promoting three main practices: the development of social management tools such as “SMART” forest associations; the development and uptake of the national carbon monitoring tool, code and registry, to enable robust certification and related markets; the development of new business models to remunerate landowners for the provision of carbon and biodiversity benefits.

Table 5.1 – National and regional laws, regulations and other policy initiatives to foster forest associations, in Italy.

<b>National/Region</b>	<b>Reference to the law</b>	<b>Associative model/vision supported</b>
National	RD n.3267/1923	Forestry consortia
National	D.lgs.227/2001	Consortia and other associative forms
National	TUFF - DL n.34/2018	Forest management in ‘associate form’
National	DM n.13329 del 22/04/2020	Call for funding for the establishment of forest associations and consortia for forest management
National	DL n.77/2021	Forest agreements
National	National Forest Strategy (2022)	Promotes associations of forest owners and solutions for the integration of public and private forest management
National	DM n.48567 del 31/01/2023	Call for funding forest ‘value chain contracts’
Regional - Piedmont	Regional Law no. 21/2016	Land Associations
Regional - Lombardy	Art. 16, Regional Law no. 9/2019	Land Associations
Regional – Friuli-Venezia Giulia	Art. 49, Regional Law no. 28/ 2017	Land Associations
Regional - Tuscany	Art. 5, Regional Law no. 11/ 2018	Forest Communities
Regional - Marche	Art. 6, Regional Law, no. 6/2005	Forest associations (general)
Regional – Autonomous Province of Trento	Art. 59, Provincial Law no.11/2007	Forest associations (general)
Regional - Sardinia	Art. 27, Regional Law no. 8/2016	Forest associations (general)
Regional - Abruzzo	Art. 23, Regional Law no. 3/2014	Forest associations (general)

Referring to this legal framework, a first categorization was proposed (Loreggian et al., *Under review – Paper II*) to group associative forms (AF) and instruments into two macro-typologies:

*Structural solutions* – through the adoption of new formal organisational structures to associate the actors promoting them; the following three main general categories were identified for the survey within this type of solutions: consortia, associations, and cooperatives.

*Contractual solutions* – i.e., formal agreements between two or more subjects (the parties to the contract) to produce legal effects. Among these, in this research three main types of contractual solutions, namely a business network, two forest agreements and a certification group, were selected and surveyed.

### 5.3 Methodology

The applied research methodology is schematised in Figure 5.1. The research made use of primary data collected through a combination of questionnaires and in-depth interviews with a convenience

sample including selected cases of associative forms of organisations that, in recent years, have aggregated forest owners in Italy, eventually involving also other actors of the value chain. Associations directly involving forest owners or forest ownership through mid- or long-term contracts were included in the sample. For this reason, associations (as well as cooperatives and consortia) composed exclusively by companies that do not own forests, which are indeed more numerous in Italy, were excluded a priori from the survey sample: although interesting and worthy of note, they are characterised by peculiar dynamics that do not coincide with the objectives of this work. Cases from the three continental Italian macro-regions were searched, and the sample integrated each of the three selected categories of institutional solutions and three of the contractual instruments, with a proportion between the different typologies that roughly corresponds to their diffusion in the country. As shown in Figure 5.1, 41 different cases were identified as potential example to compose the initial sample, within 14 different Italian regions. Cases were identified based on a preliminary screening conducted via literature review and active participation of the Authors of this paper to networking activities and events, complemented with inputs from experts operating in the forest sector and the LIFE ClimatePositive project partners.

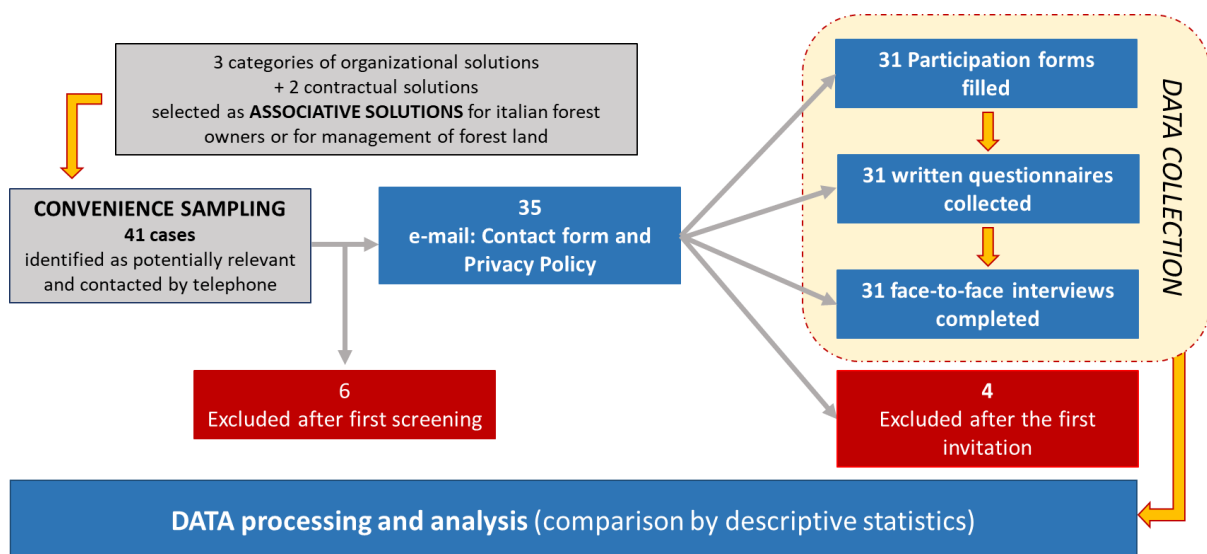


Figure 5.1. Scheme of the research methodology applied. (Own elaboration).

An invitation email was sent to 35 out of the first 41 shortlisted cases, after reaching all 41 cases preliminarily via phone to introduce the survey and set the ground for it. 6 cases were excluded after the phone call, because not consistent with the survey sample. 31 out of 35 responded (88.6% response rate), filling out a first online form to confirm participation and provide a set of introductory data on the case. A second questionnaire was then sent by email asking more detailed information

about operational, organisational, and economic aspects. Finally, face-to-face interviews were conducted arranging short visits to the seat of the entities interviewed.

The questionnaire, fully reported at the end of the paper in Table S5.1 (Chapter 5.7) was built on the conceptualisation of the ‘organisational model’ developed in (Loreggian et al., 2023), as a representation of the way actors establish internal and external relationships, set order (rules), manage responsibilities and allocate power and resources, to achieve their purposes, influenced by a context that, in turn, is impacted by their activity. The broad analytical framework used considers 25 variables, grouped into four key dimensions: i) actors: who the members are; ii) purposes: which objectives they aim to reach; iii) rules: the legal/formal framework; iv) distribution of power and resources. Given the overall size and breadth and in order to make data management feasible while reducing the risk of fatiguing respondents, the questionnaire was split into three parts, a first one to be filled online, a second one still written and submitted by e-mail, and a third one under the form of semi-structured face-to-face interviews with key staff of the selected organizations. Data were collected in April-October 2023, involving managers (either directors or chairpersons) of selected Italian forest associations or a reference person for contractual agreements.

Results presented in this article refer mainly to data collected through written questionnaires, more focused on organisational, operational, and performance aspects (mainly descriptive and quantitative data), while only a smaller part of data come from face-to-face interviews, more focused on narrative and qualitative data, to address other research questions. Data were elaborated via descriptive statistics and analysed accordingly to provide a comparative assessment among different types of initiatives addressed by the study and draw some general considerations.

Unfortunately, a comprehensive assessment of all existing forest associations is missing: consortia, being enterprises, must be included within the register of the Chamber of Commerce, Industry and Handicrafts; whereas associations, of any kind, can be established even without any public act, and in any case a specific register for them does not exist. This lack of information represented a great challenge, in the attempt to capture and describe the ‘universe’ of associations of Italian forest owners, therefore also for the methodology, impeding the definition of a precise representativeness of the selected sample.

## **5.4 Results**

As mentioned, 31 cases of Italian forest associations or contractual solutions for associate forest management accepted to participate in the survey, from 10 different Italian regions, as represented in Figure 5.2 and detailed in Table 5.2. Regions included in the survey are not exactly the same for

which dedicated policy initiatives were detected (and described, in Chapter 5.2), because in some of those Regions no relevant examples of associations could be found, whereas some relevant cases were identified also for Regions where specific norms or funding initiatives were missing.

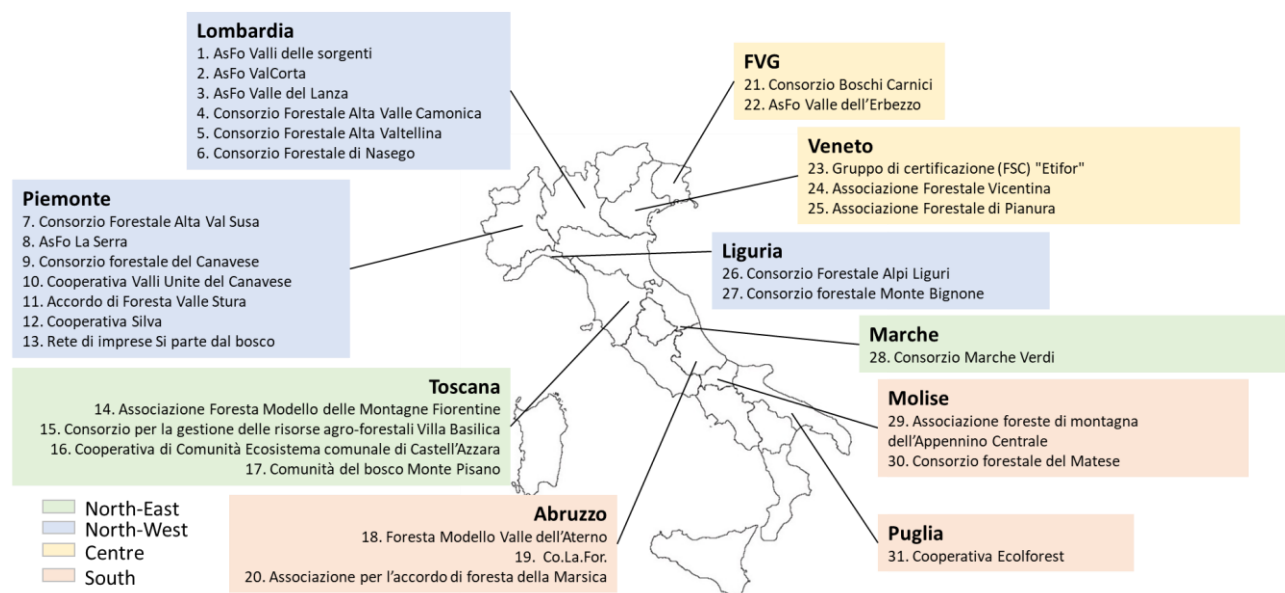


Figure 5.2. Associative solutions that composed the survey sample. (Our elaboration).

The 31 cases surveyed have forest management responsibilities over a total area of more than 68,215.21 hectares (corresponding to about 0.6% of the Italian forests) and involve an overall number of 1,219 members. These can be owners or managers of forests or agroforestry areas (both public and private), or actors who decided to join the association even if they are not landowners.

Remarkable differences were found between different types of associations. As reported in Chapter 5.3, the research was designed to explore five main categories of associations; however, data analysis suggests considering separately different types of association, for a better understanding. Therefore, by using the legal entity as per the Italian civil code, as a first classification criterion, additional types of organisations were identified according to three further levels: i) other state laws detailing peculiar types; ii) regional laws introducing peculiar types; iii) typologies defined by private networks/schemes. Based on the above, 11 different types of association can be recognised within the sample, belonging to one of the 6 main categories eventually broken down into more peculiar types, as detailed in Table 5.2.



Table 5.2 – Typologies, categories and peculiar types of AF surveyed.

Typology	Category	Peculiar typeS	n° of cases (% over total)	Legal reference
Structural associative solution	Consortia (Civil code, art. 2602)	Forestry consortium	9	Royal Decree 3267/1923
		Public company	1	L. n. 142/1990 and D.Lgs. 267/2000
		Second level consortium of forestry cooperatives	2	Civil code, art. 2602
	Cooperatives (Civil code, artt. 2512)	Forestry cooperative	3	Civil Code, art. 2512
		Community cooperative	1	Regional law (Tuscany) n. 67/2019
	Associations (Civil code, artt. 14-43)	Forest association	3	Civil code, art. 14
		Forest community	1	Regional law (Tuscany) n. 11/2018
		Land Association	5	Regional laws: Piedmont n.21/2016, Lombardy n.9/2019
		Model Forest	2	Private (international) network
	Contractual associative solutions	Business network	Business network	1
Forest Agreement		Forest agreement	2	DL n.77/2021
Certification Group		Certification Group	1	Informal - Private (international) certification scheme

#### 5.4.1 Internal governance

The legal entity corresponds to different internal governance structures (as well as legal requirements): all the structural solutions for AF are based on an assembly, to which all members can participate, to approve the balance sheet and elect a smaller group (board of directors, BoD, or council) of people entrusted with responsibilities for carrying out management activities, with high decision-making power. The BoD or council consists, on average, of three members and is responsible for all strategic decisions, whereas operational decisions are taken by a professional director, who participate to the BoD but does not always have voting rights in board decisions. Although a common general scheme can be recognised to organise the participation of the association's members in these two key activities, different solutions can be observed in the implementation.

Consortia's members display an active and lively participation in the assembly, they vote for a small board of directors (BoD, with three members, on average), which is responsible for all strategic decisions, whereas operational decisions are taken by a professional director, who participate to the BoD but does not always voting rights in board decisions. Consortia are also the only organisational

solution where some sanctions are seldom implemented, towards employees, but also against members who do not respect contractual agreements (membership in a consortium is regulated as a contractual agreement).

Associations generally have more democratic and participative governance structures; however, there are significant differences within different typologies, also related to the overall size of the association and the number and volume of the activities. Land associations and forest associations are the smaller ones among surveyed organizations and are organised similarly, as they are open and democratic entities, and the BoD is larger, including a chairman, a deputy, a secretary, and frequently some more members. The members of the BoD also keep all operational responsibilities, supported by one or more professional figures that in most of the cases (5 out of 7) include a forester.

The two Model forests and the community forest involved in the survey are the only ones active in Italy, to date. They have a higher number of members, about one hundred on average, and they include a very diversified range of actors: owners and non-owners, private individuals, public administrations, other third sector's entities, and companies. In these cases the governance of the assembly is way more challenging as, besides voting a BoD, in all three cases it is also organised in a more complex and structured way, consisting of internal commissions focused on specific topics (such as forest management, tourism, social issues, agriculture, etc.) coordinating among them to achieve the goals of the association.

Contractual solutions have a different structure. In the targeted cases one member has a key role of 'activator' and is entrusted with carrying out the contract/agreement's purpose. This role may also be assumed by another signatory party, representing all other members and acting in their name and on their behalf, within the limits of the purposes defined in the contract/agreement.

#### *5.4.2 Membership*

As shown in Table 5.3, 'associations' tend to include a higher number of members compared to consortia, including both forest owners and non-owners. Forest owners are less relevant within cooperatives, which are composed mainly by private individuals (workers). Indeed, cooperatives get management responsibilities neither by ownership or membership, but through contractual instruments, such as concessions or forest agreements (which is the case of the community cooperative).

Land associations have an explicit purpose to increase the area (possibly contiguous) under their direct management responsibilities, therefore they are engaged to involve more and more members (owners), which, on average, tend to be more numerous than in forest associations. Indeed, the only

requirement to become a member of a land association is to be landowner in the same administrative area – i.e. within the same municipality or a few neighbouring ones - where the association has been established.

Table 5.3 – Average number of members in different AF.

Category	Associative typology	Public owners	Private owners	Public non-owners	Private non-owners	TOT.
Consortia (15.8)	Forestry consortium	6.6	4.2	0.3	5.0	16.1
	Second level consortium of forestry cooperatives	1.5	2.0	0	12.0	15.5
	Public company	14.0	0	0	0	14.0
Associations (59.9)	Forest association	8.7	21.7	0.7	1.0	32.0
	Land Association	2.2	30.2	0	7.8	40.2
	Model Forest	12.5	3.5	0	84.0	100.0
	Forest community	5.0	50.0	1	106.0	162.00
Cooperatives (41.5)	Community cooperative	0	3.0	0	104.0	107.0
	Forestry cooperative	0	0	0	19.7	19.7
Contractual solutions (47.0)	Forest Agreement	7.5	4.5	0	0.5	12.5
	Business network	0	1.0	0	10.0	11.0
	Certification group	5.0	147.0	0	0	152.0

#### 5.4.3 *Managed forest area*

Membership is a characteristic that should be analysed in parallel with the size and main features of the forest area (which also include, though to a lower extent, agricultural areas, especially for some land associations) under management responsibility (Table 5.4). In general terms, consortia are characterised by a prevalence of public forests and lands: nearly 99% of the total area they manage is public, belonging almost exclusively to municipalities. On the other hand, 64% of the land managed by associations is private owned, mainly by individuals. It is also interesting to note that associations also manage some public lands, owned by a much broader variety of public actors, such as public companies or parks, than consortia. The public/private ownership ratio for cooperatives' forests is nearly the same as that of associations, however, although it differs greatly between the two types of cooperative surveyed and, in general, the forests of this category are much smaller in size than those of the other categories.

Consortia tend to have direct and full management responsibilities over the areas, while associations and cooperatives involve much more non-owner members than consortia. This is very evident especially within two types of association: ‘Forest community’ and ‘Model forests’, which have the purpose to develop a permanent path of participatory governance, directly involving many different actors in a forest region, including actors who do not strictly belong to the forest sector.

Interestingly, forest agreements are used to frame the management responsibilities of significant forest areas, larger than 3,500 ha. The certification group also deals with some thousands of hectares of forests, though it does not assume full responsibility for management, but is dedicated only to ensuring compliance with sustainable forest management certification requirements for those forests. Certification is quite a common option between forests managed by associated subjects, since the total certified forest area corresponds to 38,489.70 ha, i.e. 56% of all forest areas managed within the survey sample.

Forests managed by associations (of any type) are characterised by a higher coverage of forest planning than the national average: approximately 64% of the forests included in the survey have a valid management plan in place, whereas only 8% do not have any plan, the remaining being included in some general territorial plan or in Natura 2000 management plans.

Table 5.4 – Average forest property (ha), planned and certified areas under direct mid- to long-term management by associative typologies.

Category (Total managed area, ha)	Associative typology	Managed area (ha)		Of which (%)		
		Public	Private	Forest management plan	No plan <sup>4</sup>	Certified
Consortia (7,705.6)	Forestry consortium	6,884.2	101.7	78.8%	6.8%	67%
	Second level consortium of forestry cooperatives	9,000.0	300.0	50.5%	49.5%	100%
	Public company	18,700.0	0.0	100.0%	0.0%	100%
Associations (4,894.6)	Forest association	1,395.5	151.8	76.7%	23.3%	67%
	Land Association	15.4	48.9	0.0%	20.0%	25%
	Model Forest	7,721.0	16,150.0	30.0%	0.0%	0%
	Forest community	461.0	675.0	100.0%	0.0%	0%

<sup>4</sup> Areas with “No plan” are those for which is missing any kind of planning activity. They are not simply the difference between the total and the areas with forest management plan, because some areas are included in other types of plan (e.g., “general territorial plan” – *piani di indirizzo territoriale* – or Natura 2000 management plan).

Cooperatives (90)	Community cooperative	0.0	120.0	100.0%	0.0%	100%
	Forestry cooperative	73.3	6.7	50.0%	50.0%	100%
Contractual solutions (2,512.7)	Forest Agreement	3,576.9	75.0	50.0%	0.0%	50%
	Business network	0.0	0.0	100.0%	0.0%	n.a.
	Certification group	1,452.7	1,306.2	100.0%	0.0%	100%

#### 5.4.4 Management activities

Consortia and cooperatives conduct a wider variety of activities than associations. In fact, while 50% of the surveyed associations declare to carry out only one activity, more than 50% of the consortia and cooperatives surveyed declare to carry out more than two activities regularly. In particular, 100% of the cooperatives and 80% of the consortia carry out commercial activities aimed at selling products and/or services to third parties, whereas only one within the 12 associations surveyed does. The same association engaged also in tenders to supply some services to municipalities. Services contracted from public administrations, through public tenders, represent a key activity for 75% of the interviewed cooperatives. Associations mainly carry out activities aimed at providing services to members (above all, forest management planning) and coordination/governance between them (Figure 5.3).

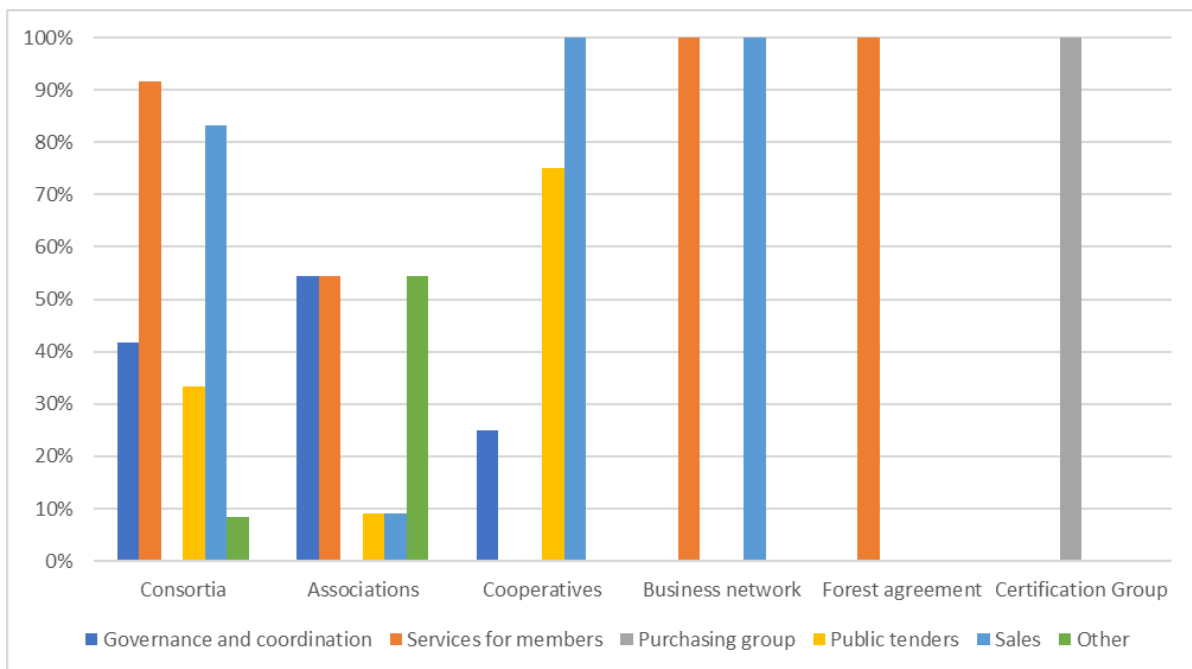


Figure 5.3. Main activities carried out from different associative categories.

Business networks, having the opportunity to become ‘legal entities’, can carry out activities such as marketing, selling, but also logistic and administrative tasks and fund raising. Forest agreements cannot be considered as legal entities themselves; rather, the ‘executor’ can be asked to carry out activities in the name and for the others. With that premise, within forest agreements, the executors interviewed carry out forest management and also commercial activities. Finally, the certification group is created to optimise costs and operations to obtain sustainable forest management certification, as such it can be said to be a ‘purchasing group’.

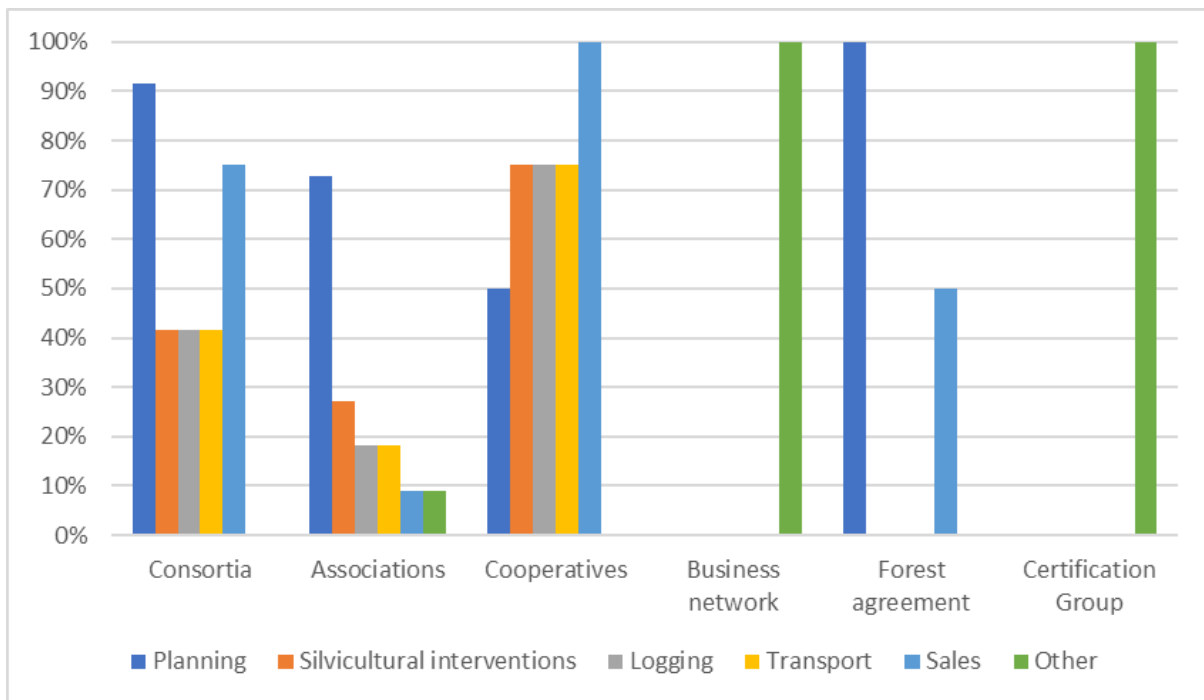


Figure 5.4. Forestry activities of various typologies of AF.

Forest management activities (Figure 5.4) reflect the general attitude and trends observed in more general terms in Figure 5.3. Only two of the surveyed associations carry out forestry operations directly, with one of them doing it just on voluntary basis onto very small areas to provide some firewood to its members, and the other one being more structured, even including the use of some machineries, to support its members in forestry operations. This association also declared that it supports the sale of forest products by individual members, logistics’ management, and prices negotiation. Most of the associations are responsible for forest management planning.

On the other hand, consortia, and even more so cooperatives, directly carry out silvicultural interventions and the subsequent sale of forest products. Consortia control forest management from management planning to product sales, whereas cooperatives are more focused on forest operations and sales, normally working in forests managed by third parties. The business network and the certification group are not really concerned with forest management activities, which is instead the

purpose of forest agreements, within which planning is the main forestry activity carried out directly by the executor of the agreement. Other forestry operations are contracted to forestry companies, which could theoretically be involved as signatory parties within the same agreement, although this was never the case within the surveyed sample.

#### 5.4.5 Funding

The type of activities carried out also influence the source and kind of income (Figure 5.5). Most of the associations' revenues, as well as community cooperative's, come from public contributions (e.g., Rural Development Programs (RDP)' funds, regional calls for funding), while other types of income, mainly from the provision of services, play a very marginal role. All in all, the revenues are fairly balanced between the three main sources considered, i.e. public contributions, the sales of products, and the provision of services to third parties, however notable differences can be identified between (and within) different types of associations. For example, sales represent 98% of the total annual income for that peculiar type of consortium which has become a public company. Forestry cooperatives sell their services to private and public entities, they get some public funding (RDP or other regional calls) and a lower amount from direct sales of forest products.

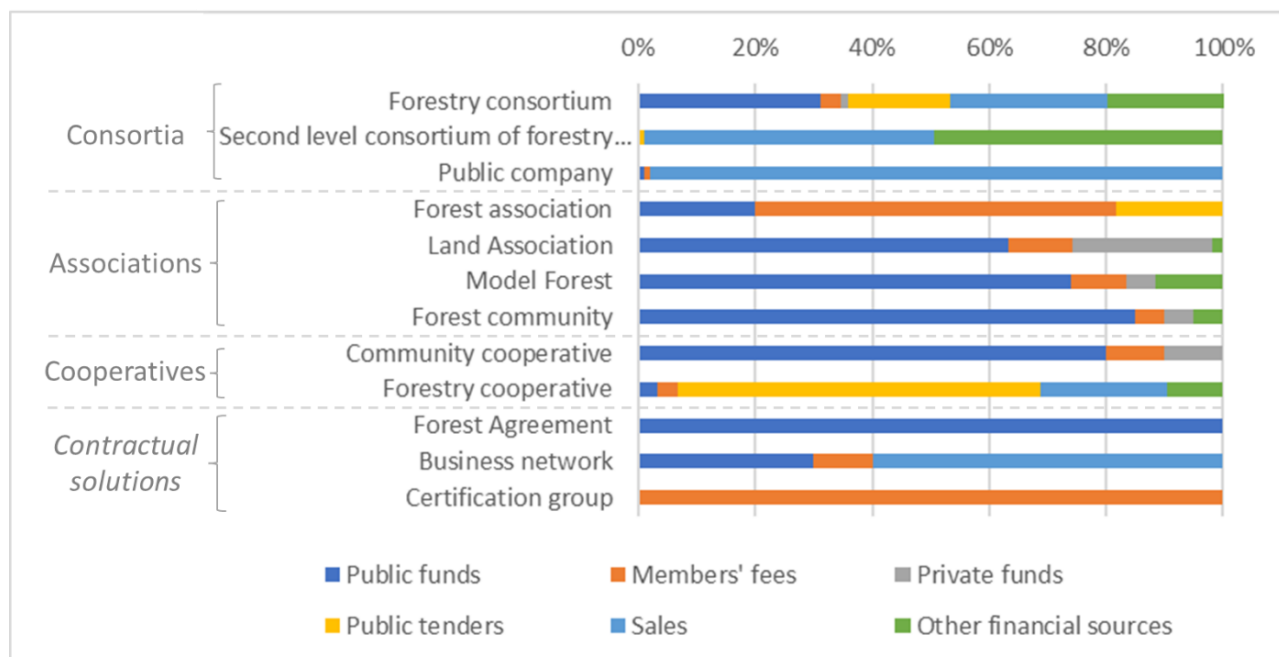


Figure 5.5. Main sources of revenues (on annual base) for the different typologies of AF.

#### 5.4.6 Staff (workers and employees)

As shown in Table 5.5, model forest is the only type of association with employees. Associations mainly rely on voluntary work by their members, and they all have steady collaboration with external professionals, including at least one professional forester per association. Consortia and cooperatives

have an average number of employees ranging from 0.3 (for consortia of cooperatives) to more than 25 (for the forestry consortium evolved into a public company), and they both regularly rely on a number of seasonal workers and external professional collaborators.

The average turnover and the percentage of revenues from forestry activities allow for a better understanding of the volume of activities carried out by different associative typologies. Looking at the annual turnover, relevant differences can be caught between the public company consortium (more than 2 million €) and land associations (less than 10,000 €, on average). Forestry consortia (9 cases observed) anyway display a remarkable variability, four of them have a turnover higher than 1 million €, whereas three reported less than 10,000 € and one a bit more than 200,000 €. Two out of three forestry cooperatives have a turnover higher than 1 million €, and the third reports slightly less, while the community cooperative has a modest turnover, in any case not deriving from forestry activities.

Table 5.5 – Number of workers (employees, seasonal workers and external collaborators – full time equivalent), turnover (1,000 €) and relevance of forestry activities (% of the annual turnover) within different associative typologies.

Associative solution typology	N. of workers, of which			Turnover (1,000 €)	Revenues from forestry activities (as a % over total revenues)
	N. of employees	N. of seasonal workers	N. of external professional collaborators		
Forestry consortium	2.7	6.9	4.0	100-500	42%
Second level consortium of forestry cooperatives	0.3	0.0	0.5	500-1000	54%
Public company	25.5	12.0	3.0	>1000	60%
Forest association	0.0	0.0	1.0	0-10	32%
Land Association	0.0	0.0	2.2	0-10	2%
Model Forest	1.3	0.0	3.0	10-100	45%
Forest community	0.0	0.0	18.0	10-100	0%
Community cooperative	0.0	0.0	2.0	10-100	0%
Forestry cooperative	8.3	12.3	2.3	500-1000	40%
Forest Agreement	0.8	0.0	4.0	10-100	25%
Business network	0.0	0.0	0.0	0-10	0%
Certification group	0.0	0.0	2.0	10-100	100%



### 5.4.7 Communication and participation

Associations are very active in external communication initiatives. Indeed, although in most of the cases communication activities are carried out by members on a voluntary basis, associations seem to care more than consortia and cooperatives of tasks such as the development of newsletters or management of social media. In addition to that, associations are also active in organising public events: 75% of the surveyed associations reported that they regularly organise events in the area with the aim of maintaining and expanding their membership base, whereas none of the consortia and cooperatives does. Probably one of the main reasons why associations are so active in terms of communication is that the attitude of most of the association members remains, according to those interviewed, 'interested but not participating' (Figure 5.6). Furthermore, associations have, among their main purposes, the promotion of their activities, with the goal to increase the number of their members as well as enhancing their social and ecological impacts.

The forest agreement and the Certification group show a common attitude by their member forest owners, which are 100% 'interested but not participating', and are involved in the contract due to the initiative and mediation of a promoter, otherwise they would likely not be part of any association. On the contrary, AF based on the participation of a community, such as the Community cooperative or the forest community, succeed in getting active engagement of forest owners in their activities. Completely absentee forest owners are reported as an issue by forest cooperatives and forest associations, while consortia members are actively participating in their association. Slightly less than 50% of forestry consortia report cases in which members are 'interested but not participating'.

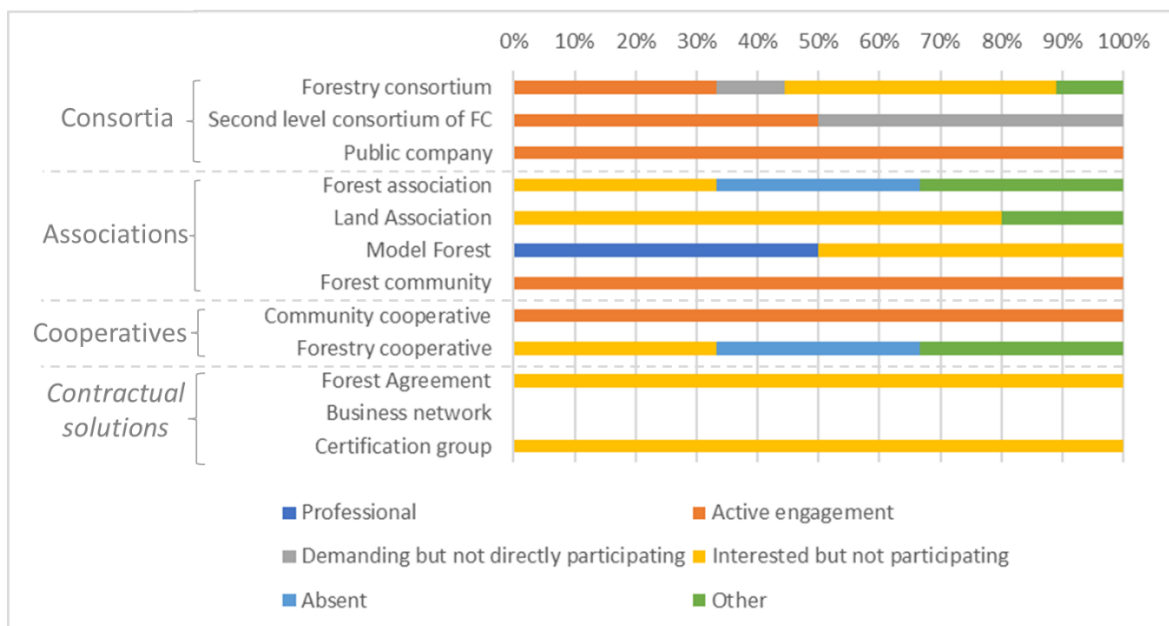


Figure 5.6. Attitude of members towards various typologies of AF.

## 5.5 Discussion and conclusions

Different typologies of AF can be applied according to who the forest owners are, to the characteristics of the forest and of the whole region, to the presence (or not) of other actors than landowners, and their effort, to the participation and the role of public entities (municipalities, above all). In summary, all AF seem to be more suitable according to these general characteristics, that should be observed carefully in the different context, to understand what AF could be promoted. Table 5.6 presents a summary of the main characteristics assessed within the different AF, according to the main aspects observed, and a highlight of the reason why such aspects were considered to analyse AF.

Table 5.6 – Summary of the main characteristics of AF assessed and their relevance.

KEY ASPECTS	RELEVANCE	CONSORTIA	ASSOCIATIONS	COOPERATIVES
INTERNAL GOVERNANCE	<i>Key feature to determine responsibilities and operational capacity (effectiveness).</i>	Strong empowerment of the BoD + Director with full operational responsibilities. Well structured, professional, transparent and effective. Efficiency hampered by bureaucracy.	Democratic and participative. Simple organisational structure. Not always effective, sometimes missing competences. Strongly reliant on volunteers. Low general costs.	Strong empowerment of the BoD, rarely further structured. Professional, effective, efficient.
MEMBERSHIP	<i>Engagement of different types of members can significantly influence the AF, in terms of representativeness, trustworthiness, power, attitude.</i>	AF preferred by Public forest owners (municipalities), in some cases also private owners participate and, less frequently, also non-owners.	Typically involving private forest owners, but also non-owners. Public actors can participate, generally increasing trustworthiness.	Forestry coop - Typically workers (non-owners). Community coop - Inhabitants of rural areas (eventually forest owners).
MANAGED FOREST AREAS	<i>The size and type of forest areas influence the activities, the range of Ecosystem Services that can be provided, the business opportunities</i>	Bigger (public) properties, up to some thousands of hectares. Frequently at higher altitude, until the treeline. Frequently encompassing highforests with remarkable value of timber.	Smaller (mostly private) properties, extremely fragmented. Frequently abandoned, encompassing former pastures and grasslands, old coppices and an overall poor value of timber.	Forestry coop - Forests managed through contracts, based on accurate economic evaluation. Community coop - Forest management contracted to maximise a broader range of ecosystem services.
FOREST MANAGEMENT ACTIVITIES	<i>Depend on the forest areas managed, but also on strategic choices, according to the demand for ecosystem services to be intercepted.</i>	From planning to timber sales. Some operational activities to external contractors.	Planning + some cultural/educational and landscape conservation activities.	Silvicultural interventions and timber sales + Innovative recreational and touristic activities.
FUNDING	<i>Variable, from sales to public incentives. Key aspect, especially in relation with forest management activities and the ecosystem services targeted.</i>	Diversified. Sales + payments for ecosystem/environmental services + public (EU/RDP) funds from tenders	Public funds + membership fees + revenues from services	Diversified. Sales + public (EU/RDP) funds from tenders

STAFF	<i>Indicated as the most important key resource by 90% of the respondents, the number of employees is at the same time an indicator and an enabling factor of the business capacity.</i>	From smaller consortia (with only the Director appointed) to bigger companies equipped with 5-10 permanent employees + 20-30 seasonal workers	Made of volunteers + external professional contractors. Bigger associations (model forests, the "Forest community") also hire a secretary.	From some units to more than 30 workers, to hold both technical and operational skills.
COMMUNICATION AND PARTICIPATION	<i>Key aspect to support the value proposition, both to enhance the marketing capacity and to achieve the organisation's mission</i>	Mainly "institutional" communication, to accomplish transparency rules.	Engaged in communicating their purpose, to gain consensus, promote awareness, increase membership, eventually raise funds.	Forestry coop - functional to marketing Community coop - rationale similar to that of associations

Consortia have historically been applied as a tool to associate public properties, and today the most successful consortia are those that have become public entities or act in a very similar way. Interestingly, four within forestry consortia reported to have 'interested but not participating' members, in contrast to the others where members are mostly 'actively engaged'. This discrepancy goes hand in hand with other characteristics, including (but not limited to) turnover, the number of employees and the type of prevalent activity. Consortia reporting non participating members are the same ones that were established thanks to the initiative/mediation of a third party, which was not directly a forest owner, and thus struggled to involve forest owners, both public and private, since their origin. On the contrary, consortia managing larger forest areas and getting higher incomes were established with an active and decisive engagement of members since the first steps.

Associations can bring together very heterogeneous actors who, in some cases, share their status of forest owners, which however does not always correspond to a proactive forest management attitude, nor to particular objectives in this regard. On the contrary they can be completely absent or not participating. All in all, organisations addressed by our survey tend to show a very different profile from the owners' associations that can be found in other European countries, such as in eastern Europe, France or Germany, where members in most of the cases are themselves actively managing their forests (Ficko et al., 2019; Pivoriūnas, 2021; Sarvašová et al., 2015). In any case, the legal form of Italian association cannot generate profit, and it has limited possibilities to develop commercial activities. Also, for these reasons, they revealed issues in financing and business development: low solvency and low income strongly limit their possibility to buy assets and even to carry out activities within projects benefitting public funding. Financial regulations in public tenders almost always require associations to anticipate payments and to ask for public contributions ex post, with periods of financial exposure easily exceeding 1 year. Meanwhile, due to their legal entity and low solvency

because of low capitalisation, they struggle in getting bank loans and fell into a vicious circle hardly challenging start-up and scale-up phases, in which they are anyway strongly reliant on public funding.

In a similar manner, surveyed cooperatives differ significantly from those operating in Eastern and Northern Europe: they are initially established as forestry enterprises without any land property, manage forest areas limited in size, and are dedicated to other prevalent activities (e.g. management of green urban areas). The surveyed cooperatives often work public forest areas through public tenders (so called “municipal forest plots”) or on private forest areas through more or less formalised contracts, carrying out punctual and short-term operations, thus considerably diversifying their profitable activities and income sources.

Community cooperatives, on the other hand, are potentially very innovative tools, but to date they have not yet come to a mature form and assumed a significant role in forest management. They are created to satisfy primarily social needs and, although they pursue the creation of economic and employment opportunities for the inhabitants of a given area, they do not directly involve forest owners in their structure, at least not intentionally and proactively. The case analysed reveals a significant opportunity for the convergence of private interests (though with spillover effects benefiting the whole local community) of the cooperative, with public interests and utility, thanks to the support of a robust and effective legal framework provided by a forest agreement, an innovative contractual instrument. The re-activation of forest management on the three private forests will allow landowners to benefit from the enhancement of the overall value of their assets, rather than undergo a reduction of the value, meanwhile the community cooperative will generate forest ecosystem services, some directly benefitting the whole local community (e.g., footpaths and recreation in the forest, risk reduction for forest fires) and others to be marketed by the cooperative, in turn benefitting the community, anyway. Similarly, one of the three forestry cooperatives interviewed has set up a network of enterprises to guarantee market outlets for certain forest products, a prerequisite for building a medium-long-term management commitment on a municipal area, for which it is negotiating a multiyear concession agreement. The long-term agreement will allow the cooperative to better develop its entrepreneurial activities, and in return, the municipality will be able to demand that the cooperative implement management choices that guarantee the possibility for the community to enjoy ecosystem services and the full conservation of forest value.

Contractual agreements therefore prove to be a fundamental linking instrument which allows certain associative subjects, which are outlined as being more capable than an individual in reactivating local territories and their management, to take on a key role in forest management, when the association per se does not achieve in accessing to forest property or to its management. From this point of view,

a forest agreement, although very simple in its legal formulation being basically a contract, can be very effective and innovative in terms of impacts on the ground. It can be applied to build a formal framework within which forest owners, managers and even users can clearly agree about their roles and responsibilities in a clear and binding way, finally protecting and supporting the interests of each party. Some elements included within the forest agreement were already present in other pre-existing contractual instruments, such as the regulation of a project for the joint management of a business or parts of it, inherent in the network contract. The latter, however, is limited to the business sector and its actors, i.e., to entrepreneurs. The concession contract could also represent an option, in particular when public entities want to temporarily transfer the management of certain areas to private subjects under given conditions, but it can hardly be applied to bind more than two parties. This implies that it can be easily shaped as a supplier-customer or owner-tenant relationship, rather than a co-responsibility agreement.

Overall data on the amount of forest areas with a valid forest management plan in place (64%) and certified forests (56%) in the surveyed sample seem to indicate some ability of associative forms to promote these practices far beyond national average figures at national scale, where 15.5% of Italian forests have a with valid forest management plan in place and 9% are certified (Direzione generale delle Foreste - MIPAAFT, 2017). Although the sample analysed is not statistically representative of the total population of associative forms in Italy and notwithstanding the fact that caution should be used in such a comparative assessment, it is possible to argue that associating, in some way, forest owners might work as a catalyst to overcome bottlenecks that single owners may not be able to deal with. This may derive, for example, from the capacity to activate economies of scale that reduce costs associated to planning and certification. Therefore, associating forest owners can be considered, in general terms, an effective solution to encourage active and sustainable forest management. Recent policy initiatives have addressed the issue of land abandonment, indicating land associations or associate management as a key solution (Ferrucci, 2018; R. Romano, 2018), however an uneven normative framework has been developed within Italian regions that complicates the understanding of these instruments and how they can be implemented.. A better knowledge of the topic is needed, as well as the disambiguation of some legal aspects, such as the possibility to carry out any kind of activity (for the associations), or the procedures and norms that should be followed (for consortia whose members are public owners).. In the surveyed sample, notable differences exist in terms of size and impacts within different associative typologies, with reference to several of the analysed variables. However, a simple linear comparison between them, only looking at absolute quantitative features, may miss a key point: the relevance of the context. etc. Very different socioecological contexts can be found across the Italian forest regions, and even at a more local level (sub-regional

difference exist) and different solutions can diversely address specific issues and rely on local opportunities and resources. Furthermore, associations can be entrusted with forest management responsibilities not only through membership, which could be too demanding in some cases, but also by applying contractual solutions, which may more easily allow to broaden the range of management possibilities.

The Italian Consolidated Forestry and Forest Supply-Chain Law 34/2018 also indicates associations as the strategic subject to reactivate the management of silent lands (Art. 12, c.3). However, and again, the same law assigns to Regional Administrations the competence to define how this process should be implemented, and no clear and specific procedures have been set to date. One of the main barriers (and cost) to this process is the identification of landowners, due to hard bureaucracy and to migration of many people from rural (mountain) areas to cities or to other countries, thus making their identification very difficult or even not fully possible. Understanding who (especially private) forest owners are, what their characteristics, motivations and attitudes are would be a key step for policy makers and practitioners in selecting the most effective instruments to implement case by case.

The lack of such a clear understanding represented also a limitation for this research: having no reference to previous studies on the topic and missing comprehensive studies on Italian forest owners (Mozzato & Gatto, 2016), we focused on organisational solutions to associate forest owners but we were missing detailed information about forest owners and land abandonment. Furthermore, as already stated in Chapter 5.3, a comprehensive assessment of all existing forest associations is also missing and is a further limitation of this study. However, solutions were found basing the survey on a convenience sample with clear selection criteria, that allowed to complete a rich and unprecedented analysis of the associative forms in the Italian forest sector. Even if neither representativeness nor completeness can be claimed, many information and some clear trends emerged, and can represent a solid basis to refer, both for practitioners and policy makers, in the implementation of such solutions to encourage active forest management by associating forest owners.

**Supplementary Materials:** The following Supplementary materials are available after references: S5.1. Questionnaire developed for the survey of the different associative forms existing in the Italian forest sector.

**Author Contributions:** Conceptualisation: F.L., N.A., M.M.; Methodology: F.L., N.A., L.S.; Data collection: F.L.; Formal analysis and Data curation: F.L. and N.A.; Writing- draft: F.L., N.A.; Writing - review: M.M., L.S., F.L.; Visualization: F.L.; Supervision: L.S., D.P. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was developed within the LIFE ClimatePositive project but carried out within the PhD program at the LERH (Land, Environment, Resources, and Health) School, financed by the University of Padova, therefore did not receive external funding.

**Conflicts of Interest:** The authors declare they have no conflict of interest.

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## 5.7 Supplementary materials

S5.1. Questionnaire developed for the survey of the different associative forms existing in the Italian forest sector.

1. GENERAL DATA				
<i>Per le domande relative alla superficie forestale, si faccia riferimento alla superficie conferita in gestione al soggetto associativo (associazione/consorzio/contratto/gruppo/ecc.), qualunque sia la modalità di conferimento. Se il soggetto associativo non gestisce direttamente il bosco, si faccia riferimento alle superfici complessive di proprietà dei soci/membri.</i>				
1.1	Complete name			
1.2	Legal Entity	<input type="radio"/> Associazione <input type="radio"/> Consorzio <input type="radio"/> Cooperativa <input type="radio"/> Rete di imprese <input type="radio"/> Accordo di foresta <input type="radio"/> Altro (specificare: _____)		
1.3	Website			
1.4	Area/Region	Legal address:	Operational area:	
1.5	Your AF is:	<input type="radio"/> Active, with at least 1 balance sheet approved <input type="radio"/> Active for the first year <input type="radio"/> Going to be established <input type="radio"/> Other (specify: _____)		
1.6	Forest area managed	Public (ha):	Private (ha):	
1.7	Interviewee	Name and surname:		
		Role:		
		E-mail:		
		Tel.:		
1.8	The interviewee is:	<input type="radio"/> a member/shareholder <input type="radio"/> Employee but not member <input type="radio"/> External collaborator <input type="radio"/> Other (specify: _____)		
2. ORGANISATIONAL DATA				
1	Who and how many are the members of your AF?	1. Forest Owners	TPOLOGY	N°
			Municipalities	
			Public Companies	
			Parks	
			Forestry consortia	
			Private Individuals	
			Companies	
			Others (specify: _____)	

		2. Non forest owners	Municipalities	
			Public Companies	
			Parks	
			Forestry consortia	
			Private Individuals	
			Forestry enterprises	
			Other Companies	
			Others (specify: _____)	
2.2	Are there some requirements for the admission?			
2.2 b	Which are the admission requirements?			
2.3	Is your AF participating to other organisations (e.g.: associations, federations, consortia, networks, etc.)?			
2.4	Which are the fundamental values of your AF?			
2.5	What is the mission of your AF?			
2.6	Prioritise the material resources used for your activities (from 1 being the most important)		Machineries	
			Human resources	
			Tools and instruments	
			Technologies	
			Buildings	
			Other (specify: _____)	
2.7	How is the BoD elected?			
2.8	Do you have a Director?			
2.9	How is the Director entrusted?			
2.10	Is there anyone else who can take relevant decisions? Who and which ones?			
2.11	Are there internal rules set for making the organisation work?		<input type="radio"/> Internal rules are written and everybody know them <input type="radio"/> Internal rules are written but only a few people know them <input type="radio"/> Internal rules are not written but everybody knows them <input type="radio"/> No Internal rules are set, to date <input type="radio"/> Other (specify: _____)	
2.12	Are sanctions and/or incentives implemented?			
2.13	Do you collaborate with a professional forester? Which role does/do he/she/they have?			
2.14	Quanti sono i lavoratori dipendenti in forze in questo momento, per ciascuna delle seguenti categorie?		Full-time permanent employees	
			part-time permanent employees	
			Full-time temporary employees	
			part-time temporary employees	
			Season workers	

2.16	How many external people are regularly collaborating with your organisation?		
2.17	Quali strumenti e modalità usate per la comunicazione interna, finalizzata al coinvolgimento degli associati? (Selezionare una o più opzioni)	<input type="radio"/> Riunioni periodiche in presenza <input type="radio"/> Riunioni in videoconferenza <input type="radio"/> Sito internet <input type="radio"/> mailing list <input type="radio"/> campagne informative <input type="radio"/> eventi <input type="radio"/> altro (specificare: _____)	
2.18	I soci/membri/aderenti hanno tutti uguale accesso alle informazioni relative alle scelte dell'associazione/consorzio/contratto (ad esempio verbali di cda, delibere, scelte strategiche, nomina del direttore, ecc.)?	<input type="radio"/> Sì, in ogni caso le informazioni sono sempre trasmesse a tutti <input type="radio"/> Sì, se partecipano attivamente alla vita associativa <input type="radio"/> No, solo un gruppo limitato di soci/membri accede alle informazioni sulle scelte dell'organizzazione <input type="radio"/> No, solo i decisori (amministratori/direttore/delegati) <input type="radio"/> altro (specificare: _____)	
2.19	Chi è incaricato di occuparsi della comunicazione?		
2.20	Avete una strategia e/o un piano di comunicazione esterna (ad esempio per promuovere la vostra attività, i vostri servizi/prodotti, o per coinvolgere nuovi soci)?	<input type="radio"/> Presenti sia strategia sia piano di comunicazione <input type="radio"/> abbiamo solo una strategia di comunicazione <input type="radio"/> Non è prevista una strategia né un piano di comunicazione, si gestisce la comunicazione di volta in volta <input type="radio"/> Non viene effettuata alcuna comunicazione esterna <input type="radio"/> Altro (specificare: _____)	
2.21	Quali strumenti e modalità usate per la comunicazione ESTERNA, finalizzata a informare il pubblico/promuovere l'attività dell'organizzazione? (Selezionare una o più opzioni)	<input type="radio"/> Sito internet <input type="radio"/> mailing list <input type="radio"/> Social networks (specificare quali: _____) <input type="radio"/> campagne informative <input type="radio"/> eventi <input type="radio"/> altro (specificare: _____)	
<b>3.</b>	<b>GENERAL ACTIVITIES AND BUSINESS</b>		
<p><i>In questa sezione vengono poste domande sull'attività dell'associazione/consorzio/contratto, per capire di cosa si occupa e in quale misura. Alcune domande si riferiscono alle attività commerciali (quando si parla di vendita, clienti, ecc.) mentre altre guardano a tutto lo spettro di attività dell'associazione/consorzio/contratto, che può svolgersi anche in forma non commerciale (quando si parla di servizi ai soci, stakeholders beneficiari, ecc.)</i></p>			
3.1	Che tipologia di attività conduce l'associazione/consorzio/contratto? (indicare una o più opzioni)	<input type="radio"/> Coordinamento/governance tra i soci/membri/aderenti <input type="radio"/> Servizi a favore dei soci/membri/aderenti <input type="radio"/> L'associazione in sé non svolge attività propria, bensì agisce come un "gruppo d'acquisto" di servizi da uno o più fornitori a vantaggio dei soci/membri/aderenti <input type="radio"/> Attività commerciali di vendita di prodotti e/o servizi a terzi <input type="radio"/> Servizi da affidamenti pubblici (appalti, concessioni) <input type="radio"/> Altro	
3.2	Quali servizi a vantaggio dei soci svolge la vostra associazione/consorzio/contratto?		
3.3	Elencate in ordine di importanza i prodotti/servizi forestali venduti (dove 0 significa che il prodotto/servizio non è venduto dall'organizzazione, mentre 1 è il più importante):	Legname in piedi	
		Legname tondo	
		Legname lavorato	
		Prodotti Forestali non legnosi (specificare quali: _____)	
		S. tecnici selvicolturali c/terzi	

		S. ricreativi forestali			
		Servizi ecosistemici di regolazione (specificare: _____)			
		Altro (specificare: _____)			
3.4	Elencate in ordine di importanza i prodotti/servizi NON forestali venduti (dove 0 significa che il prodotto/servizio non è venduto dall'organizzazione, mentre 1 è il più importante)?	Servizi amministrativi			
		S. commerciali			
		S. tecnici di lavorazione del legname c/terzi			
		altri S. tecnici non forestali c/terzi (specificare):			
		Altro (specificare: _____)			
3.5	Quali sono le principali tipologie di clienti?	<ul style="list-style-type: none"> <li><input type="radio"/> Pubbliche amministrazioni</li> <li><input type="radio"/> Imprese forestali</li> <li><input type="radio"/> Aziende private del settore legno - arredo</li> <li><input type="radio"/> Aziende private di altri settori (specificare: _____)</li> <li><input type="radio"/> Consumatori individuali (Descrivere meglio chi sono: _____)</li> <li><input type="radio"/> Nessun cliente "esterno" (i servizi sono resi esclusivamente a favore dei soci, senza dar luogo ad attività commerciali)</li> <li><input type="radio"/> Altro (specificare: _____)</li> </ul>			
3.6	Quali sono i principali canali di vendita?	<ul style="list-style-type: none"> <li><input type="radio"/> Aste pubbliche</li> <li><input type="radio"/> Grossisti</li> <li><input type="radio"/> Agenti commerciali</li> <li><input type="radio"/> Accordi commerciali con altri operatori di settore</li> <li><input type="radio"/> Contatto diretto con clienti aziendali</li> <li><input type="radio"/> Marketplace online</li> <li><input type="radio"/> Negozio fisico/magazzino</li> <li><input type="radio"/> Rete interna dei soci/membri</li> <li><input type="radio"/> Network esterno dei soci/membri</li> <li><input type="radio"/> Altro (specificare: _____)</li> </ul>			
3.7	Avete pianificato l'obiettivo di far crescere le dimensioni della vostra organizzazione nei prossimi 3 anni?	<ul style="list-style-type: none"> <li><input type="radio"/> SI</li> <li><input type="radio"/> NO</li> </ul>			
3.8	Qual è la strategia di sviluppo del business a supporto dell'obiettivo di crescita? (selezionare una o più opzioni)	<ul style="list-style-type: none"> <li><input type="radio"/> diversificazione</li> <li><input type="radio"/> incremento superfici/produzione</li> <li><input type="radio"/> specializzazione</li> <li><input type="radio"/> aumento del numero di soci</li> <li><input type="radio"/> Altro (specificare: _____)</li> </ul>			
3.9	Con quali azioni si punta ad attuare la strategia di crescita?				
3.10	Facendo riferimento all'ultimo bilancio approvato (anno: _____), indicate le dimensioni economiche delle seguenti voci del bilancio:	Entrate/ricavi	Uscite/Costi	Patrimonio netto	Utile
	0 – 10.000,00 €				
	10.001,00 € – 100.000,00 €				
	100.001,00 € – 500.000,00 €				
	500.001,00 € - 1.000.000,00 €				

	Oltre 1.000.000,00 €				
	non previsto				
	non so				
3.11	Potete stimare il contributo percentuale delle varie tipologie di USCITE/COSTI che compongono il bilancio?	Spese vive per le attività (carburanti, materiali, rimborsi)			%
		Costi per la sicurezza:			%
		Consulenti esterni:			%
		Costi per il personale:			%
		Costi amministrativi e generali:			%
		Ammortamenti (per acquisto di macchine e attrezzature)			%
		Altro (specificare: _____)			%
3.12	Potete stimare il contributo percentuale delle varie fonti di ENTRATE/RICAVI che compongono il bilancio?	Contributi pubblici:			%
		Autofinanziamento (quote soci):			%
		Fondi privati:			%
		Appalti pubblici:			%
		Vendite v. Privati:			%
		Altro (specificare: _____)			%
3.13	Attualmente ritenete che l'attività del vostro ente sia economicamente sostenibile, al netto di contributi pubblici?	<input type="radio"/> Sì <input type="radio"/> No			
3.14	Quale % di ricavi (sul totale) deriva da attività/prodotti/servizi derivanti dalla gestione forestale?				
<b>4.</b>	<b>FORESTRY ACTIVITIES</b>				
<i>In questa sezione si indagano gli aspetti più strettamente forestali, ovvero le modalità e i risultati della gestione forestale praticata nelle foreste. Le foreste di riferimento sono quelle la cui gestione è affidata all'ente rispondente OPPURE, nei casi in cui l'ente non si occupi direttamente della gestione, perché ha finalità diverse (vd. domanda 4.2 - ad es. gruppi di certificazione) ci si riferisce alle foreste di proprietà dei soci/membri aderenti.</i>					
4.1	Chi sono i proprietari delle foreste di cui l'associazione/consorzio/contratto si occupa, e che estensione hanno le rispettive superfici?	Comuni	n =	ha =	
		Aziende speciali/partecipate pubbliche	n =	ha =	
		Enti gestori aree protette	n =	ha =	
		Persone fisiche	n =	ha =	
		Imprese	n =	ha =	
		Altro (Specificare: _____)	n =	ha =	

4.2	Qual'è il compito dell'associazione/consorzio/contratto rispetto alle foreste di cui si occupa?	<ul style="list-style-type: none"> <li>○ Gestione forestale “chiavi in mano”</li> <li>○ Responsabile di alcune fasi della gestione forestale (Indicare quali: _____)</li> <li>○ Fornitura di servizi funzionali alla gestione forestale, che rimane in capo ai soci/membri</li> <li>○ Nessuna delle precedenti (descrivere: _____)</li> </ul>																
4.3	Che tipo di pianificazione di gestione è attuata sulle superfici forestali? in quale percentuale (rispetto alla superficie totale delle aree forestali di cui si occupa l'associazione/consorzio/contratto)?	Piano di assestamento/di riordino/di riassetto (altri sinonimi)																
		Piano Forestale di Area Vasta (PFIT o altri simili)																
		Piano di gestione area Natura 2000																
		Altra pianificazione (specificare: _____)																
4.4	Quali attività di gestione forestale sono condotte direttamente dalla vostra organizzazione e quali sono affidate a terzi?		Direct management	Third parties														
		Pianificazione:																
		Interventi selvicolturali (tagli):																
		Esbosco:																
		Trasporto:																
		Vendita:																
		Altro (specificare: _____)																
4.5	Adottate scelte gestionali mirate per massimizzare i seguenti servizi ecosistemici?	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Produzione legno</td> <td></td> </tr> <tr> <td>Prodotti forestali non legnosi (funghi, piccoli frutti, ecc.)</td> <td></td> </tr> <tr> <td>Cattura e stoccaggio CO<sub>2</sub></td> <td></td> </tr> <tr> <td>Tutela della biodiversità</td> <td></td> </tr> <tr> <td>Regolazione dell'acqua potabile</td> <td></td> </tr> <tr> <td>Servizi “culturali” (paesaggio, valori spirituali, uso ricreativo, ecc.)</td> <td></td> </tr> <tr> <td>Altro (specificare: _____)</td> <td></td> </tr> </table>			Produzione legno		Prodotti forestali non legnosi (funghi, piccoli frutti, ecc.)		Cattura e stoccaggio CO <sub>2</sub>		Tutela della biodiversità		Regolazione dell'acqua potabile		Servizi “culturali” (paesaggio, valori spirituali, uso ricreativo, ecc.)		Altro (specificare: _____)	
Produzione legno																		
Prodotti forestali non legnosi (funghi, piccoli frutti, ecc.)																		
Cattura e stoccaggio CO <sub>2</sub>																		
Tutela della biodiversità																		
Regolazione dell'acqua potabile																		
Servizi “culturali” (paesaggio, valori spirituali, uso ricreativo, ecc.)																		
Altro (specificare: _____)																		
4.6	Quale gestione era praticata sulla superficie forestale gestita dalla vs. organizzazione e/o dai soci/membri, prima che l'associazione/cooperativa/contratto se ne occupasse?																	
4.7	Secondo voi, da quando la vostra associazione ha assunto la gestione del bosco, la fornitura di servizi ecosistemici è aumentata/diminuita/rimasta stabile?	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Produzione legno</td> <td></td> </tr> <tr> <td>Prodotti forestali non legnosi (funghi, piccoli frutti, ecc.)</td> <td></td> </tr> <tr> <td>Cattura e stoccaggio CO<sub>2</sub></td> <td></td> </tr> <tr> <td>Tutela della biodiversità</td> <td></td> </tr> </table>			Produzione legno		Prodotti forestali non legnosi (funghi, piccoli frutti, ecc.)		Cattura e stoccaggio CO <sub>2</sub>		Tutela della biodiversità							
Produzione legno																		
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Cattura e stoccaggio CO <sub>2</sub>																		
Tutela della biodiversità																		



		Regolazione dell'acqua potabile	
		Servizi "culturali" (paesaggio, valori spirituali, uso ricreativo, ecc.)	
		Altro (specificare: _____)	
4.8	Avete scelto di certificare la gestione forestale? Con quale schema?		
4.9	In generale, come definireste l'attitudine dei proprietari forestali nei confronti dell'organizzazione?	<input type="radio"/> Professionale <input type="radio"/> Impegno attivo <input type="radio"/> Esigente ma non partecipante <input type="radio"/> Interessato ma non partecipante <input type="radio"/> Assente	

## 6 Conclusions and recommendations

This last chapter is structured into three parts: in the first one, a discussion is carried out referring to the research specific objectives, and dedicating a sub-chapter to each of the three papers that present the main results of the research activities, to remark the principal conclusions they brought; in a second section, the main limitations of the research are commented, then the last part tries to draw general conclusions and provide some policy recommendations and suggestions for future studies about innovation in the organisational models of the forest sector.

### 6.1 Concluding remarks

This Ph.D. thesis aimed to analyse organisational models in the Italian forest sector, identifying innovation initiatives and experiences, to understand whether and how they can be implemented to encourage sustainable forest management. Understanding how to approach the analysis of organisational models, starting from a solid conceptualisation, was the first big research problem, since no similar studies were not found in the literature nor a clear conceptualisation, even less considering its application in the forest sector. Therefore, the research was designed framing it in three main parts, consequent and interconnected: a conceptualisation was developed to ground an analytical framework to be used in the following steps; the framework was first tested to get a general overview of the European context; referring to this work, the Italian context was then approached.

#### *6.1.1 Organisational models: a proposal for a conceptualisation and an analytical framework*

The first specific objective (Figure 1) was to conceptualise the organisational models and develop a framework to analyse them. Based on literature reviews, no uniform conceptualisation of the ‘organisational model’ was found in relation to the forest management domain in Europe. Trying to embrace the complexity of organisational arrangements, especially in this specific domain, the “organisational model” has been conceptualised as a representation of the way one or more actors establish internal and external relationships, establish order (rules), manage power, responsibilities, and resources, to achieve their purpose, influenced by a context that, in turn, is impacted by their activity. It was pointed out that organisations change over time, adapting to external changes and reshaping themselves to better suit new needs and purposes, for example through a process that is called organisational learning (Dedeurwaerdere, 2009), adapting to changes that can occur internally or externally (Primmer & Wolf, 2009). This work did not explore these concepts and dynamics but recognises their relevance especially looking for ‘innovation’ in organisational models, which is hardly defined in absolute terms, rather depends on where and when the processes and actors analysed are found. Several studies have considered various types of innovation and, if a univocal

categorisation was not found, but it was not the purpose of this research, some main types of innovation can be recognised: product innovation, market innovation, organisational innovation, and social innovation (Bureau of European Policy Advisers (BEPA), 2011). Moreover, it is useful to underline that the concept of innovation embodies two basic interrelated dimensions: it may refer to the phenomenon and process in general or to the results and outcomes (Weiss et al., 2020).

Before trying to identify innovative models, a multitude of organisational types were observed within the literature for forest management organisations, at a European level. A categorisation has been proposed together with a description of their characteristics, based mainly on the identification of the members and on the relationship they have with forest ownership. In doing so, four main ‘axes’ emerged to qualify such organisations:

- The legal nature of members, distinguishing between public/private and formal/informal;
- The relationship with forest ownership, which can be internal (of members) or external (owners as partners/clients/contractors);
- The purpose, within the profit/not-for-profit dichotomy.

Focussing back to the analytical framework hypothesised, four (internal) plus one (external) key dimensions were identified, within the proposed conceptualisation, to characterise organisational models: i) actors; ii) values/purposes, iii) rules and iv) power/responsibilities and resources allocation, that have to be considered within a given context (which is, in effect, a fifth key dimension itself). Twenty-five characteristics, belonging to the five over-mentioned key dimensions, were selected to describe the diverse organisational models within European forest management organisations. This final framework is represented in Figure 3.3, and was used for all the analyses carried out in the research. Some of the 25 characteristics belong more distinctly to one of the five key dimensions, while others lie at the intersection of several dimensions. The figure indeed represents each of the four internal key dimensions as an area with intersections with all of the others, surrounded by the fifth key dimension (the external context), which influences the organisation and its features, and can in turn be influenced. Despite the fact that the word ‘model’ could indicate the search for a replicable standard representation, complexity is the major trait that emerged from this conceptualisation, so generalisation should be avoided. A strict semantic interpretation of modelling as a “simple description of a system or process to make calculations or predict what might happen<sup>5</sup>” is not suitable to describe organisations, which are intrinsically complex. In our approach, organisational models can be properly described through an accurate analysis that includes all the five key dimensions.

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<sup>5</sup> <https://dictionary.cambridge.org/it/dizionario/inglese/modelling> - accessed 28/02/2024

### *6.1.2 Organisational models in the Italian forest sector: between innovation and tradition*

The second specific objective of this research was split into two sub-objectives: s.o. 2a) is to describe and characterise the main OMs available for forest management in Italy, and s.o. 2b) is to identify innovative OMs implemented to manage Italian forests. The work resumed in Paper II identified the broad range of associative solutions as the most relevant OMs in the Italian forest sector; for the purpose of this study, then, basing on the conceptualisation developed within the first part of the research, a categorisation is proposed, referring to the legal framework, and to the issues they are trying to address.

Italian forests are characterised by a general trend of growth, both in terms of expansion (+74% in the last 90 years) and in timber volume, considering that, on average, less than 20% of the annual increment (amounting 35,9 Mm<sup>3</sup> in the country) is withdrawn by silvicultural operations (Direzione generale delle Foreste - MIPAAFT, 2017). Data on forest management display quite low rates: only 15,5% the forests with a valid management plan, versus 37,4% without any silvicultural intervention, to cite only some. Private forests prevail (64%), but are mostly owned by individuals with very small and often fragmented properties, less than 3 ha, on average, but most frequently smaller than 1 ha (Rizzo et al., 2019). Public forests (37%) are characterised by a higher rate of managed areas, although they also suffer lack or poor management, due to weakened local administrations, such as municipalities (owning 65% of public forests) or mountain communities (Amato et al., 2022; Luca & Modrego, 2021).

In such a context, the Consolidated Forestry and Forest Supply Chain Law 34/2018, and the subsequent National Forest Strategy, clearly indicated the promotion and implementation of associated forms for forest management as solutions to address land fragmentation and lack of management (which can easily become land abandonment, in any case an issue strictly related to fragmentation) (Ferrucci, 2018; MIPAAF, 2018); furthermore, associative solutions are also encouraged to stimulate the activation of local forest-based value chains, further boost to forest management and to potential entrepreneurial initiatives in mountain rural areas.

In this light, associative OMs can be identified as one of the main fronts of innovation for the Italian forest sector. In a context where, immediately before and after the national law of 2018, also other regulatory and political initiatives have promoted such solutions and instruments and pushed for their implementation by means of funding initiatives, a considerable variety of options are now possible and many are already established, with different characteristics and prerogatives, which we have tried to acknowledge and describe, pointing out a first categorisation and some typical applications of the various forms.

However, land abandonment is really a wicked problem linked to several other problems: management issues (undeveloped supply chains, high costs), land consumption, population decline, and climate change (Dax et al., 2021), only to cite some. It is currently very difficult to focus on the issue in detail because the data are scattered and incomplete, missing many data on land ownership and land use, the monitoring process of policy initiatives is discontinuous, sporadic, and with uncertain and different outcomes depending on the sources of information.

Understanding owners' behaviour would be very important to improve the success rate of policy initiatives aimed at promoting forest management through associative models, either for private, public or collective properties but, especially when the goal is to involve private owners, it is essential to target owners with a tailored mix of policy instruments (Malovrh et al., 2015, 2017). To date, only one detailed study of individual private ownership exists, focussing only on the Trento Autonomous Province (Rizzo et al., 2019), while a couple more tried to describe some general characteristics and attitudes, based on case-study (Canton & Pettenella, 2010) but affirming that a big information gap exists on this (Mozzato & Gatto, 2016).

The consolidated text on Forestry and Forest Supply Chains also finally clarified the relevance of another related issue, which has been called "silent lands", precisely qualified by the lack of management, verified depending on the type of forests, and by the impossibility of reaching the owner after an official and public attempt has been made. The law establishes that Regional authorities should define how the public preliminary investigation should be conducted, and, after that, these lands should be directly managed by the Regions; otherwise, forest management should be entrusted to forest companies, consortia and cooperatives. To date, no regional authority implemented this regulation. Furthermore, if we look at the category of 'silent owners' or 'absent owners', which are no longer farmers, we also suggest that more attention should be paid to the policy instruments design to new types of land owners, shifting from the traditional role assigned to farmers in rural development funding programmes to innovative profiles of civil society-driven groups of potential owners and managers who are increasingly interested in taking care of forests, eventually for nature conservation purposes.

### *6.1.3 Associative forms for forest management: different solutions and performances, with some innovation perspectives*

The third part of the research was dedicated to a deeper analysis of performances, limits and opportunities, the social impacts and innovative solutions within OMs for managing Italian forests (s.o. 3) and to understand to what extent can innovative forest management OMs represent an opportunity for forest-related communities (s.o. 4).

Results of the survey confirmed some hypothesis derived from the precedent part of the study: different typologies of AF can be applied according to who the forest owners are, to the characteristics of the forest and of the whole region, to the presence (or not) of other actors than landowners, and their effort, to the participation and the role of public entities (municipalities, above all). In summary, all AF seem to be more suitable according to specific general characteristics, that should be observed carefully in the different context, to understand what AF could be best promoted.

In general terms, the overall data on the amount of forest areas with a valid forest management plan in place (64%) and certified forests (56%) within the surveyed sample of forest AF, would suggest to consider these organisational models as an effective solution to encourage sustainable forest management, if compared to the national averages, where 15.5% of Italian forests have a valid forest management plan in place and only 9% are certified (Direzione generale delle Foreste - MIPAAFT, 2017). Looking more closely at the different AF analysed, relevant differences have been recognised between different typologies.

Forest associations encompass quite a variety of types, from the very small land associations (40 members and 64 hectares managed, on average) to the big and complex Associations for Model Forests or the Forest Community (more than 150 members and thousands of hectares of forests). The smaller the association, the bigger the challenges they face during the start-up and scale-up phases, when associations are all strongly dependent on public funding, but still they struggle in finding financial solutions to overcome low solvency and, consequently, reluctance of banks to grant loans. If many associations revealed an obvious difficulty in direct and active management, due to economic-financial limitations but also to responsibility, on the other hand, some of them also found effective solutions by involving public bodies, to which the most demanding management responsibilities were delegated. Moreover, despite financial limitations, associations show a remarkable capacity to involve a variety of different members, public and private, individuals and collective, therefore they could be recognised as strategic solutions to involve people and entities and build awareness and culture about forest management, which is an underrated issue strongly related to land abandonment and to changes in mountain socioecological systems.

Forest Consortia represent the (only) traditional model implemented in Italy, the oldest being almost 150 years. One could think that innovation can hardly be found in such historical institutions; however, only some of them succeeded in evolving and are still active and healthy, whereas several closed in the past (Brun et al., 1998), and even in the present, considering that one of them, selected to be part of the survey sample, failed during the survey period, and two more were supposed to be investigated as case-studies, but did not complete the constitutional phase. Without investigating in

detail the reasons for these failures, which is beyond the purposes of this study, investigated consortia showed that some innovation pathways can be recognised. Members' engagement and participation is a first key point, together with the development of the technical team. The team sizing outlines two possible submodels: the consortium internally endowed with all the necessary operational capacities (even more than 40 employees) and the consortium that instead makes use of external partners, maintaining only a directing and steering role (very light, 1 or two employees). No big differences were detected in terms of economic performance and forest management activities, rather the two different models can influence their respective socioeconomic contexts in very different ways. Big consortia can directly bring employment opportunities for local people but often compete with professional foresters and small forestry companies; smaller consortia are not very relevant in terms of direct employment but bring opportunities of collaboration for other companies and foresters, stimulating the development of complex networks where the consortium plays a key role.

Cooperatives are not implemented in Italy to associate forest owners, however they can be found as an organisational solution within forestry companies, and in the interesting innovative model of community cooperatives. Even if not directly associating forest owners, both these models can play a role in management of third parties' forests, building steady partnerships with owners by means of contractual solutions.

Whatever the AF implemented, a crucial aspect lie in the involvement of private forest owners. As already mentioned, a critical gap is recognised in understanding who the Italian individual private forest owners are, what their attitudes and motivations can be, which objectives they have (if any) for their properties. A better knowledge of private owners is needed, together with a better monitoring of land abandonment; anyway, and moreover, the distance between forest owners and forest managers should be bridged. Hard bureaucracy and high costs are necessary to reach absent and silent owners, and this hampers many initiatives to involve their forests in the attempt to reactivate management that AF often start from small aggregation cores that are brought together by some pioneer and brave activators. Preliminary investigations to reach "silent owners" should be defined (and promoted) by the Regions, according to the Consolidated Text on Forestry and Forest supply chains (art. 12), but Regional authorities seem to assume an absconding behaviour on this topic, and such a lack of cooperation between different governance levels represent another obstacle that AF face when they try to plan forest management in their territories.

The survey respondents have also attributed to public entities a further role by the survey's respondents: the participation of municipalities, in particular, has been highlighted as decisive for considering AF trustworthy, especially the smaller ones. In several cases municipalities are involved

as members, in some others they have been promoters. In AF composed only of public members (such as many forestry consortia), this aspect is quite obvious; anyway, one of them usually had a role of “activator”, building trust between the others and into the associative OMs. The involvement of public entities was reported as relevant also within AF promoted by private actors, or characterised by a prevalence of private initiatives, both for aggregating also public forest (or parts of it) and for claiming trustworthiness towards the local community, other potential members, or other stakeholders. Participation of public actors, in turn, may bring some important challenges in terms of increased bureaucracy or political influences. Nevertheless, AF controlled by public actors, even if considered private entities yet, must comply with several complex regulations typical of public entities, such as tendering and recruitment procedures, business administration, governance transparency.

Another crucial problem, already mentioned, is finance. Most of the AF surveyed have been set up thanks to the impetus of public calls for tenders (regional or ministerial) and they all affirm that they need financial support, certainly for the entire start-up, most also later on (only 26% of the surveyed cases say that their business is economically sustainable even without public funding, while 74% said “no”). Above the solvency issues already described, the survey results revealed that the uneven framework for AF can also have critical consequences in the planning phase of public financial instruments, typically characterised by the need to establish strict criteria for defining funding eligibility. Several respondents complained that too rigid criteria excluded their AF from at least one call for funding, apparently dedicated to support associative management solutions, but not taking into consideration that peculiar OMs, even if established according to other normative or funding initiatives. Most of the AF surveyed affirmed that they do implement management choices with the purpose to maximise the provision of a broad range of ecosystem services, including soil protection, water cycle regulation, capture of CO<sub>2</sub>, biodiversity and landscape conservation (these groups of ecosystem services were explicitly cited in the questionnaire). Some AF cases were established with the priority objective of managing the land (and the forest) in order to enable the well-being, and even the safety, of the human communities living in contact with those environments. However, none of these succeeded in obtaining direct payments for providing such environmental services. Some consortia, especially those operating in Lombardy and in Piedmont, according respectively to two different legal frameworks, get public incentives to guarantee the provision of “environmental services” (so called in the Lombardy Region legal framework, ex art. 56 of LR 31/2008). These incentives are assigned to finance projects of active management operations, that must be accounted every year for getting the payment. In Piedmont two consortia benefit from schemes of payment established in agreement with the society responsible for the distribution of clear water, respectively in the towns of Torino and Cuneo, where final users pay an additional fee which is dedicated to active



management of mountain watersheds, entrusted to forestry consortia. Apart from these cases, other AF responsible for forest management cannot benefit from any payment for most of the ecosystem services supported by their activity, and this is a crucial problem. Indeed, even those cases where most effort is brought by volunteers, have to face with some costs that are initially covered by public funding, but can't rely on this in the mid nor in the long term. It is somehow a contradiction, since the rationale of public funding recognises the relevance of active management with respect to abandonment status in terms of an overall better provision of ecosystem services, but on the other hand no instruments are established to support this effort after the start-up phase.

Contractual agreements prove to be a fundamental linking instrument which allows certain associative subjects, which are outlined as being more capable than an individual in reactivating local territories and their management, to take on a key role in forest management, when the association per se does not succeed in accessing to forest property or to its management. Several contractual instruments are available, some more specific and limited (such as network contracts, the prerogative of companies, and concessions, applied by public owners), others much more open and applicable to diverse contexts, such as the forest agreements.

A key role in planning and establishing any associative OMs is that of the "activator". Such a role is played by one person or a small group, which develop the initial idea and works first of all to involve the first key actors and to build consensus between them and with the proposed idea. This role was acknowledged and described by all of the 31 respondents of the survey, being sometimes assumed by a professional forester, or by one (or a few) resident(s), or by a mayor. Interestingly, in all cases surveyed, an evolutionary dynamic was described for this role, not always identical: in some cases, the "activator" fully assumed the leadership also as an official role entrusted with legal responsibility within the organisation, in other cases they kept an external position, as consultant, in some older others, the activator's leadership had been overcome and new leaders had emerged.

In these last features, extensively described in the interviews, together with narratives of the constitutional and start-up phase, and with other key aspects, typical dynamics of social innovation can be recognised which is closely intertwined with what might appear to be pure application of regulatory/institutional instruments. On the contrary, social capital and social innovation dynamics are probably the most influential factors for the implementation of associative organisational models. Unfortunately, it was not possible to complete Study 4 (SO4), i.e. the analysis and presentation of the content of the interviews, which tell this very story with extraordinary effectiveness and will be published later on. This represents, in any case, an interesting direction for future research on the topic.

## 6.2 Limitations

The main limitation to this research was time. Two main obstacles challenged time management and the overall research design: the need for a complex conceptualisation in the early phase, and the failure of the planned methodology for the third part of the research. Missing a clear conceptualisation in the application of organisational studies to the forest sector, the first approach was quite disoriented, and it took some time to develop a strategy to overcome this issue and then to implement it. At the end of the day, the first part of the research was fully completed, with the publication of the paper, only in April 2023. While working on the conceptualisation, other parts of the research were carried on, in parallel. The research was initially designed to carry out some case studies' analysis, that started at the beginning of the second year but, unfortunately, one year later had to be abandoned. Two out of three selected case studies were associative OMs (forestry consortia) that were planned to be established by the end of summer 2022, the case study protocol developed for these two cases was based on following their establishment and start-up phase. At the end of 2022, the two consortia had not been established, yet (and still they have not, to date). If it was only one case to have failed its purpose, it could have been integrated in the study as a failure, but being two out of three, it was the overall case study protocol to be failed. Consequently, we decided to change the planned activities for this part, and run a broader study, in connection with the LIFE Climate Project, through a survey with questionnaires and face-to-face semistructured interviews, involving a much larger number of respondents and cases. The new design was drawn in January 2023, and interviews were conducted between June and October 2023, but I was not able to complete the content analysis before the end of the year, therefore the thesis is missing this last precious part.

Some more limitations are specifically related to some parts of the research.

As anticipated in Chapter 3.2.2.2, some more organisational 'typologies' were detected within the 66 articles, but the results were too poor to allow a complete analysis to describe their organisational model according to the framework and to present one or more additional categories. The categorisation proposed in Chapter 3.3 is far from being a complete representation of the organisational models for forest management organisations in Europe, missing some surely relevant typologies such as those cited in Chapter 3.3.6, namely, ENGOs, Model Forests, umbrella organisations, and certification groups, and probably some more that did not even result within the literature review. These gaps were addressed by encompassing such categories in a dedicated chapter (3.3.6) with a brief description of the emergent characteristics, even if not as complete as for the other categories.

In the second part of the research, missing comprehensive data on land abandonment and on private forest owners, the investigation referred to some proxy data from different sources, apparently inconsistent with each other. An interpretation is given to such apparent inconsistencies; however, a fully reliable assessment of the phenomena was not possible. Similarly, no repository of regional regulations nor of forest associations exists; therefore, the analysis presented can be defined complete, at best of our knowledge, but not comprehensive in absolute terms.

The detailed analysis of Associative OMs (presented in paper III) suffered from the same limitations cited above. Unfortunately, a comprehensive assessment or register of all existing forest associations is missing: consortia, being enterprises, must be included within the register of the Chamber of Commerce, Industry, and Handicrafts; whereas associations, of any kind, can be established even without any public act, and in any case a specific register for them does not exist. This lack of information represented a great challenge in the attempt to capture and describe the ‘universe’ of associations of Italian forest owners, therefore also for the methodology, preventing the definition of a precise representativeness of the selected sample.

A solution was found basing the survey on a convenience sample with clear selection criteria, which allowed to complete a rich and unprecedented analysis of the associative forms in the Italian forest sector. Even if neither representativeness nor completeness can be claimed, much information and some clear trends emerged and can represent a solid basis to refer to, both for practitioners and policy makers, in the implementation of such solutions to encourage active forest management by associating forest owners. Furthermore, an accurate analysis of the forest context, in which the analysed AF operate was not carried out, within the scope of this study. To comment associative solutions also considering ecological and silvicultural aspects could help, especially for a better understanding of their potential in terms of business development, starting from the valorisation of timber, for instance. In general, it can be stated that the presence of forests with better tree composition (in terms of species, volumes, shape) allows the development of AF with more solid business models; on the contrary, AF that are established to manage abandoned/poor land evidently need public support to carry on the management initiative. It can seem intuitive, but a more precise assessment of such aspects could help to improve research on this topic.

### **6.3 Conclusions and policy recommendations**

The gradual abandonment of mountain / rural areas and the resulting impacts are a complex issue with multiple factors at play. Like all complex problems, tackling it requires an approach that encompasses a plurality of perspectives and solutions, appropriately coordinated and integrated. For these reasons, first of all, this study cannot claim to be exhaustive, evidently. The current climate

crisis and related risks for human communities, as well as the dynamics linked to the loss of biodiversity due to the degradation of inadequately managed ecosystems, call for reactivating the active management of territories and forest stands in order to make them more resilient and to reduce trade-offs due to abandonment. At the same time, there is a need to take into account the socioeconomic dynamics of the same territories and to support local economies and communities in harmony with the management of natural resources.

Land fragmentation has been recognised as one of the bottlenecks to the implementation of active forest management policies, strategies, and initiatives (Mantero et al., 2020; Rizzo et al., 2019; Secco et al., 2018). To overcome it, associative organisational models have been indicated by the most recent Italian forest policies, consistently with an intuition that was first readable within the historical Royal Decree from 1923, considering such associative forms as able to aggregate owners, public and private - and to encourage networking among themselves and, possibly, with other actors. Over the last couple of decades, in the wake of a lively season of renewal and relaunching of policies and governance in the national forestry sector, various regulatory and funding initiatives were taken, aimed at defining, promoting, and supporting traditional and new aggregative models, pushing this direction with the ultimate goal of favouring the aggregation of owners and overcoming the technical and economic limits imposed by land fragmentation.

If, on the one hand, this has stimulated the creation of numerous initiatives in many territories, many of them with certainly appreciable results in terms of the reactivation of forest actors and supply chains, on the other, not all such experiences were successful and it has led to an uneven and not always coordinated framework of regulatory cases and reference models. Drawing on this varied reservoir of experiences, the present study has attempted to bring order by analysing and categorising such solutions looking at laws, regulations, and other policy initiatives, at a national and subnational (regional) level, starting with a conceptualisation based on a broad literature review and a first analysis of the European context. Then, without claiming to have completed an exhaustive study, however, an attempt has been made to gather a detailed account of the available experiences involving the protagonists, in order to identify, analyse, and describe the main options, their characteristics and potentials, but also their needs and pitfalls.

The results that emerged show how the various aggregative models lend themselves, by virtue of their profile and characteristics, to different purposes. Implementation of associative OMs for forest management requires careful evaluation of the socioecological systems. As it may sound intuitive that business opportunities strongly depend on the characteristics of the forests and on the existence and quality of the related value chains, it seems less considered that a crucial role must be recognised

to social capital, to be assessed at a very local scale. The diffused coincidence between forest lands and mountain areas, in Italy, impose to carefully evaluate the actual capacity of these territories to give birth to and develop initiatives that cannot remain an end in themselves, according to the available social capital, in some cases really poor, in others incredibly alive.

At the same time, greater consideration should be given to the overall social value that many associative organisational models are able to develop, recognising their decisive social utility character, especially in areas where otherwise the tendency to abandonment leads to the definitive depletion of the social dimension as well. Recognition of this value, to be juxtaposed with the aforementioned regulatory and cultural ecosystem services, should be further explored in order to justify more than legitimate public support, which should not be intended as welfarist, but rather in a perspective of full application of the principle of subsidiarity, in areas where public service is nowadays decidedly rarefied. As mentioned in chapter 6.1.3, progresses in the assessment of the ecosystem services produced/produced and related to the management/non-management of forest assets should be encouraged, in order to reach an adequate determination of the measure of incentives, as well as an assessment of the threshold of interest for their acceptance. Nevertheless, more accurate evaluation of ecosystem services could allow the sizing of a continuous support over time, not based on a logic of assistance but rather of remuneration for well-defined services of collective utility.

Moreover, this kind of initiatives should be accompanied by careful, robust and timely monitoring and evaluation process about the on-the-ground effectiveness of the various policy instruments introduced, to assist policy makers and practitioners in having evidence-based information to guide their decisions. Experiences surveyed, and even more those that could not be surveyed (three previously selected AF's projects failed within the survey period, less than one year) and the few other proxy indicators available at national level, seem to demonstrate that, at least so far, these instruments have not always been as effective as expected or needed. Financial and leadership issues, unreliable business models, isolation, lack of support by public administrations, are only some of the critical points identified. On the other hand, to cite a representative example, one of the last Italian policy initiatives for the forest sector was a call for funding, in spring 2023, for complex associative organisational models (the "supply-chain agreements and contracts") whose selection criteria was solely the chronological order in which the application was submitted from a 'click day'.

In a logic of improvement, it may be useful to look at the numerous experiences abroad, some of which were analysed in the first part of this study. Although apparently similar in their general organisational structure to Italian forest associations and consortia, observed European associative OMs have typically remarkable differences. In most cases, they are characterised by a much bigger

and more defined membership base, which almost exclusively includes private owners. This allows European associations to rely on regular and considerable income from membership fees, supplemented by revenues from the sale of services, which is not as easy in the Italian legal framework, and anyway could be better developed if bigger associations were set up. The financial stability also allows for more solid and articulated organisational structures, as well as the availability of dedicated professional resources. In addition to this, the bigger and more robust structure allows the associations to play a role not only for aggregation, coordination, and technical support, but also for the representation and protection of members' interests. This latter, especially, is declined through merging the single regional or local organisations into second-level bigger associations, which gain the representativeness (and build up the capacity) to bringing the owners' stakes and demands to national or even international policy tables.

The vision on the role of associations embedded in the policy initiatives that have been analysed should be enriched with this important political function, together with the aforementioned socio-cultural function (see Chapter 7.1.3), for which the association is probably better suited, rather than for the operational management of the forest, for which consortia and cooperatives are probably the best options. In fact, in addition to the important objective of reactivating forest management, associationism could also have the function of giving forest owners representation and a voice at the appropriate tables and forums, thus also directly advising policy makers about real needs and issues. Also considering this fundamental function, the Italian model further diverges from that of other countries, where second-level associations play a fundamental role of linking and lobbying, instead being characterised by a strong fragmentation and even rivalry and quarrelling between the few entities of this type within the sector.

In this sense, a conclusive highlight could be that associationism is clearly not an end in itself, but can be instrumental to many other policies in the sector and beyond, which should be coordinated and framed within a clear strategic design for the country's development, giving back to mountain areas' communities a key role.

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