

# Social capital as power resource in forest governance networks: A systematic review



Sugeng Riyanto<sup>ab</sup>   | Mohd Hafizal Ismail<sup>a</sup>  | Sheena Bidin<sup>a</sup> 

<sup>a</sup>Department of Recreation and Ecotourism, Faculty of Forestry and Environment, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia.

<sup>b</sup>Department of Socioeconomics, Faculty of Agriculture, Brawijaya University, Malang, Indonesia.

**Abstract** Forest governance involves complex power relations among diverse stakeholders, where social capital functions as a critical power resource that shapes actor influence and coordination effectiveness. Trust functions as a critical component of social capital, enabling stakeholder collaboration in collective forest management activities. Understanding how social capital enables or constrains stakeholder power dynamics is essential for improving multilevel forest management outcomes. This systematic review examines how actors mobilize trust, norms, and networks to influence governance processes in forest management systems. Using PRISMA methodology, we conducted bibliometric analysis on 85 articles and systematic review of 43 selected studies from Scopus/WoS databases spanning 1998-2024. The dataset encompasses publications from 245 institutions across 58 countries, representing diverse forest management contexts. Bibliometric analysis revealed increasing research focus on stakeholder relationships, multilevel governance, and actor coordination in forest management. Systematic review identified five key dimensions of trust, norms, and networks as power resources: trust-based influence mechanisms, normative authority systems, information coordination processes, resource mobilization channels, and conflict mediation structures. Findings demonstrate that trust and coordination mechanisms operate as distributed power resources enabling local actors to influence forest management through three primary mechanisms: network coordination, power redistribution, and governance legitimacy. Leadership emerges as a key factor in mobilizing trust for conflict resolution and aligning interests with conservation goals. Actor analysis shows that effective forest management emerges from effective coordination of trust and networks by key actors who bridge local communities, government agencies, and external organizations. Field evidence reinforces the importance of trust-based coordination and leadership in addressing forest resource management issues. The findings provide an analytical framework for understanding power relations in forest management systems, with implications for designing more inclusive and effective multilevel governance systems.

**Keywords:** multilevel governance, actor influence, institutional coordination, collective action, resource mobilization

## 1. Introduction

Forest governance serves as a crucial mechanism in balancing conservation needs with socio-economic development, particularly in areas where forests constitute the main source of livelihood for local communities. This pressure becomes even more pronounced in developing countries, where forests provide livelihoods for millions of people yet paradoxically face intense deforestation pressure. The lowlands of South America and Africa exemplify this phenomenon (Návar, 2015). The World Bank notes that the forestry sector in developing countries requires sophisticated governance arrangements to ensure economic sustainability while achieving conservation goals (Muthee et al., 2022; Houghton & Castanho, 2023). Contemporary forest governance operates through complex networks of actors including government agencies, private sector entities, local communities, NGOs, and international organisations, each wielding different types and levels of influence over forest management outcomes (Thompson et al., 2013; Vásquez-Grandón et al., 2018). The effectiveness of these governance networks depends heavily on the structure of power relations and the ways different actors mobilise resources to influence decision-making processes.

Traditional top-down governance approaches have proven inadequate in addressing the complex realities of contemporary forest management. These hierarchical systems fail to effectively tackle the multifaceted challenges of forest conservation, sustainable use, and equitable benefit distribution, particularly in contexts where multiple stakeholders hold competing interests and varying levels of power (Owuor et al., 2019; Arima et al., 2014). The limitations of centralized governance become particularly evident when dealing with cross-scale environmental problems that require coordination among local communities, national governments, and international organizations. Consequently, a more nuanced understanding of stakeholder power dynamics and coordination mechanisms becomes essential for developing governance systems that can effectively balance conservation imperatives with socio-economic development needs while ensuring meaningful participation of all relevant actors.



Social capital has emerged as a fundamental power resource in forest governance systems, encompassing networks of trust, shared norms, and reciprocal relationships. Unlike formal institutional power or economic resources, social capital operates as a distributed asset that can be strategically mobilised by different actors to influence governance processes and outcomes (Pretty, 2003; Musavengane & Simatele, 2017). Social capital's extends beyond facilitating simple collective action; instead, it functions as a complex power resource that can reshape stakeholder influence patterns, enable coalition building, and alter the distribution of decision-making authority within forest governance networks (Górriz-Mifsud et al., 2016).

Actor influence in forest governance has gained significant scholarly attention in recent years. Traditional hierarchical leadership models prove insufficient for contemporary forest governance, which requires an understanding of leadership as network orchestration—the ability of key actors to coordinate diverse stakeholders, facilitate information flows, and mobilise collective action across various scales of governance (Górriz-Mifsud et al., 2016). From this perspective, strong forest governance depends on the strategic deployment of social capital by actors who can bridge different stakeholder communities and coordinate multilevel governance processes.

This study applies a framework that views social capital as a power resource within forest governance networks. Actor-Centred Power Theory (Krott et al., 2014) serves as the main theoretical lens, analysing how different stakeholders utilise social capital to influence governance outcomes through three mechanisms of power: coercion (enforcement of regulations), incentives (distribution of resources), and information (coordination of knowledge). Network Governance Theory complements this approach by explaining how governance effectiveness emerges from coordinated interactions among interdependent actors rather than hierarchical control structures.

The theory of social capital as a power resource synthesises insights from Putnam, Coleman, and Bourdieu. This framework conceptualises social capital not only as a community asset but as a strategic resource that actors deploy to alter power relations within governance networks (Pretty, 2003; Musavengane & Simatele, 2017). The framework recognises three dimensions of social capital power: bonding capital that strengthens solidarity within groups and collective action capacity; bridging capital that connects diverse stakeholder groups and enables coalition building; and linking capital that provides access to formal decision-making processes and external resources (Górriz-Mifsud et al., 2016).

The Multilevel Governance Framework places the dynamics of social capital in the broader context of forest governance, which encompasses local, national, and international scales. This approach draws attention to how social capital can facilitate or hinder coordination between levels of governance and how power dynamics at one level impact another (Ido, 2019; Pairunan et al., 2021). Despite the growing recognition of social capital's significance in forest governance, significant analytical gaps remain. Existing research has predominantly concentrated on the overall benefits of social capital for collective action, offering little insight into the specific mechanisms through which social capital functions as a power resource within governance networks (Djamhuri, 2008; Ido, 2019). Furthermore, the relationship between social capital mobilisation and patterns of actor influence within forest governance systems remains under-explored, particularly regarding how local actors use social capital to navigate and influence multilevel governance processes (Muttaqin et al., 2019; Bizikova et al., 2012).

Understanding these dynamics has become increasingly urgent given that forest governance has become central to achieving the UN 2030 Sustainable Development Goals, specifically SDG 15 (Life on Land) and its linkages to climate change mitigation, poverty reduction, and sustainable development (Baumgartner, 2019; Da Silva et al., 2023). Effective forest governance must integrate local stakeholder participation with broader conservation objectives to fulfill these global commitments while ensuring equitable outcomes for forest-dependent communities (Katila et al., 2020; Ma et al., 2022). This systematic review analyses social capital as a power resource in forest governance networks, examining how different actors mobilise trust, norms, and networks to influence governance processes and outcomes. Specifically, this research addresses three main objectives: (1) analysing the dimensions of power resources by examining how different forms of social capital (bonding, bridging, linking) function as power resources mobilised by actors to influence forest governance; (2) mapping the mechanisms of actor influence by investigating how social capital enables network orchestration, power redistribution, and governance legitimacy in forest governance systems; and (3) identifying factors of governance effectiveness by determining the conditions under which social capital mobilisation leads to better coordination, inclusive participation, and sustainable forest outcomes.

The findings contribute to forest governance theory by providing an analytical framework for understanding power relations in stakeholder networks, while offering practical insights for designing more effective and equitable multilevel governance systems. This research proves particularly valuable for policymakers, practitioners, and researchers working to implement participatory forest governance approaches that harness local social capital while achieving broader conservation and development objectives.

## 2. Materials and Methods

This research integrates two established literature review techniques: bibliometric analysis and thematic analysis, which were employed to conduct the systematic review process. Systematic review uses reliable procedures to identify, select, and assess all relevant evidence in a particular area of study. The bibliometric indicators aim to explore production analysis of publications over the years. The analysis endeavors to highlight factors such as most productive authors, most productive

journals, most productive institutions, and global research collaboration trends. In contrast, thematic analysis applies the PRISMA checklist to arrive at the core thematic areas that include forest studies and social capital. By integrating these two approaches, the study ensures extensive discussion of the issue and provides rich and meaningful findings.

2.1. Data collection

The articles were accumulated specifically from databases Scopus and Web of Science (WoS) Core Collection by using a specific set of keywords – a search string (see Table 1). The search was undertaken on December 10, 2024, and returned data points including the publication title, authors' names and institutions, publication year, abstracts, journal titles, keywords used, field of study, and citation records. As evident in Table 1, the search initially yielded 117 studies which were considered to have the potential to provide the needed information. These records were then transferred to the Mendeley reference manager with duplicate entries removed, resulting in 85 articles for preliminary screening. These 85 articles were used to carry out the bibliometric analysis. Following the bibliometric analysis, thematic synthesis was conducted on the selected articles. The flow of studies followed the PRISMA checklist for systematic reviews and meta-analysis, as shown in the flowchart below (Figure 1). To address any disagreement by any team member at this stage, discussion and consensus were held among the research team. Consequently, a total of 43 articles were included in the thematic synthesis.

Table 1 Search vector.

Search query	Results	
	WoS	Scopus
("social capital" AND ("village" OR "rural development") AND "forest")	34	83

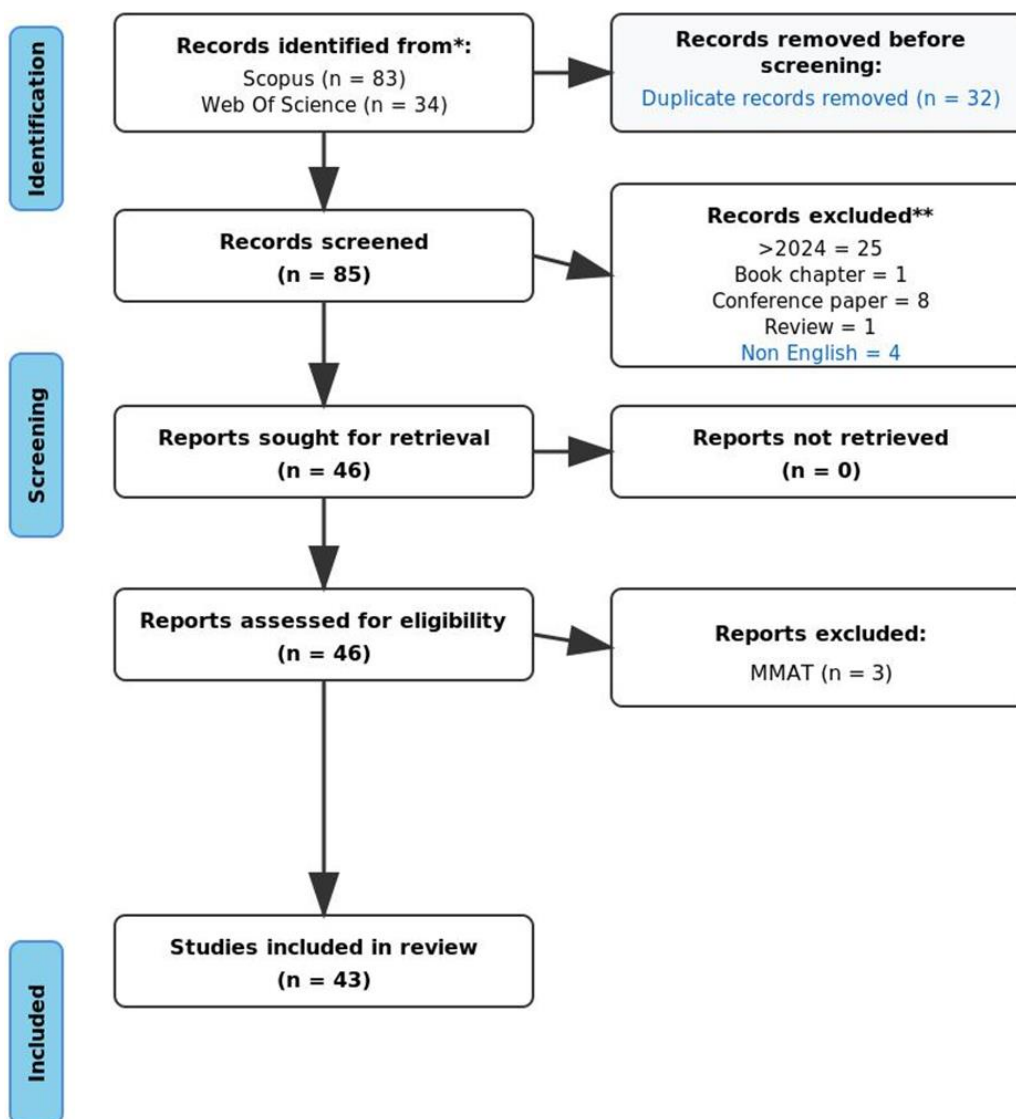


Figure 1 PRISMA flow for article selection.



## 2.2. Data analytical method

This study used bibliometric and thematic analysis in a systematic review of the literature to explore the established correlation between forests and social capital. The systematic review enabled mapping of existing knowledge about the topic, with details of publication history and frequency, as well as identification of authors, journals, research areas, institutions, and countries. This analysis was carried out on 85 articles after removing 32 duplicate articles from the data.

To interpret different aspects of the studies, thematic analysis was employed to assess primary debates and trends within the research. The PRISMA framework was applied in this process as indicated in Figure 1. The PRISMA methodology includes four stages: study identification, screening, eligibility assessment, and inclusion (Moher et al., 2009). This framework aims to improve the clarity of reporting systematic reviews of primary research studies by encouraging researchers to adopt a comprehensive approach to identifying and appraising relevant studies for inclusion, and then analyzing and synthesizing data qualitatively. The screening process was performed by each author individually, with subsequent discussion of any disagreement. Finally, the pool of 43 articles published in peer-reviewed journals underwent comprehensive qualitative analysis using the PRISMA approach to establish the main categories linking forestry with social capital.

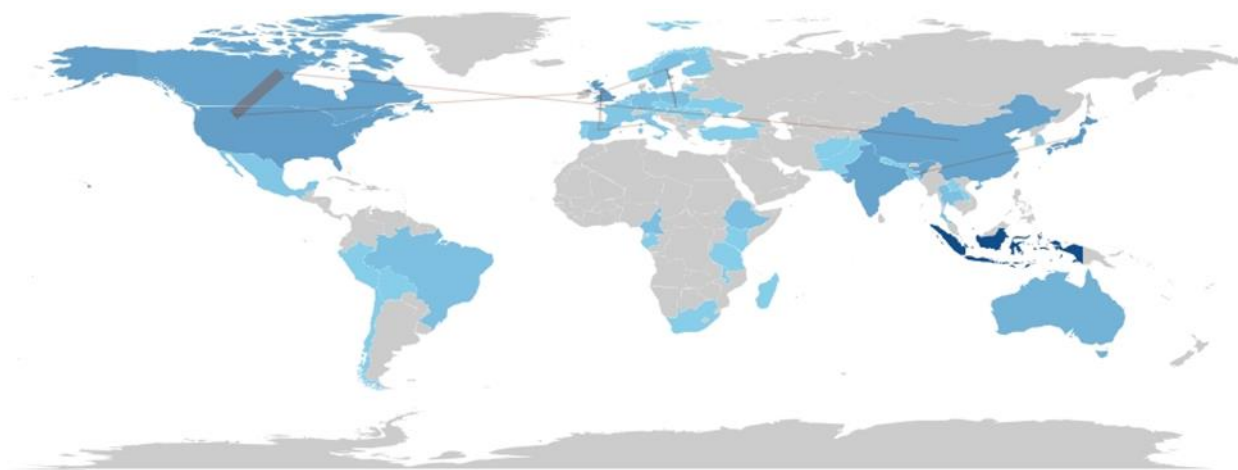
## 3. Results and Discussion

### 3.1. Bibliometric analysis

#### 3.1.1. Summary of dataset

Bibliometric analysis examines 85 selected and peer-reviewed articles that were published in the areas of social capital and forestry. Furthermore, these articles received a total of 1,350 citations, and the mean citation rate of the papers was estimated at 15.88 as highlighted in Table 2. The studies encompass 55 different journals, including, for example, *Unasylva*, *Land Degradation and Development*, *World Development*, and *Ecological Economics*, which demonstrates the interdisciplinary nature of the discipline. The reviewed articles were authored by 319 first authors from 245 institutions, indicating the emphasis on collaboration in this field. The prominence of terms related to social aspects of forest management is evident through the frequency of terms 'social capital,' 'collective action,' 'rural development,' and 'community forestry.'

The geographical distribution of published research spans 57 countries across both developed and developing regions, demonstrating the international relevance of this research area. This indicates that the numerous researchers who have embarked on research in this area come from different parts of the world, such as North America, Europe, Asia, Africa, and South America, suggesting differences in perspectives and approaches to understanding social capital in forestry contexts. Such international cooperation proves even more significant as it unites professionals from countries with well-established frameworks of forestry education, such as the USA or Germany, with professionals from countries with vast forest resources and developing management systems, like Indonesia, Nepal, or Brazil, as represented in Figure 2. The high citation rate combined with the broad distribution of the included institutions and geographic locations confirms the relevance and valuable contribution of social capital research in the field of forestry across various socio-economic and environmental conditions.



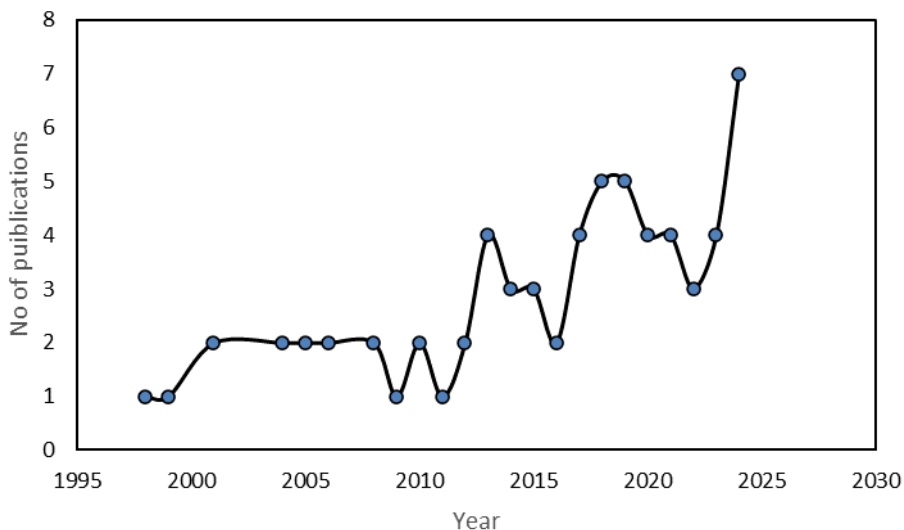
**Figure 2** World map of country scientific production and collaboration in Forestry and Social Capital.

Source: Scopus Database and Web Of Science.

#### 3.1.2. Publication trend over the years

The publication trend analysis shows an interesting pattern of research activity associated with social capital and forestry over more than two decades (Figure 3). Growing from humble origins in the late 1990s to the current level of substantial growth, publications are now produced regularly, with one or two papers per year now only a distant memory. Around the year 2000,

the publication output remained fairly constant, though at a relatively slow rate, with two to three publications per year being the norm. Like other similar topics, emerging interest in this area surged around 2013, although volume has been steadily rising since the late 2000s. The most active research years were clearly during the second half of the 2010s and early 2020s, with several years reaching peaks of seven to eight publications per year. Eight papers were published in both 2018 and 2024, while 2019, 2021, and 2023 each reported seven publications. This relatively recent upward trend in publication frequency, particularly over the last decade, indicates enhanced recognition and understanding of social capital in forestry studies, possibly reflecting increased financing sources, international collaboration, and greater acknowledgement of social aspects in forest use and preservation. The trend over the years demonstrates that the field of study is not only gradually maturing but also responding to contemporary issues in forest governance and community-based resource management.



**Figure 3** The number of publications in Forestry and Social Capital over the Years. *Source:* Scopus Database and Web Of Science.

**3.1.3. Top authors, research area, publication, publishers and languages**

Analysis of the bibliometric research on social capital in forest management reveals several unique tendencies in scientific publications. The authors and institutions that have significantly contributed and led the research in social capital within forest management are shown below, reflecting interest and contribution to the research area. It should be noted that these results are based on the total number of publications. When individual performance is considered, the following authors have the highest number of publications: Purwanto with 4 publications, R.H. and Faida, L.R.W. Similarly, Nath, T.K., Inoue, M., Angelstam, P., and Lee, Y. contributed 3 publications each (Figure 4). The other authors—Hickey, G.M., Kimengsi, J.N., Van Damme, P., and Locatelli B.—have each contributed 2 publications. There appears to be a fairly equal distribution of contribution among the most prominent researchers in the area. Institutional analysis reveals that Universitas Gadjah Mada leads with 6 publications while the University of Chittagong has 5 publications (Figure 5). Four publications were credited to the Swedish University of Agricultural Sciences, University of Tokyo, and National Research and Innovation Agency (BRIN), Indonesia. The institutions that have produced 3 papers include Seoul National University, McGill University, University of British Columbia, Hasanuddin University, and Technische Universität Dresden. This institutional distribution reveals significant involvement of universities from Asia, especially those from Indonesia, Bangladesh, and Japan. This indicates that research is underway in areas where forest management, social capital, and local development intersect. This represents a truly international research field with participants from North America (McGill University, University of British Columbia) and Europe (Swedish University of Agricultural Sciences, TU Dresden).

Based on the research areas analysis, it is possible to conclude that the research demonstrates interdisciplinarity. The most productive research area is Forestry with 35 publications (30.4%) followed by Environmental Science with 28 (24.3%) and Social Science 25 (21.7%). The fact that Agricultural Sciences has been listed as one of the disciplines with the largest share (13.0%) and Economics, which occupies the fifth largest share (10.4%), demonstrates how multidisciplinary the field is (Figure 6). Other emerging research areas include Rural Development, Conservation Biology, Natural Resource Management, Sustainable Development, and Environmental Management, which support the interdisciplinary approaches of the field. This distribution shows the interdisciplinary character of forest management issues, the solutions to which can involve findings from various scientific disciplines. There is a clear preference for journals, which represent the most numerous types of publications, totaling 75 articles or 88% of all publications. Only 9% of these research outputs are conference papers comprising 8 papers, and 3% are book chapters with 2 papers. This suggests that most researchers in this field tend to publish their research results in peer-reviewed journals. The top publishing houses dominating the field are: Elsevier – 12 articles (14%); Springer – 10 articles (12%). While more than a hundred organizations contributed to the articles, notably, 8 articles are from MDPI and 7 articles



are from IOP Publishing. However, approximately 57% of publications are from other publishers, suggesting that there exists a diverse publishing system (Figure 7). Concerning language distribution, all papers are published in English, which comprises 94% of overall papers, with 80 papers out of 85 being written in English (Figure 8). Chinese accounts for 2 publications (2%), while Japanese, Polish, and other languages have contributed one (1%) each. This strong preference for English reflects the fact that the language is dominant in international scholarly communication in this discipline.

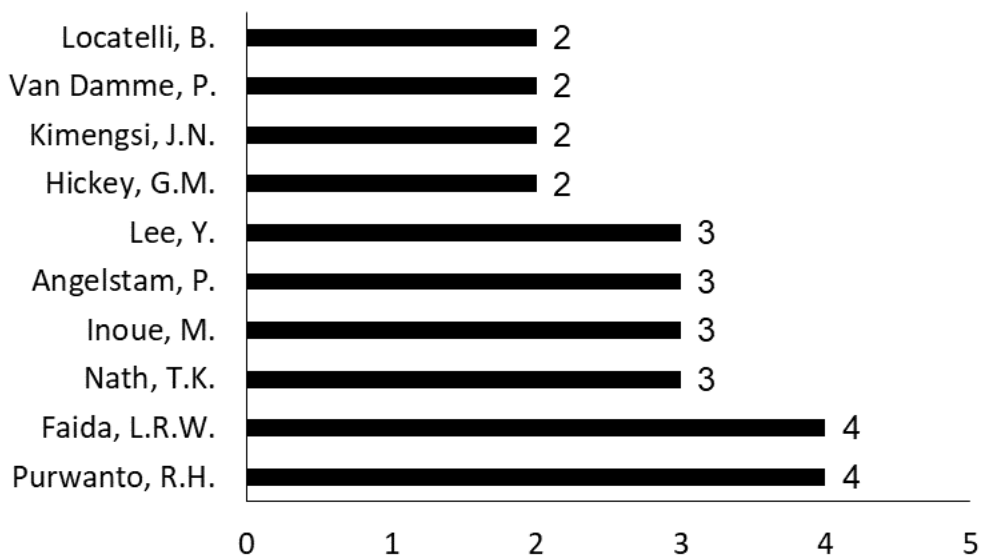


Figure 4 Top 10 researchers in Forestry and Social Capital. Source: Scopus Database and Web Of Science.

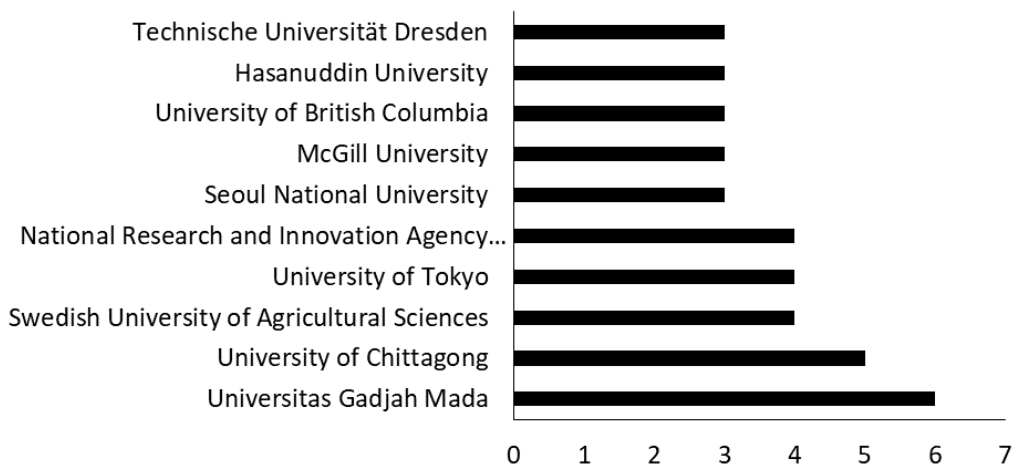


Figure 5 Top 10 institutions in Forestry and Social Capital. Source: Scopus Database and Web Of Science.

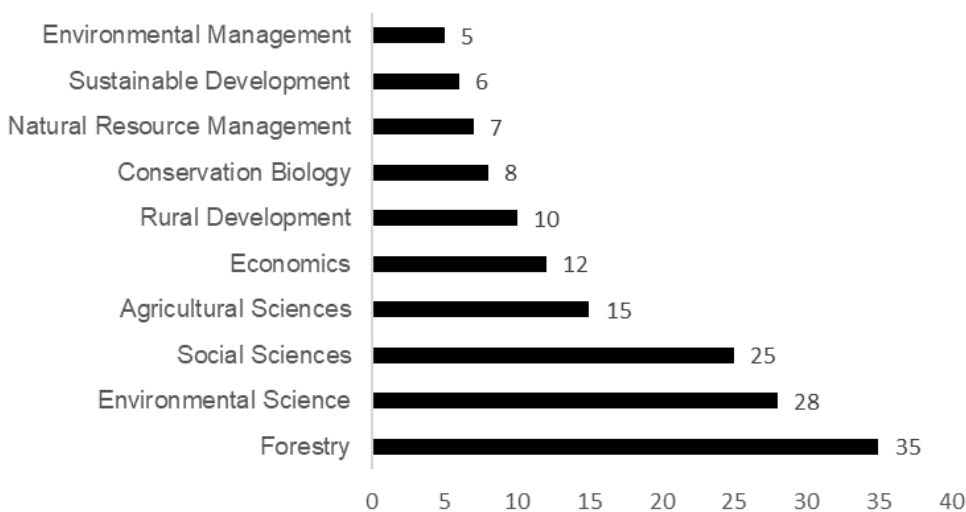


Figure 6 Top 10 research area in Forestry and Social Capital. Source: Scopus Database and Web Of Science.



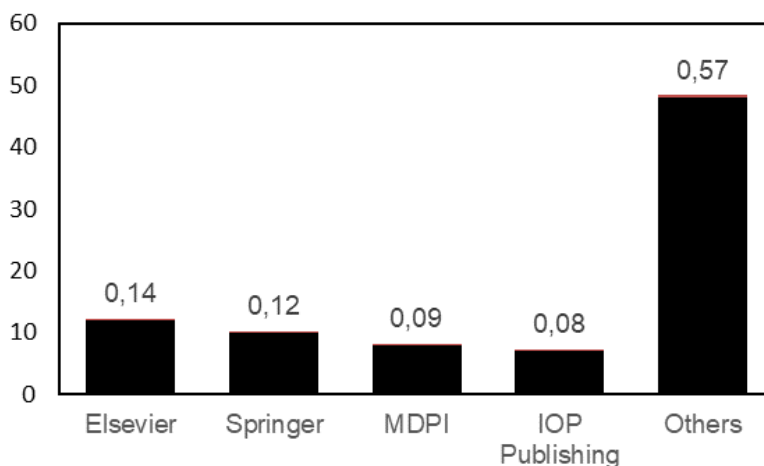


Figure 7 Publisher distribution of forest and social capital. Source: Scopus Database and Web Of Science.

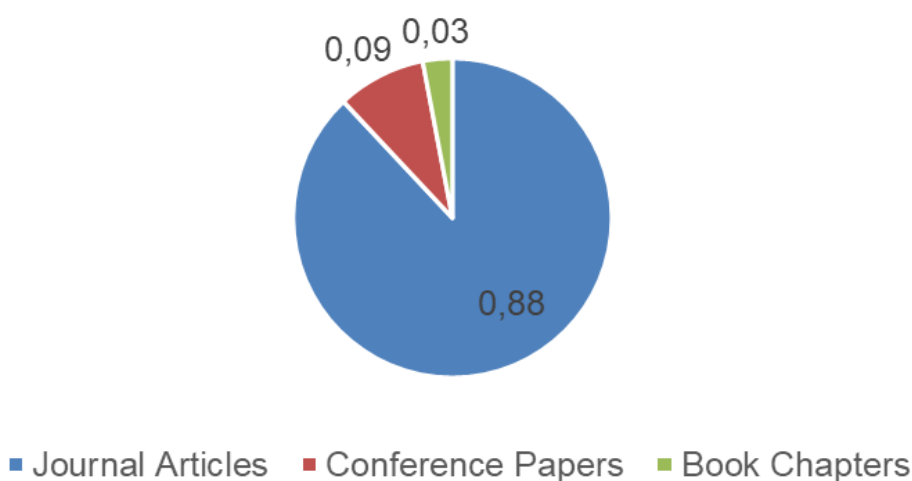


Figure 8 Publication type of forest and social capital. Source: Scopus Database and Web Of Science.

3.1.4. Keywords analysis

The mapping of keywords within bibliographic databases of social capital and forestry provides a comprehensive understanding of the thematic areas of the field and its evolution over time. All papers include "social capital" as the chief focus of investigation (Figure 9). Building on this core, generic terms like 'social capital', 'forestry', and 'forest management' have remained as reliable indicators that emphasize the community-based approaches. The fact that 'rural development', and 'participatory approach' are among the most prominent keywords confirms the development and engagement-oriented nature of this field.

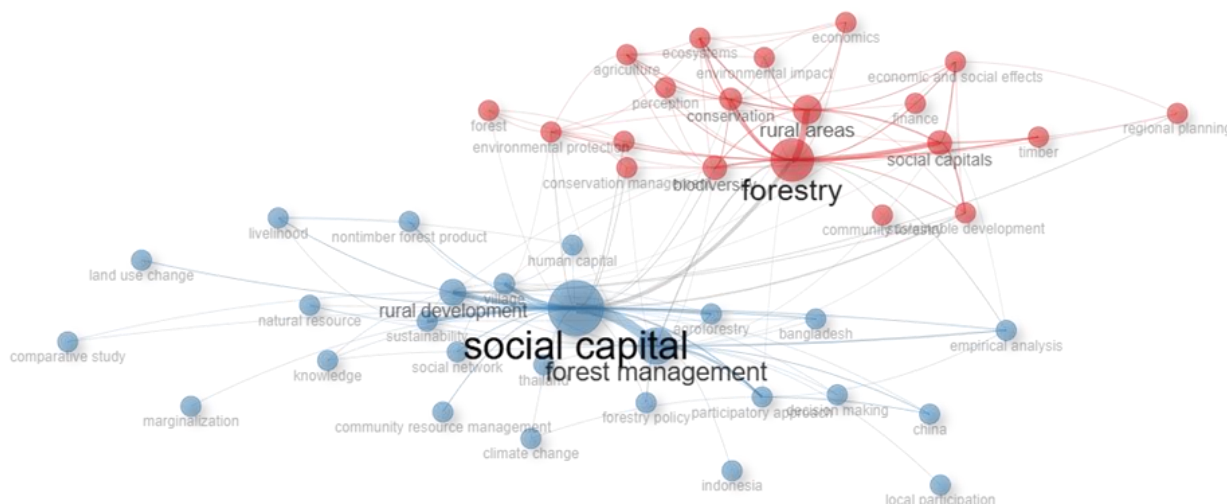


Figure 9 Keyword co-occurrence-Network. Source: Scopus Database and Web Of Science.



The field has experienced unique developmental phases over the years. In the foundation period of 1998 to 2004, scholarly activity focused mainly on identifying fundamental linkages between social capital and forestry management (Figure 10). The expansion period (2005-2009) was marked by the introduction of advanced ideas such as participatory models and broader conceptions of sustainability. Based on the organization of publications, the research reveals four major thematic zones that changed throughout the period. The Management & Governance cluster, with 45 cases, is mainly related to institutional and administrative topics. Most of them appeared in the integration period (2010–2014) as climate-related terms and ecosystem service concepts started to be used. Second to this is the Social & Community cluster with 40 instances, emphasizing social interaction and communal affiliations. This cluster became particularly relevant during the network phase of the research (2015-2019), where social networks and community resilience emerged as important topics of study. The detailed breakdown of these thematic developments across different time periods is comprehensively outlined in table 2.

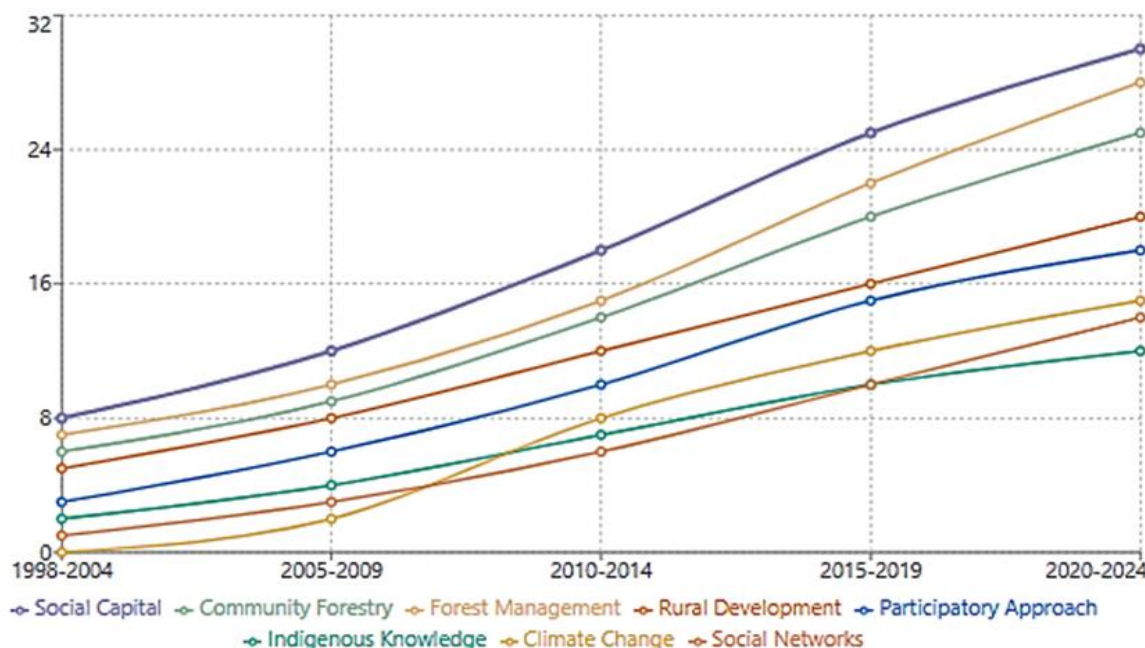


Figure 10 Thematic evolution of keywords in social capital and forestry articles. Source: Scopus Database and Web Of Science.

Table 2 Thematic evolution of keywords in social capital and forestry articles.

1998-2004	2005-2009	2010-2014	2015-2019	2020-2024
Foundational Concepts	Institutional Development	Environmental Integration	Social-Ecological Systems	Innovation & Integration
Low frequency (1-5 papers/year)	Medium frequency (5-10 papers/year)	High frequency (10-15 papers/year)	Very high frequency (15-20 papers/year)	Peak frequency (>20 papers/year)
Emerging Keywords: Community forestry	Emerging Keywords: Participatory approach	Emerging Keywords: Climate change	Emerging Keywords: Social networks	Emerging Keywords: Digital forestry
Social capital	Governance	REDD+	Community resilience	Climate resilience
Forest management	Sustainable development	Ecosystem services	Forest landscape restoration	Environmental entrepreneurship
		Declining Keywords: Basic forest management	Declining Keywords: Simple governance	Declining Keywords: Traditional management

Source: Scopus Database and Web Of Science.

The Development & Sustainability cluster has the largest frequency, with 35 occurrences, enhanced in the integration period through concepts of livelihood strategies and sustainability. This cluster can be discussed in light of the growing focus of the field on resilience and socio-economic performance. Meanwhile, the Traditional & Cultural cluster with 25 instances focuses more on cultural factors and norms. This cluster has remained consistently relevant throughout the development of the field, and its interaction with other contemporary approaches has become progressively more nuanced.

The final "innovation" period, which covers the years 2020-2024, included new keywords reflecting modern issues and opportunities in forest management, such as digital forestry, climate change resilience, and environmental entrepreneurialism. This period shows how the discipline sought to include new technological developments and maintained its focus on social



relations and community. This has revealed the interdisciplinary character of the field throughout its development. There has been enhanced integration of traditional forest management concepts with social capital, emphasizing that social aspects are more central to successful forest management than previously realized. The trends in the keywords reveal a field that has evolved from basic community participation to an integrated social-ecological systems perspective, while remaining grounded in understanding and enhancing community-forest dynamics. This evolution has captured not only the increase in the number of studies but also improvements in the complexity of approaches to addressing social capital in forest environments.

### 3.1.5. Methodology analysis

Analysis of research methodologies clearly reveals the characteristics of methodological trends in social capital and forest research as well as data collection methods (Figure 11). When analyzing the studies by their methodological approach, the bulk of the research comprises mixed methods studies with 32 (37.6%), which is entirely reasonable given the nature of social capital research, where both qualitative and quantitative data are needed. Qualitative methods come second with 28 (32.9%) studies, showing that there is an emphasis on in-depth exploration of social phenomena as well as community dynamics. Among the methodologies of the included studies, 21 (24.7%) are quantitative, and they focus on assessing social capital levels and their connection to forest management outcomes. A significantly reduced proportion (4.7%) are review or conceptual papers, which integrate current information or theoretical frameworks about the phenomenon under discussion. Regarding particular methods of data collection, household surveys were used most frequently, according to 45 (52.9%) articles. This is followed by semi-structured interviews (38, 44.7%) and focus group discussions (35, 41.2%), demonstrating the emphasis on community-centred approaches. Field observations are present in 30 studies (35.3%) while document analysis appears in 25 studies (29.4%). Case studies appear in 20 (23.5%) of the studies, where most of the studies offer detailed analysis of specific community forest management programmes.

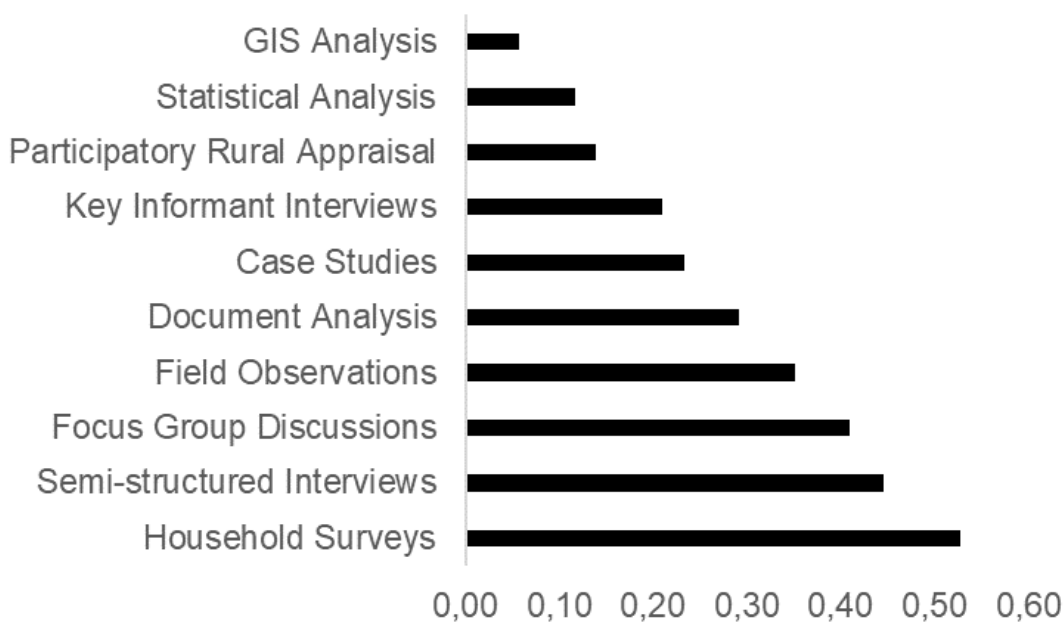


Figure 11 Methodology used in the Forest and Social capital studies. Source: Scopus Database and Web Of Science.

Key informant interviews are employed in 18 (21.2%) of the 85 studies, while PRA is used in only 12 (14.1%). Technological methods include the use of statistics (10 studies, 11.8%) and geographical information systems (GIS) (5 studies, 5.9%), which are not commonly used but offer quantitative validity when used. As mentioned earlier, most of the conducted studies use more than one data collection technique to enhance the comprehensiveness of addressing the multifaceted nature of social capital in forest management. This ensures methodological triangulation that seeks to provide cross-verification and enhanced understanding of the phenomenon under study. Therefore, the use of participatory and community-based research procedures as a dominant paradigm in forestry research stems from the contextual approach that seeks to unravel issues related to local people and their interactions with the forests..

### 3.2. Social capital as power resources in forest governance networks

Analysis of 43 studies shows that social capital takes various forms, with governance actors employing different approaches to influence institutional processes, reconfigure stakeholder relationships, and reshape decision-making dynamics within forest governance networks. The empirical evidence reveals that social capital functions not merely as a collective action



facilitator, but operates as a distributed power resource that enables or constrains actor influence across multiple governance scales and institutional contexts (see Figure 12).

Trust functions as a fundamental governance resource that enables actors to establish institutional authority, coordinate multi-stakeholder interactions, and reduce transaction costs across multilevel governance systems. Trust-based authority emerges as particularly crucial in contexts with weak formal institutions, where social capital compensates for inadequate legal frameworks and unreliable contract enforcement mechanisms (Hedge, 2015). Trust enables governance actors to establish authority and coordinate complex stakeholder relationships even in the absence of formal hierarchical structures through multiple pathways: enabling collective action coordination, legitimizing institutional compliance, facilitating resource mobilization, and providing conflict mediation capacity.

Normative systems function as institutional power resources by establishing governance frameworks that integrate traditional authority structures with contemporary forest management imperatives. Cultural norms and customary institutions create hybrid governance arrangements that derive legitimacy from both traditional authority and formal policy frameworks (Górriz-Mifsud, 2016). Traditional conservation practices such as "Sasi" demonstrate how customary norms create governance frameworks that regulate resource access while promoting community-wide participation in decision-making processes (Singgalen, 2020; Roslinda, 2017). These normative systems establish accountability mechanisms and collective responsibility frameworks that enhance governance effectiveness by creating shared expectations for behavior and participation (Nguyen, 2017; Oniki, 2020). Cultural norms facilitate the integration of traditional ecological knowledge within contemporary regulatory frameworks, creating hybrid governance systems that enable communities to maintain cultural autonomy while engaging effectively with formal institutional structures.

Social networks serve as crucial institutional channels through which social actors coordinate the flow of information, mobilize resources, and manage diverse conflicts across governance levels. Information coordination networks establish a system for knowledge dissemination that connects various stakeholder activities with policy objective compliance and creates linkages with multilevel governance processes (Seitz & Misra, 2020; Kailola, 2023). Such networks become part of governance through knowledge access and resource provision as prerequisites for making strategic progress by reducing information asymmetries across governance systems. Resource mobilization networks provide essential access to financial sources, technical expertise, and institutional support from governmental and non-governmental organizations (Subekti et al., 2019; Hara, 2018). Key actors include farmers, charcoal producers, and local politicians for whom the network has created connections by bridging stakeholder groups and promoting consensus-building processes (Hara, 2018). Conflict mediation networks build trust among stakeholders and facilitate equitable participation in governance processes by providing mechanisms for conflict resolution and social cohesion (Behera et al., 2019; Roslinda, 2017).

Mechanisms of bonding, bridging, and linking provide distinct power redistribution patterns in forest governance networks. Bonding social capital strengthens in-group cohesion and collective action capacity, thus effectively mobilizing internal resources and presenting a unified front in governmental negotiations (Behera et al., 2019). Bridging social capital allows for coalition structure and resource sharing between previously disparate actors through forming links across different cultures, economies, or institutions (Kailola, 2023). However, both tend to be uneven, particularly for marginalized communities, who are not connected to networks that could otherwise extend their governance influence (Cosyns, 2014). In this context, linking social capital permits communities to gain access to formal decision-making processes and influence policy while accessing resources controlled by government agencies and other powerful actors. This functions as a power resource enabling local actors to influence governance processes outside their own communities..

Social capital enables participatory governance mechanisms that redistribute decision-making authority and create more inclusive institutional arrangements. Inclusive governance mechanisms enhance participation through shared benefit distribution systems and systematic approaches to addressing structural barriers such as gender inequality and economic marginalization (Riveros, 2016; Atmadja, 2023). Women's participation remains constrained by social and institutional barriers, often requiring mediation through male household members rather than direct engagement with governance processes (Atmadja, 2023). Transparent governance processes and equitable benefit-sharing mechanisms legitimize governance outcomes and maintain stakeholder support by ensuring that all participants can influence decisions and share in governance benefits (Sulistiyorini, 2018; Kailola, 2023). Community empowerment approaches facilitate effective mobilization of local knowledge and resources by aligning governance objectives with community values and cultural practices, functioning as a power redistribution mechanism that enables communities to assert greater influence over governance processes while maintaining cultural autonomy.

As illustrated in Figure 12 and Table 3, successful forest governance emerges from using strategic combinations of five social capital power resources instead of relying on just one. Trust creates governance authority and stakeholder coordination capacity while enabling joint conservation efforts, boosting compliance, fostering resource sharing and labor cooperation, and ensuring effective governance mediation. Norms build frameworks for accountability and legitimacy, which enables them to manage access and participation, ensure cooperation, and combine customs with formal governance approaches.

Social networks facilitate knowledge sharing and goal alignment while providing crucial partnerships for funding and technical expertise, and serving as mechanisms to mediate conflicts and build trust across different governance scales. Through

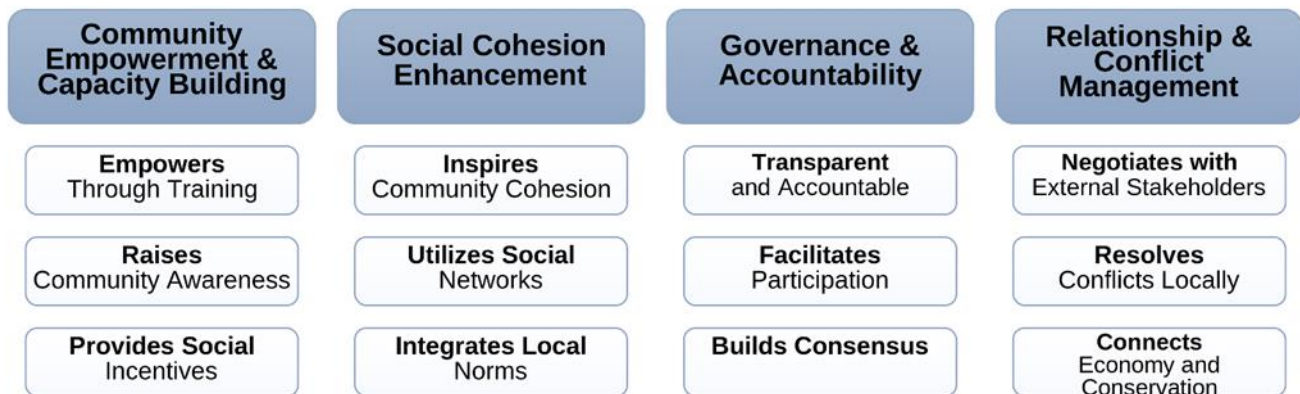
the three components of social capital (bonding, bridging, and linking), trust and cooperation are promoted within groups, marginalized groups are included in more diverse networks, and stakeholders can participate in decision-making. Finally, participation mechanisms ensure inclusive decision-making that enhances inclusivity, establishes transparency that fosters equitable participation, and drives empowerment toward shared governance goals.

**Table 3** Types of Social Capital and Their Influence on Access and Participation in Forest Management.

Type of Social Capital	Forms of Cooperation and Active Participation	Author (Year)
Trust	Trust enables collective action coordination and equitable resource-sharing agreements, providing leaders with authority to organize stakeholder coalitions	Górriz-Mifsud (2016), Vainio (2018), Hegde et al. (2015), Qurniati (2017), Nguyen (2017), Oniki (2020), Lucungu et al. (2022), Hulugala et al., (2021)
	Trust in local institutions increases compliance with governance rules and legitimizes participatory decision-making processes	Hegde et al. (2015), Qurniati (2017), Sylviani (2020), Pitri et al. (2023), Hulugala et al., (2021)
	High interpersonal trust enables resource mobilization, voluntary coordination, and collective contribution to governance initiatives	Hegde et al. (2015), Nguyen (2017), Sylviani (2020), Hulugala et al., (2021)
	Trust in traditional leaders provides governance legitimacy and enables effective conflict mediation across stakeholder groups	Nguyen (2017), Lucungu et al. (2022)
Norms	Customary norms (e.g., "Sasi") regulate resource access and establish participatory governance frameworks that integrate traditional and formal systems	Singgalen (2020), Roslinda (2017), Górriz-Mifsud (2016), Sharifi (2019)
	Social norms create accountability mechanisms and collective responsibility frameworks that enhance governance effectiveness	Nguyen (2017), Oniki (2020), Sylviani (2020), Dako et al. (2019), Sharifi (2019)
	Cultural norms enable integration of traditional ecological knowledge with contemporary governance practices, creating hybrid authority systems	Oniki (2020), Nguyen (2017)
Social Networks	Information networks disseminate governance knowledge, align stakeholder actions with policy objectives, and coordinate multilevel initiatives	Seitz and Misra (2020), Kailola (2023), Behera et al. (2019), Jung (2022), Song (2024), Sylviani (2020), Hulugala et al., (2021)
	Partnership networks provide access to funding, technical expertise, and support from government agencies and NGOs, enabling resource mobilization	Subekti et al. (2019), Hara (2018), Roslinda (2017), Riveros (2016)
	Conflict mediation networks strengthen stakeholder trust and ensure equitable participation in governance processes	Behera et al. (2019), Roslinda (2017), Jung (2022), Hulugala et al. (2021)
Bonding, Bridging, Linking	Bonding capital strengthens in-group solidarity, bridging capital connects diverse stakeholder groups, and linking capital provides access to formal decision-making processes	Nguyen (2017), Angelstam (2021), Behera et al. (2019), Cosyns (2014)
	Bridging and linking networks enable marginalized groups to influence policy processes and access governance resources previously controlled by elite actors	Jung (2022), Song (2024), Kailola (2023)
Participation	Inclusive governance approaches enhance participation through shared benefits distribution and systematic addressing of structural barriers	Riveros (2016), Atmadja (2023), Rastogi (2015), Jung (2022), Vercher et al. (2021), Sharifi (2019)
	Transparent decision-making processes and equitable benefit-sharing mechanisms legitimize governance outcomes and maintain stakeholder support	Sulistyorini (2018), Kailola (2023), Jung (2022)
	Community empowerment and culturally-aligned governance approaches enable effective mobilization of local knowledge and resources	Jung (2022), Subekti et al. (2019), Vercher et al. (2021)



By combining these five resources, governance systems become effective while simultaneously ensuring that community members are involved. Integration should always be guided by recognizing power inequities and ensuring that social capital use supports rather than undermines equitable and sustainable management.



**Figure 12** Social Capital and Their Influence on Access and Participation in Forest Management.

*Source:* Adapted from: Angelstam, 2021; Atmadja, 2023; Vercher et al. 2021; Behera et al., 2019; Cosyns, 2014; Dako et al., 2019; Górriz-Mifsud, 2016; Hara, 2018; Hedge, 2015; Hulugala et al., 2021; Jung, 2022; Kailola, 2023; Lucungu et al., 2022; Nguyen, 2017; Pitri et al. 2023; Oniki, 2020; Qurniati, 2017; Rastogi, 2015; Riveros, 2016; Roslinda, 2017; Seitz & Misra, 2020; Sharifi, 2019; Singgalen, 2020; Song, 2024; Subekti et al., 2019; Sulistyorini, 2018; Sylviani, 2020; Vainio, 2018.

### 3.3. Coordination mechanisms and stakeholder network orchestration

Trust enables collaborative action under conditions of institutional uncertainty and resource constraints, thereby reducing transaction costs associated with governance activities. Nevertheless, trust overcomes these obstacles through specific channels, as observed by Hegde et al. (2015): trust functions as a fundamental coordination resource that creates stable patterns of cooperation when formal institutions are weak and contract enforcement is unreliable. This phenomenon is particularly evident in traditional forest management practices in Indonesia, where indigenous communities have successfully maintained forest sustainability for centuries despite lacking strong formal institutional support.

A significant assessment of trust-based coordination relates to practical outcomes demonstrated by Sylviani (2020) and Pitri et al. (2023), who observed that stakeholder trust in leadership and institutions reduces administrative costs while promoting adaptive governance through informal agreements during critical phases. Additionally, trust forms the core of adaptive governance during informal arrangements in critical phases, where communities in East Nusa Tenggara automatically share water and land resources during prolonged drought periods without governmental interference due to mutual trust built over time (Depari et al., 2023).

Examining the transformation process, network-based coordination mechanisms create space for interaction between stakeholders not merely within their communities but also to link grassroots initiatives with wider policy agendas. This reality echoes the insights provided by Nath & Inoue (2014), Roslinda (2017), and Schröter (2018), regarding how formal institutions, informal kinship networks, and local meetings create complementary relationships with one another. Another strength of network coordination lies in facilitating access to emerging technologies as shared resource systems. Girma (2022) and Sulistyorini (2018) noted that inter-sectoral collaboration through networks has made ecosystem management more efficient.

Smallholder farmers, charcoal producers, and local politicians have become important actors in Indonesia, connecting various groups of stakeholders. Notably, the network fulfills its dual purposes of bridging and bonding: bridging cooperatives, land management groups, and farmers from different sectors, while bonding facilitates peer-to-peer information sharing among actors of similar types. Kresna (2024) found that through this mechanism, control over resources and opportunities shifts to smallholder farmers in terms of governance, resulting in the exchange of resources and labor that enhances social relations and reduces the effort and costs associated with coordination.

Comprehensive understanding of involved policies and required technical capacity necessitates effective participation in complex governance processes, making capacity building, such as information-sharing and collaborative policy understanding, critical elements for technical development. Jung (2022), Cosyns (2014), and Schröter (2018) stressed the importance of this coordination approach for effective involvement of local actors in technical policy processes and multi-level governance arrangements. Governance capacity development programmes like REDD+ training schemes are tangible programs that empower communities to understand policy frameworks so that local stakeholders are better able to engage in national and international governance processes, as supported by Oniki (2020), who detailed how these initiatives assist in implementing sustainable practices and land-use planning through technical assistance that connects local action to broader governance agendas.



Extension workers and governance facilitators perform vital roles, as Sylviani (2020) notes. Their trusting relationships enable effective knowledge transfer and capacity building, which leads to robust participation in local governance. Moreover, joint capacity development provides avenues for knowledge sharing and collective action that significantly improves governance outcomes through better understanding and navigation of complex policy environments, creating pathways toward more inclusive and effective forest governance systems.

Sustainable coordination extends beyond technical skills alone. Instead, utilizing deeper social ties and cultural foundations should be equally important for governance effectiveness. Coordination mechanisms based on solidarity are more resilient for collective governance. They achieve this by tapping into community identity, rather than relying on incentives, or through cultural obligations and reciprocal responsibilities. These coordination mechanisms encourage cooperation and engagement in governance through culturally-grounded identity structures and shared responsibility frameworks. For example, village and community social identities serve as fundamental coordination mechanisms for ensuring sustained participation in governance activities, as noted by Pitri et al. (2023), Depari et al. (2023), and Oniki (2020).

The power of solidarity is evident in its ability to mobilise resource contributions without expecting direct rewards, as observed by Singer (2015) and Nguyen (2017) that households contribute resources and assistance to create robust governance framework even during periods of resource scarcity or external pressure. Cultural traditions and practices not only facilitate governance coordination but also maintain social order and community autonomy within broader governance arrangements, enabling communities to preserve their cultural identities while participating in modern governance structures.

Norm-based coordination mechanisms establish the legitimacy of governance through informal enforcement systems, dispute resolution mechanisms, and compliance with customary governance institutions that blend traditional and formal authority systems. In this way, sustainable resource management is facilitated through traditional practices like 'Sasi' and agreements established through customary governance, where cultural authority provides legitimacy as an alternative to formal law. Nath & Inoue (2014), Singgalen (2020), and Sylviani (2020) show that these practices derive their legitimacy from cultural authority, with strong norm-based coordination evident in communities that demonstrate minimal need for formal enforcement, as informal enforcement mechanisms, including social pressure and cultural expectations, prove more effective in ensuring compliance with governance requirements than formal punitive measures.

Most people rely on locally-established custom practices for practical and effective governance beyond formal legal codes, especially when these lack the local legitimacy or enforcement capacity of the official institutions, as Roslinda observed in 2017. Normative coordination relies on customs, mediation groups, and cultural paradigms through which governance disputes are settled, thus promoting social harmony and balanced participation in governance as the instrument for maintaining a delicate balance between traditional authority and modern governance requirements. Institutional coordination supports governance engagement through financial incentives, technical assistance, and NGO training programs that comprehensively involve stakeholders.

Building on the findings of Atmadja (2023) and Jung (2022), these different mechanisms promote inclusive governance by empowering disadvantaged communities and addressing structural barriers to participation. Evidence provided by Owusu et al. (2021) shows that government incentives encourage low-asset households to become active participants in forest landscape restoration activities, particularly when such programs operate through economic incentives. By combining capacity building and support for non-governmental organizations working together, Ward (2018) demonstrates collective efforts in adopting sustainable practices.

Beyond institutional support, governance coordination also requires improving stakeholders' understanding of governance processes through awareness-based coordination that enhances stakeholders' understanding of governance processes and ecosystem services through public forums, campaigns, and educational initiatives. Vercher et al. (2021), Angelstam (2021), and Schröter (2018) show that increased awareness fosters a sense of resource ownership and encourages governance participation by improving community understanding of benefits, responsibilities, and opportunities for influence. Awareness-based coordination also facilitates information sharing and collective action by rural households, enabling involved actor groups to participate in discussions, identify challenges, suggest improvements, and develop ideas for new projects, creating a democratic space where every stakeholder can contribute according to their knowledge and experience. Thus, awareness-based coordination serves as a key mechanism for activating social innovation processes and mobilising citizens towards collective solutions, ensuring that generated solutions are truly aligned with local needs and contexts, thereby achieving a higher probability of long-term success. These various forms of social capital and their specific impacts on forest management cooperation are comprehensively outlined in table 4.

Effective forest governance requires strategic integration of multiple coordination mechanisms rather than reliance on any single approach. The combination of trust-based coordination, network integration, capacity building, and cultural mobilization creates governance systems that are both effective and resilient, capable of adapting to changing conditions while maintaining stakeholder cooperation and achieving conservation objectives. Critical attention must be directed toward power dynamics to ensure coordination mechanisms promote, rather than undermine, both inclusive governance and sustainable resource management.

**Table 4** Forms of Social Capital and Their Impact on Cooperation and Active Participation in Forest Management.

Type of Social Capital	Forms of Cooperation and Active Participation	Author (Year)
Trust-Based	Facilitates collective action coordination in conservation programs and resource-sharing arrangements, reducing transaction costs and enabling informal governance agreements	Qurniati (2017), Jung (2022), Depari et al. (2023), Lucungu et al. (2022)
	Reduces administrative oversight costs and fosters compliance through stakeholder confidence in governance institutions and leadership	Hegde et al. (2015), Sylviani (2020), Pitri et al. (2023), Hulugala et al. (2021)
	Enables adaptive governance through informal agreements during critical periods (e.g., resource sharing during droughts or economic shocks)	Depari et al. (2023)
Network-Based	Builds collaborative platforms through farmer associations, kinship networks, and local forums that enhance community-driven governance initiatives	Nath and Inoue (2014), Roslinda (2017), Schröter (2018), Hulugala et al. (2021)
	Expands governance capacity through access to new technologies, shared resources, and cross-sectoral partnerships for ecosystem management	Girma (2022), Sulistyorini (2018), Schröter (2018)
Capacity-Building	Provides governance education through training programs, workshops, and extension services that enhance community understanding of policy processes and management techniques	Jung (2022), Cosyns (2014), Schröter (2018), Oniki (2020)
	Encourages adoption of sustainable practices through technical support and knowledge transfer that aligns local actions with broader governance objectives	Oniki (2020)
Solidarity-Based	Strengthens collective identity through cultural practices and shared solidarity that sustains long-term governance commitments and resource management efforts	Singer (2015), Hara (2018), Cosyns (2014)
	Promotes voluntary resource contributions and collective labor for ecosystem restoration through community identity and cultural obligation systems	Pitri et al. (2023), Depari et al. (2023), Oniki (2020), Hulugala et al. (2021)
Norm-Based	Promotes collective responsibility through informal enforcement mechanisms, conflict resolution procedures, and adherence to traditional governance frameworks	Behera et al. (2019), Nath and Inoue (2014), Depari et al. (2023)
	Ensures sustainable resource management through traditional practices (e.g., "Sasi") and compliance with customary governance agreements	Nath and Inoue (2014), Singgalen (2020), Sylviani (2020)
Institutional Support	Enhances governance participation through financial incentives, technical resources, and NGO training programs that enable stakeholder engagement	Owusu et al. (2021), Ward (2018), Sharifi et al. (2019)
	Promotes inclusive governance by empowering marginalized groups and supporting targeted initiatives that address structural participation barriers	Atmadja (2023), Jung (2022)
Awareness-Based	Raises stakeholder understanding of governance processes and ecosystem services through public forums, campaigns, and educational initiatives	Vercher et al. (2021), Angelstam (2021), Schröter (2018)
	Encourages governance participation by increasing community understanding of benefits, responsibilities, and opportunities for influence	Schröter (2018), Vercher et al. (2021), Sharifi et al. (2019)
Cross-Sectoral	Builds governance synergies between communities, businesses, and government agencies through collaborative economic initiatives and resource-sharing agreements	Singgalen (2020), Girma (2022), Schröter (2018)
	Facilitates multilevel coordination between local communities and formal governance institutions through partnership development and collaborative planning	Schröter (2018)
Conflict Resolution	Resolves governance disputes through local mediation mechanisms, traditional conflict resolution procedures, and community-based harmony maintenance systems	Behera et al. (2019), Ido (2019), Depari et al. (2023)
Cultural Mobilization	Uses cultural practices, rituals, and traditions to strengthen governance legitimacy and maintain social cohesion supporting long-term conservation commitments	Singgalen (2020), Angelstam (2021), Hara (2018)

### 3.4. Power dynamics and network orchestration in forest governance

Social capital works through customs and established norms to enhance the effectiveness of governance in forest management systems. Leaders combine traditional rules with formal policies to design hybrid governance systems that unite customary power with regulatory requirements. Traditional practices like Sasi permit control over the access of local resources that advance wider conservation goals while maintaining legitimacy from the community (Nath & Inoue, 2014; Singgalen, 2020; Sylviani, 2020). In this cultural framework, governance leaders are able to mitigate conflicts, maintain stakeholder cooperation, and support equitable participation among different civil society groups. This normative base provides a mediating mechanism in the management of complex stakeholder relationships without undermining popular support from communities for governance decisions. Thus, traditional institutions sustain the development of governance solutions with legitimacy from both customary and formal policy systems while creating sustainable coordination mechanisms that link local practices with larger governance needs.

Trust-based coordination mechanisms are vital for managing stakeholder relationships under different governance arrangements and among different sectors. Coordination mechanisms that confer authority through trust are better positioned to mediate between local communities and external actors, broker complex arrangements, and mitigate conflict situations that hinder successful governance (Nguyen, 2017; Lucungu et al., 2022; Aliyar, 2024). Trust-based legitimacy allows governance systems to establish compliance frameworks and encourage stakeholder cooperation in multilevel governance systems where formal enforcement mechanisms are weak or inaccessible (Qurniati, 2017; Hegde et al., 2015; Sylviani, 2020). This foundation of trust proves extremely useful in situations where formal institutions are still emerging or have limitations in reaching local communities.

Trust-based coordination has been practically implemented, and there is ample empirical evidence to support its effective operation. The case of Maridjan, documenting how the traditional leader's strong reputation and deep trust provide him with the necessary authority for institutional negotiation with formal government institutions, shapes effective collaboration between traditional and formal governance systems (Depari et al., 2023). Trust-based coordination can also mobilise collective action to negotiate with external governance regimes and empower the active participation of local communities in broader governance networks (Nath & Inoue, 2014; Dako et al., 2019). The forest officer's experience serves to illustrate how coordination mechanisms operate through trusted institutional brokers positioned between local communities and formal forest authorities, thereby facilitating cross-scale governance coordination. These brokers are essential for opening up communication and understanding between two different but complementary governance systems.

Beyond formal institutional systems, effective governance coordination is underpinned by strong, deeper social ties and shared cultural traditions. Solidarity-based mechanisms persist through capabilities that promote collective governance based on community identity, cultural obligations, and reciprocal accountability mechanisms, rather than incentive structures alone. When communities have used cultural means for engagement, governance leaders have developed policy alternatives that satisfy local values and broader conservation goals. Shared community identity nurtures governance systems that respect cultural authenticity while advancing sustainable resource management goals. Leaders mobilise collective commitment by emphasising collaborative benefits and community values. This process involves stakeholders in participatory decision-making processes that contribute to governance sustainability and local relevance (Pitri et al., 2023; Depari et al., 2023; Oniki, 2020). This cultural alignment becomes paramount in determining governance effectiveness because it attracts broad community participation in critical decisions and protects distinct cultural traditions and practices that support engagement in long-term conservation.

Network-based coordination mechanisms use social networks to engage external stakeholders and communities and facilitate the provision of additional resources, support, and influence across different levels of governance and decision-making processes. These enable cross-boundary functions, promoting cooperation among local communities and government institutions, non-governmental organisations, and other external actors (Behera et al., 2019; Jung, 2022; Schröter, 2018; Hulugala et al., 2021). Network coordination enables stakeholder organizations to mobilise collaborative meetings, align local actions with overarching governance objectives, and manage multilevel conservation interventions that demand cross-scale and cross-sector cooperation (Roslinda, 2017; Behera et al., 2019; Nath & Inoue, 2014). The effectiveness of these networks lies in their ability to create synergies among different levels of governance that often operate separately.

Networks have coordination mechanisms that manage social networks to mobilize innovators and connect with external stakeholders and communities, enabling them to gain further resources, support, and influence across different levels of governance and decision-making processes. The capabilities of network coordination enable cross-boundary functions and cooperative behaviour among local communities and government institutions, non-governmental organisations, and other external actors (Behera et al., 2019; Jung, 2022; Schröter, 2018; Hulugala et al., 2021). This enables stakeholder organizations to hold collaborative meetings, synchronize local actions with overarching governance objectives, and manage cross-scale and cross-sector cooperation in multilevel conservation efforts (Roslinda, 2017; Behera et al., 2019; Nath & Inoue, 2014). The value of these networks lies in their effort to create synergy between different levels of governance that often operate separately.

Examples of network coordination practice demonstrate its varied effects on participation and conflict resolution processes. The case of the Nayagarh block-level federation of India demonstrates the alignment of forest protection committees across hierarchies for participation through a dedicated platform for women's groups through network

coordination (Behera et al., 2019). Additionally, the coordination mechanism resolves disagreements and facilitates cooperation among various groups, thus proving its importance for effective governance. Network-based coordination utilizes institutional positions in conflict resolution and maintains productive relationships among multiple stakeholders with diverse capabilities and interests to ensure long-term collaboration toward effective governance. Such dynamics within the network create a platform for dialogue that allows diverse voices to be heard and integrated into decision-making processes.

This sophisticated governance mode has drawn from the rich tradition of mobilising community access to rituals, practices, and social institutions to provide legitimacy and connect it with the community. This approach has the capacity to mobilise larger communities for accessing social and natural capital, making it important social infrastructure that nurtures trust and expands coordination networks across governance systems (Singgalen, 2020). Traditional communication and cross-community interaction systems show significant convergences with conservation governance frameworks and demonstrate how cultural coordination can integrate with formal governance seamlessly (Hara, 2018). Cultural mobilization thus facilitates effective dissemination of information about governance activities to established social networks and creates sustained relationships for community involvement and support for conservation initiatives. Traditional spaces like religious institutions, community gathering places, and public areas provide significant coordination infrastructure for governance cooperation through trust-building processes and direct relationships (Angelstam, 2021). Cultural foundations embed governance systems within community life while addressing broader policy objectives.

Resource mobilization provides tangible resources for governance initiatives, establishing an integrated system to catalyze sustainable development initiatives such as ecotourism and agroforestry initiatives, integrating livelihood improvement with governance objectives to create a comprehensive approach that achieves conservation and development goals (Schröter, 2018; Song, 2024). Communities participate in governance systems, which include resource mobilization coordination that provides tangible benefits to sustain continued involvement. The mobilization of governance resources encourages participation, especially among marginalized groups, for influencing governance processes and provides access to opportunities previously controlled by elite actors, through coordination mechanisms with strong social capital foundations (Atmadja, 2023; Song, 2024; Schröter, 2018). Thus, governance achieves legitimacy because it places benefits from resource distribution within reach of different stakeholder groups. An excellent example is the Payment for Ecosystem Services program from Costa Rica, demonstrating how coordination mechanisms can strategically promote trust and shared values to prepare local inhabitants for community governance schemes connected to broader policy formulations (Schröter, 2018). This enables them to engage in self-government while remaining involved in wider governance networks.

Legitimacy coordination mechanisms include balancing external institutional requirements with local community needs. Local governance frameworks meet community needs while being integrated into broader policy strategies. Transparent and accountable coordination approaches foster stakeholder trust, thus increasing participation in collaborative governance activities and enhancing overall governance effectiveness (Sulistyorini, 2018; Kailola, 2023; Hulugala et al., 2021). However, lack of transparency in resource management can undermine community trust and reduce governance effectiveness, highlighting the necessity of accountability in legitimacy coordination (Kailola, 2023). Indigenous coordinating systems integrate traditional normative frameworks with modern governance practices and create hybrid authority systems that legitimize governance through two sources of authority (Singgalen, 2020; Nath & Inoue, 2014; Hulugala et al., 2021). This integrated approach provides governance structures with culturally-accepted power without compromising their effectiveness within formal and external organizational requirements. Community network structures determine the information diffusion patterns and hierarchical information arrangement across governance systems, where network-positioned actors influence information accessibility and distribution that shape governance decisions (Górriz-Mifsud, 2016). Effective coordination of community networks enables rapid information dissemination as well as strategic knowledge direction through advantageous network positions, which proves important in modern forest governance systems because such coordination requires sophisticated information management, integration of various actors, and alignment of local activities with broader policy objectives. These leadership dynamics are comprehensively outlined in table 5.

### *3.5. Network orchestration capabilities for effective forest governance*

Transparency and accountability function as foundational capabilities that enable leaders to establish trust-based authority essential for network orchestration. Leaders who demonstrate transparency in decision-making processes and prioritize stakeholder needs gain the trust and support necessary for coordinating complex governance networks (Qiu, 2021; Aliyar, 2024; Nguyen, 2017; Oniki, 2020). Governance accountability creates the foundation for all other orchestration capabilities by establishing leader credibility and stakeholder confidence essential for complex coordination activities. Transparent decision-making processes enable stakeholders to understand and participate in goal-setting while accountability ensures leaders consider stakeholder needs comprehensively.

**Table 5** The influence of social capital on local leadership dynamics in forest management.

Type of Social Capital	Dynamics of Social Leadership	Author (Year)
Trust	Leaders mediate stakeholder relationships between communities and external actors (government agencies, NGOs) to negotiate governance agreements and resolve multilevel conflicts	Nguyen (2017), Lucungu et al. (2022), Aliyar (2024)
	Trusted leaders establish governance authority to enforce conservation rules and foster stakeholder compliance with multilevel governance frameworks	Qurniati (2017), Hegde et al. (2015), Sylviani (2020)
	Trust-based authority empowers leaders to organize and mobilize collective action for conservation while coordinating with external governance systems	Nath and Inoue (2014), Dako et al. (2019), Sylviani (2020)
Norms	Leaders utilize traditional governance norms (e.g., "Sasi") to regulate resource access while integrating customary authority with formal governance systems	Singgalen (2020), Oniki (2020), Nguyen (2017)
	Leaders deploy cultural norms as governance resources to mediate conflicts, maintain stakeholder harmony, and ensure equitable participation across diverse groups	Sylviani (2020), Qurniati (2017)
	Customary normative frameworks guide leaders in creating hybrid governance systems that integrate traditional authority with contemporary policy requirements	Oniki (2020), Nguyen (2017)
Social Networks	Leaders strategically utilize social networks to connect communities with external stakeholders, enabling resource access, advocacy support, and policy influence	Behera et al. (2019), Jung (2022), Schröter (2018), (Hulugala et al., 2021)
	Leaders orchestrate network coordination to convene stakeholder meetings, align local actions with broader governance objectives, and coordinate multilevel conservation initiatives	Roslinda (2017), Behera et al. (2019), Nath and Inoue (2014)
	Leaders use network positioning to mediate stakeholder disputes and build inter-group trust essential for collaborative governance effectiveness	Behera et al. (2019), Roslinda (2017)
Shared Values and Cohesion	Leaders align governance initiatives with shared cultural values, fostering collective identity and stakeholder cohesion that sustains long-term governance commitments	Suswadi (2024), Subekti et al. (2019), Singgalen (2020)
	Leaders emphasize shared benefits and cultural cohesion to motivate stakeholder participation in governance processes and conservation initiatives	Sulistiyorini (2018), Suswadi (2024)
Empowerment through Social Capital	Empowered leaders promote sustainable development initiatives (eco-tourism, agroforestry) that align livelihood enhancement with governance objectives	Schröter (2018), Song (2024)
	Leaders with extensive social capital mobilize governance resources and foster inclusive participation, particularly enabling marginalized groups to influence governance processes	Atmadja (2023), Song (2024), Schröter (2018)
	Leaders strategically use trust and shared values to initiate community-driven governance programs that achieve both conservation and development objectives	Schröter (2018), Oniki (2020)
Legitimacy and Governance	Leaders maintain governance legitimacy by ensuring conservation objectives align with community interests while distributing governance benefits equitably across stakeholder groups	Nath and Inoue (2014), Kailola (2023), Hegde et al. (2015)
	Transparent and accountable leaders cultivate stakeholder trust that improves participation in collaborative governance activities and enhances overall governance effectiveness	Sulistiyorini (2018), Kailola (2023), (Hulugala et al., 2021)
	Customary leaders integrate traditional normative frameworks with modern governance practices, creating hybrid authority systems that enhance governance legitimacy and effectiveness	Singgalen (2020), Nath and Inoue (2014), (Hulugala et al., 2021)

While institutional integration provides the structural framework for governance, effective leadership also requires ensuring broad stakeholder participation. The capacity for institutional integration allows leaders to incorporate prevailing

governance norms into formal policy frameworks, thereby creating hybrid governance regimes that have legitimacy among various stakeholder groups and achieve policy objectives (Kresna, 2024; Górriz-Mifsud, 2016). Through institutional integration capabilities, leaders effectively operate in organizations characterized by multiple governance authority systems. Institutional integration capabilities enable leaders to strengthen collective action and social cohesion by facilitating the alignment of community values, interests, and conservation objectives, inspiring shared commitment, and promoting ongoing stakeholder involvement (Suswadi, 2024; Subekti et al., 2019; Singgalen, 2020). Effective leadership requires understanding diverse governance systems to use alignment processes for developing structures that address stakeholder needs and priorities.

Facilitating inclusive participation enables leaders to create space for capacity development and encourages involvement of marginalized groups, especially women, thereby improving the inclusiveness and legitimacy of governance (Riveros, 2016; Girma, 2022; Atmadja, 2023). The case study of Mandimbo illustrates how ongoing training in alternative livelihoods fosters new skills and knowledge, as well as regular participation from stakeholders (Riveros, 2016). Effective leadership involves identifying and addressing policies that hinder equal participation while creating enabling environments for diverse stakeholder involvement in governance processes. Greater participatory governance enhances decision quality by incorporating more varied perspectives and ideas.

Beyond internal mobilization, leaders must cooperate with external stakeholders to obtain broader resources and support. The ability to operate with external actors enables leaders to establish effective partnerships with governmental and nongovernmental organizations, thereby obtaining vital resources, support, and policy leverage required for successful local governance (Roslinda, 2017; Sylviani, 2020; Ayuttacorn, 2024; Hulugala et al., 2021). This involves creating linkages between local and national policies and resource networks. Leaders with strong external coordination use social capital to acquire essential resources and access knowledge-sharing opportunities for enhancing local governance capability (Sylviani, 2020; Roslinda, 2017). This helps local governance institutions access external assistance without surrendering decision-making autonomy.

However, it is common for many stakeholder groups to find themselves in conflicting situations that require mediation skills. Conflict resolution and consensus-building skills enable leaders to act as mediators in stakeholder conflicts and achieve harmonization of different interest groups needed for effective governance. The case of Merapi provides a prime illustration of leaders using persuasion through dialogue and public hearings to foster social cohesion and resolve conflicts (Depari et al., 2023). Successful mediation requires a combination of traditional and contemporary approaches by which leaders resolve governance or resource-based conflicts without damaging relationships between stakeholders (Behera et al., 2019; Ido, 2019; Depari et al., 2023; Hulugala et al., 2021). By leveraging social capital for collaborative action and governance effectiveness, leaders strive toward common objectives by minimizing value-based disagreements among stakeholders (Hulugala et al., 2021).

Building upon effective conflict resolution, leaders can then strategically mobilize networks for sustained cooperation. Strategic network mobilization capacity enables leaders to leverage social networks for facilitating stakeholder cooperation, coordinating governance actions, and promoting sustainable policy implementation (Kailola, 2023; Ayuttacorn, 2024; Hulugala et al., 2021). Network participants are able to identify network benefits, develop strong partnerships, and distribute resources among stakeholders. Leaders with network mobilization abilities actively involve constituents and external stakeholders, develop trust, and obtain ongoing support for governance activities (Lucungu et al., 2022). This engagement process develops the relational structure necessary for continued coordination and collaborative governance effectiveness.

Economic-conservation integration capability enables leaders to align economic development initiatives with conservation objectives, creating sustainable governance models that provide stakeholder incentives for continued participation (Song, 2024; Atmadja, 2023; Hulugala et al., 2021). This capability addresses the fundamental challenge of balancing livelihood needs with environmental conservation. Leaders incorporate socio-economic incentives into governance strategies, providing tangible benefits that mobilize social capital and foster higher participation rates (Song, 2024; Atmadja, 2023). Through this integrated approach, the governance system supports both stakeholder needs and conservation goals, ensuring mutual benefits.

Community awareness and social incentive capabilities enable leaders to educate stakeholders about governance processes while recognizing contributions that deepen engagement. Through public forums, educational campaigns, and awareness initiatives, leaders foster informed participation and resource stewardship (Vercher et al., 2021; Angelstam, 2021; Schröter, 2018). Social incentive systems complement material benefits by addressing identity and status needs, particularly supporting gender inclusion and marginalized group participation (Atmadja, 2023; Sulistyorini, 2018). These capabilities transform governance information into accessible formats while creating recognition systems that sustain long-term stakeholder commitment to conservation objectives.

The capacity to resolve local conflicts aids leaders in utilizing traditional mediation abilities and local committees in solving governance-related disputes, thereby ensuring social cohesion and promoting collaboration among stakeholders (Behera et al., 2019; Ido, 2019; Depari et al., 2023; Hulugala et al., 2021). This involves the application of cultural context knowledge coupled with mediation skills, which strengthens governance authority. Effectively resolving conflicts results in positive relationships among involved parties since it addresses actual differences concerning resource use, key regulations, and benefit allocation. Therefore, governance systems are adaptable and can change with stakeholder assistance.

Cultural cohesion management capability enables leaders to connect with stakeholders through shared cultural practices and identity, developing long-term commitment to governance objectives (Singer, 2015; Hara, 2018; Angelstam, 2021; Hulugala et al., 2021). This approach relies on using culture to build allies for policy and leadership. Shared identity and the significance of collective action are developed by leaders to mobilise social capital for effective governance coordination (Singer, 2015; Hara, 2018). Managing cultural unity means that governance is intertwined with community life and works toward specific policy goals (as outlined in table 6).

**Table 6** Characteristics of effective leadership in mobilizing social capital for community-based forest management.

Leadership Characteristic	Description	Author (Year)
Transparent and Accountable	Builds stakeholder trust through transparent decision-making and accountability systems, fostering active participation in multilevel governance processes	Qiu (2021), Aliyar (2024)
Integrates Local Norms	Combines traditional governance norms with formal policy frameworks to create hybrid governance systems that maintain legitimacy across different stakeholder groups	Kresna (2024), Górriz-Mifsud (2016)
Facilitates Participation	Provides capacity-building opportunities and encourages participation from marginalized groups, particularly women, to enhance governance inclusivity and legitimacy	Riveros (2016), Girma (2022), Atmadja (2023)
Negotiates with External Stakeholders	Builds partnerships with government agencies and NGOs to secure resources, support, and policy influence for local governance initiatives	Roslinda (2017), Sylviani (2020), Ayuttacorn (2024), Hulugala et al. (2021)
Builds Consensus	Uses persuasive approaches and traditional mediation mechanisms to resolve stakeholder conflicts and build consensus across diverse interest groups	Depari et al. (2023), Hulugala et al. (2021)
Utilizes Social Networks	Mobilizes social networks to strengthen stakeholder cooperation, coordinate governance activities, and promote sustainable policy implementation	Kailola (2023), Ayuttacorn (2024), Hulugala et al. (2021),
Connects Economy and Conservation	Aligns economic development initiatives with conservation objectives to create sustainable governance models that provide stakeholder incentives for participation	Song (2024), Atmadja (2023), Hulugala et al. (2021)
Raises Community Awareness	Educates stakeholder groups about governance processes and ecosystem services through forums and campaigns, fostering informed participation and resource stewardship	Vercher et al. (2021), Angelstam (2021), Schröter (2018)
Provides Social Incentives	Recognizes stakeholder contributions and creates social incentives that deepen engagement, particularly addressing gender and inclusion considerations	Atmadja (2023), Sulistyorini (2018)
Empowers Through Training	Strengthens stakeholder governance capacity through knowledge-sharing platforms, technical training, and skill development initiatives	Schröter (2018), Riveros (2016), Jung (2022)
Resolves Conflicts Locally	Employs traditional mediation methods and local committees to resolve governance disputes while maintaining social harmony and stakeholder cooperation	Behera et al. (2019), Ido (2019), Depari et al. (2023), Hulugala et al. (2021)
Inspires Community Cohesion	Strengthens stakeholder bonds through shared cultural practices and collective identity, creating sustained commitment to governance objectives	Singer (2015), Hara (2018), Angelstam (2021), Hulugala et al. (2021)

Based on the previous analysis, effective leadership in community-based forest management encompasses multiple interlinked attributes which can be viewed along four essential dimensions for sustainable forest governance (Figure 13). The Community Empowerment & Capacity Building cluster emphasizes the need to build community competencies through structured training, awareness, and social incentives that facilitate sustainable knowledge transfer and encourage continued involvement in forest management activities. These characteristics focus on uniting communities by incorporating local cultural practices, leveraging existing social networks, and encouraging collaborative action. The Governance & Accountability cluster establishes clear leadership processes, active community involvement, and consensus building for equitable and democratic decision making. Finally, the characteristics of Relationship & Conflict Management address the effective management of internal and external relationships through stakeholder negotiations, local conflict resolution, and the balance of economic

needs with conservation goals. This approach creates a comprehensive framework that ensures both social and environmental sustainability in community-based forest management.

Success in forest governance requires leaders who can integrate these capability clusters while maintaining attention to power dynamics and systematic efforts to ensure that orchestration activities enhance rather than undermine inclusive governance and sustainable resource management. Investment in developing these orchestration capabilities represents a priority for achieving long-term sustainability goals in forest governance systems worldwide.



**Figure 13** Grouping of effective leadership in community-based forest management.

*Sources:* Adapted from: Aliyar, 2024; Angelstam, 2021; Atmadja, 2023; Ayuttacorn, 2024; Vercher et al. 2021; Behera et al., 2019; Depari et al., 2023; Girma, 2022; Górriz-Mifsud, 2016; Hara, 2018; Hulugala et al., 2021; Ido, 2019; Jung, 2022; Kailola, 2023; Kresna, 2024; Qiu, 2021; Riveros, 2016; Roslinda, 2017; Schröter, 2018; Singer, 2015; Song, 2024; Sulistyorini, 2018; Sylviani, 2020.

#### 4. Final Considerations

This systematic review offers important new insights into social capital as a power resource in forest governance networks, exploring how actors mobilize trust, norms, and networks to manage stakeholder relations and influence governance outcomes at various levels. A total of 85 publications were utilized for bibliometric analysis and 43 for thematic synthesis covering the years 1998-2024, and it was found that effective forest governance depends on coordination activities and network management. However, certain challenges need to be acknowledged to enhance the manner in which power relations and governance performance within forests are conceptualized.

A significant limitation concerns the adequacy of analytical categories and methodological approaches. While this study considers multiple dimensions and factors, it does not fully capture the complete spectrum of power relations and governance dynamics within forest governance networks. As Brown and Sonwa (2018) point out, institutional interaction remains crucial for climate adaptation, yet there has been limited focus on building local actor and institutional capacity for dealing with complex governance networks. The extent to which power resources can be mobilized and networks effectively managed depends on the unique features of governance, which include formal structures, culture, economy, politics, and environment.

The complex interactions among various forms of social capital as power resources create substantial analytical challenges in identifying specific mechanisms and their governance effects during network coordination. With trust-based power, normative regulations, and coordinated networks present, it becomes challenging to determine which form of power contributes to specific effects. Moreover, the largely qualitative character of existing evidence constrains analysis of the comparative significance and strength of various coordination mechanisms. The methodological approach adopted in this review limits examination of the dynamic nature and temporal dimensions of power relations within forest governance networks.

One of the major issues is the extent to which the findings can be generalized to other forest governance contexts. The research draws on examples of specific places and types of governance arrangements; however, this may not capture the variety of frameworks, structures, and actors globally. Although the study points to linkages between social capital and governance performance, demonstrating that social capital directly affects governance improvement requires more research. According to Hulugala et al. (2021), successful network coordination in collaborative forest management involves complex and context-specific relationships that integrate the processes of trust building, conflict management, and inclusive participation. Such relationships are influenced by cultural, political, and environmental processes and therefore limit the direct implementation of particular coordination mechanisms and strategies associated with power resources.



While this research uses actor-centered power theory and network governance approaches, it also requires further development to include lessons from critical governance studies, political ecology, and institutional analysis. Building on Górriz-Mifsud's (2016) reasoning, network structures in communities have a significant influence on information flows and power dynamics, highlighting the necessity of more developed theoretical concepts that consider power complexity in forest governance networks. The interconnection of social capital as a power resource with other forms of power—such as economic, political, and symbolic—within governance networks calls for more theoretical attention.

Several specific suggestions for future research and practical application can be formulated. Researchers conducting power analysis are encouraged to examine actor sets, organizational structures, and collaborative strategies across forest governance networks. This approach must particularly consider how governance is influenced by diverse political, cultural, and ecological contexts in different regions of the world. The primary focus of investigation ought to be the mechanisms of power redistribution and their impact on the sustainability and inclusiveness of governance.

Future studies should develop integrated methods that reflect the dynamic and interdependent relationships among power resources, coordination mechanisms, and governance outcomes. This could involve the application of complex systems methods, social-ecological systems frameworks, or institutional analysis and development frameworks to examine relationships between social capital mobilization and governance effectiveness. The application of quantitative network analysis would enhance the understanding of actor positioning, information flow, and resource structure within governance networks. Mixed methods approaches in longitudinal research enable the examination of the evolution of relationships and collaborative strategies over time.

Researchers should also examine potential positive and negative outcomes when using various strategies and approaches to coordinate stakeholders. As Nath and Inoue (2014) indicate, leadership responsiveness and trust-building capacities are essential to align conservation actions, yet the contexts in which these capacities create value or constrain governance inclusivity require further comprehensive examination. Future studies should analyze concerns like the presence of elite networks, power concentration, and elite capture that may undermine governance effectiveness and equity.

Practical application of research findings warrants careful consideration and involves formulating governance capacity-building initiatives that strengthen network orchestration skills while fostering equitable power distribution. According to Suswadi (2024), leaders' effectiveness in mobilizing social capital depends on aligning community objectives with conservation objectives, where training programs need to improve coordination skills while being culturally sensitive and respectful of local autonomy. These training activities need to focus on acquiring particular skills linked to network orchestration, including stakeholder coordination, conflict mediation, institution building, and facilitating inclusive participation.

Research findings must inform the creation of policy structures that facilitate network orchestration and ensure equitable governance outcomes. Policy structures must create an environment conducive to social capital mobilization while designing accountability mechanisms that prevent elite capture and guarantee inclusive decision-making processes. Decision support systems and governance instruments that incorporate knowledge about social capital as a power resource, as well as network orchestration capability, can increase governance effectiveness in various settings.

## 5. Conclusion

This systematic review finds that social capital functions as a strategic power resource that actors mobilize to coordinate stakeholder relationships, influence governance processes, and reshape power dynamics within forest governance networks. A bibliometric analysis of 85 studies was complemented by detailed analysis of 43 articles spanning 1998 to 2024. The findings show that trust, norms, and networks are the foundational elements in network management and coordination across levels, thus constituting the bedrock of robust forest governance.

Research activity in social capital and forest management has intensified in recent years, with 2018 and 2024 each producing eight publications. A total of 245 institutions representing 57 nations participated in this research, with Indonesia contributing the most, followed by Japan, the United Kingdom, and the United States. With terms such as "social capital," "governance networks," and "stakeholder coordination," the field demonstrates how networking and power-related concepts are increasingly significant, and the field has developed to encompass more sophisticated concepts.

This bibliometric evidence supports the detailed analysis that uncovers key relationships between social capital components and forest governance outcomes. Trust-based authority serves as a coordination mechanism that minimizes transaction costs, ensures stakeholder adherence, and lends legitimacy to governance decisions. Normative authority systems construct hybrid governance structures that integrate formal and traditional authority sources. Network coordination facilitates resource mobilization, stakeholder inclusion, and dispute resolution between governments and communities. Leaders must effectively utilize trust, implement shared rules, and establish community relationships to resolve conflicts, mobilize communities for environmental actions, and secure external agency assistance.

These coordination mechanisms work synergistically, as our research shows that effective forest governance results from strategically combining multiple social capital power resources rather than relying on individual coordination mechanisms. Social capital's role in redistributing power allows bonding capital to strengthen community solidarity, bridging capital to

connect diverse groups, and linking capital to provide access to formal decision-making processes. Consequently, network orchestration is practiced by leaders to align governance processes at various levels while coordinating complex stakeholder relations and competing interests.

From a theoretical perspective, these findings advance forest governance theory by showing how social capital functions as a distributed power resource that can reshape stakeholder influence patterns within governance networks. In practical terms, a key challenge for practitioners is to empower leaders to work with diverse stakeholders and prioritize equity and power issues through investment in network orchestration.

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### Ethical Considerations

Not applicable.

### Conflict of Interest

The authors declare that they have no conflicts of interest.

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