Research Article

Collaborative Governance in Locally-Based Fisheries Management: A Literature Review

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Abstract.

Fisheries management faces complex challenges that cannot be resolved solely through top-down approaches. This article reviews the literature on collaborative governance and local wisdom in sustainable fisheries management. The study highlights that collaborative governance—through active community participation, power-sharing, and adaptive learning—can enhance the effectiveness of fisheries management policies. Meanwhile, local wisdom provides context-specific ecological knowledge, social norms, and culturally-tested conservation practices. Although both approaches have their respective strengths, their integration is still rarely addressed in a systematic manner. This article identifies a gap in the form of the separate treatment of the two concepts and the lack of effective integrative mechanisms. The research method employed is a literature review using a thematic synthesis approach. The inclusion criteria for this study involve reviewing journal articles published in SINTA 1 and Scopus from 2006 to 2024, using keywords such as "collaborative governance," "local wisdom," "fisheries management," and "community-based conservation." This article proposes an integrated framework that combines both approaches in the planning, implementation, and evaluation of fisheries management. Case studies such as the sasi system in Papua and Maluku reveal significant potential but also expose challenges, including the erosion of traditional institutions and conflicts with external interests. The article recommends strengthening local institutions, promoting continuous learning, and integrating traditional and scientific knowledge to build a resilient and equitable fisheries management system.

Keywords: collaborative governance, local wisdom, fisheries management, community-based conservation

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1. Introduction

Fisheries management is undergoing a paradigm shift that increasingly recognizes the importance of collaborative governance approaches that integrate local ecological knowledge and community participation[1]. Traditional top-down management strategies have often proven inadequate in addressing the complex challenges of the fisheries sector, particularly in small-scale contexts, thus reinforcing the need for decentralized and participatory models[2]. Collaborative governance (or co-management) involves the sharing of power and responsibility among government agencies, local communities,

and other stakeholders in the decision-making process[3]. This approach acknowledges that local communities often possess valuable knowledge about ecosystems, fish stocks, and fishing practices, which can enhance the effectiveness and sustainability of fisheries management.

Collaborative governance aims to address the limitations of conventional management systems by fostering a sense of ownership and shared responsibility among stakeholders. This approach is expected to improve compliance, enhance resource management, and deliver better socio-economic outcomes for fishing communities[4]. As a result, interest in collaborative or co-management strategies for marine resource management has been growing, reflecting dissatisfaction with existing systems and a shift toward more decentralized approaches. This decentralization of governance can also play a crucial role in the practical implementation of ecosystem-based management[5].

While the existing literature widely acknowledges the benefits of collaborative governance and local wisdom in fisheries management, previous studies have often failed to provide a comprehensive framework for integrating the two. Many studies tend to treat collaborative governance and local wisdom as separate entities—focusing on participation and power-sharing aspects of collaborative governance, and on the validation of traditional knowledge within local wisdom. As a result, there is a lack of in-depth understanding of how effective collaborative governance mechanisms can be systematically designed to incorporate and utilize local wisdom in decision-making, implementation, and evaluation processes of fisheries management.

For instance, challenges such as scaling context-specific local wisdom to broader management levels, addressing conflicts between scientific and traditional knowledge, and ensuring fair representation and involvement of indigenous communities within collaborative governance structures are often insufficiently explored. This study aims to fill that gap by developing an integrated framework that bridges collaborative governance and local wisdom, with a focus on their explicit and systematic application in sustainable fisheries management.

This study emphasizes several key points, including the development of a comprehensive framework—an area where previous research has fallen short in systematically integrating collaborative governance and local wisdom. One major issue highlighted is the tendency to treat collaborative governance and local wisdom as separate entities. Earlier studies also lack a deep understanding of integration mechanisms, particularly

how to design effective collaborative governance systems that incorporate local wisdom into decision-making, implementation, and evaluation processes.

Fisheries management based on local wisdom has been implemented in several regions of Indonesia. For example, in the provinces of Papua and Maluku, the sasi system is practiced as a customary tradition that prohibits the harvesting of certain marine resources (such as fish, sea cucumbers, or lola) for a designated period, allowing stocks to recover. Sasi is widely recognized as an effective form of local wisdom in marine resource conservation. Its success relies on the compliance of indigenous communities with sasi rules and the role of traditional leaders in enforcement.

Several indigenous communities have their own traditional fisheries management systems, which often include rules on ownership, fishing zones, restrictions on gear types, and conservation practices. Examples include the lebak lebung system in South Sumatra and the awig-awig system in some coastal areas. The effectiveness of these systems varies, depending on factors such as the strength of customary institutions, pressures from modernization, and external interventions. The success of fisheries management based on local wisdom is influenced by a range of complex factors: the resilience and authority of customary institutions, efforts to preserve traditional ecological knowledge, the pressures of modernization and socio-economic change—which may alter local wisdom—and, importantly, the support from government and other stakeholders, as well as the ability to adapt to environmental changes.

Weaknesses in certain elements have led to the failure of fisheries management based on local wisdom. For example, the erosion of the sasi system in Maluku has reduced its effectiveness due to external influences, the commercialization of fisheries, and the weakening of traditional institutions. These factors have resulted in violations of sasi regulations and a decline in the availability of marine resources. In addition to erosion, conflicts have emerged in the management of traditional fishing grounds, particularly when they clash with fishing permits granted to outside fishers or commercial fishing companies. Such conflicts have led to social tensions, overexploitation of resources, and the loss of traditional management practices. Collaboration among various stakeholders and the application of local wisdom are expected to produce sustainable impacts on the management of fisheries ecosystems and improve the quality of life for fishers themselves.

2. Literature Review

The purpose of this literature review is to provide a comprehensive understanding of the theoretical and practical evolution of the two main concepts explored in this article collaborative governance and local wisdom while clarifying the unique position of this study.

2.1. Theoretical Evolution and Application of Collaborative Governance

In fisheries management particularly in small-scale contexts the centralized top-down approach, in which decisions are made primarily by government institutions with minimal involvement from local communities, has proven to be increasingly ineffective in addressing complex challenges. As a result, the concept of collaborative governance has undergone significant development over the past few decades[5]. Collaborative governance has emerged as a promising alternative in response to the limitations of top-down approaches[6]. This concept emphasizes the sharing of power and responsibilities among a range of stakeholders, including government agencies, local communities, non-governmental organizations, and the private sector, in the decision-making process[7]. Recognizing that each stakeholder possesses unique and valuable knowledge, expertise, and resources contributes to more effective and sustainable resource management[8].

The benefits of collaborative governance in fisheries management have been highlighted in previous studies, including improved compliance with regulations, enhanced ecological conditions, increased socio-economic well-being of fishing communities, and reduced conflict among stakeholders[9][10]. Collaborative governance is viewed as a more adaptive and responsive approach to changing environmental and social conditions. However, the implementation of collaborative governance faces various challenges, such as building trust and achieving consensus among diverse stakeholders, limited capacity and resources within local communities, and resistance to change from more centralized management approaches.

2.2. Theoretical Evolution and Application of Local Wisdom

Local wisdom, also known as traditional ecological knowledge, has long been recognized as a valuable source of information for natural resource management.[11] It refers to the knowledge, practices, and beliefs accumulated over generations by local communities through close interaction with their environment.[12] This includes insights into ecology, species behavior, weather patterns, and sustainable resource management techniques.[13][14] In the context of fisheries management, local wisdom can offer critical insights into fish population dynamics, spawning grounds, migration patterns, and the impacts of fishing practices.[15] Moreover, local wisdom often encompasses social norms and customary rules that govern access to and use of fishery resources, contributing to more equitable and sustainable management.

Previous studies have shown that integrating local wisdom into fisheries management can enhance decision-making effectiveness, strengthen policy legitimacy, improve compliance with regulations, and build social capital within communities.[16][17] However, challenges in utilizing local wisdom include the risk of knowledge erosion due to social and cultural changes, which may potentially lead to conflicts between local and scientific knowledge.

2.3. The Unique Position of This Article in the Research Landscape

This article seeks to make a significant contribution to the existing literature on collaborative governance and local wisdom in fisheries management. While previous studies have discussed these two concepts separately, this research focuses on their explicit and systematic integration. It argues that effective and sustainable fisheries management requires a holistic approach that combines the strengths of collaborative governance particularly in facilitating participation and joint decision-making with the richness of local wisdom, which offers contextually relevant knowledge and practices.[1]

Good collaborative governance practices begin with the development of an integrated framework that provides practical guidance on how to incorporate both collaborative governance and local wisdom into various stages of fisheries management. The implementation of adaptive co-management plays a crucial role by emphasizing the integration of collaborative governance principles with adaptive learning to manage the complexity and uncertainty inherent in fisheries systems.[18] The integration of collaborative governance and local wisdom is also expected to explore power dynamics

and justice, with a strong emphasis on ensuring fair representation and equitable benefit sharing.

3. Research Methodology

This study employs a thematic literature synthesis approach to analyze and integrate findings from existing studies on collaborative governance and local wisdom in fisheries management. Unlike traditional literature reviews, literature synthesis places greater emphasis on interpreting and integrating findings to generate new understanding, rather than merely summarizing existing literature. The thematic approach in this research involves analyzing and synthesizing key themes that emerge from the reviewed literature. Several recurring themes identified in previous studies include the lack of a comprehensive framework for integrating collaborative governance and local wisdom, the tendency to treat these concepts separately, and a limited understanding of effective integration mechanisms. The inclusion criteria for this research involved reviewing peer-reviewed journal articles published between 2006 and 2024 that focus on case studies or conceptual analyses of collaborative governance, local wisdom, and/or sustainable fisheries management.

4. Discussion

4.1. The Essence of Collaborative Governance

The essence of collaborative governance in fisheries lies in its ability to bridge the gap between centralized authority and local realities. By actively involving local communities in management processes, collaborative governance fosters a sense of ownership and shared responsibility, which can lead to more effective and sustainable outcomes.[7] This approach acknowledges the limitations of top-down management strategies, which often fail to account for the ecological, social, and economic diversity of different fishing communities. Governance encompasses the mechanisms, practices, and procedures through which governments and citizens manage resources and address public issues.[19] Collaborative governance is not merely about consultation or information sharingit requires genuine partnerships among government institutions, local communities, and other stakeholders, where each party contributes their unique knowledge, expertise, and resources to the decision-making process.[20] Marine governance

often addresses socio-economic issues primarily when they gain political attention and resource allocation becomes a factor.[6] By integrating local ecological knowledge into management planning, collaborative governance can improve the accuracy and relevance of scientific assessments, ultimately leading to more informed and adaptive management decisions. The success of collaborative governance depends on the establishment of effective co-management organizations that facilitate communication, coordination, and conflict resolution among stakeholders.[21] These organizations must represent the diverse interests within the community and possess the authority to make binding decisions for all parties involved. The formation of co-management structures for shared resources incorporating relevant local government units and stakeholders enables a more integrated and complementary approach to law enforcement.[22] Trust and transparency are also essential elements of collaborative governance, as stakeholders must have confidence in the fairness and legitimacy of the decision-making process. The initial stages of collaborative processes are often marked by conflicts among stakeholders.[23] This is because the actors involved typically have differing interests and perspectives in managing coastal resources.

Collaborative governance can also play a crucial role in addressing transboundary issues in fisheries management. By establishing collaborative governance arrangements at regional or international levels, it becomes possible to develop harmonized management plans that consider the ecological connectivity of fish stocks and the diverse interests of stakeholders. However, the challenges faced by nations today demand management that is effective, distributed, and interconnected—not isolated within select communities.[24] International organizations and NGOs can make significant contributions to collaborative governance by providing technical assistance, financial support, and capacity building for local communities and government institutions.[25]

As an archipelagic nation, Indonesia faces inherent complexity in fisheries management due to its diverse ecosystems, cultures, and the varying scales of fisheries—from small-scale operations to large industrial enterprises. The sasi system practiced in Papua serves as a prominent example of local wisdom that plays a vital role in marine resource conservation. For the implementation of sustainable fisheries management, the sasi system must be respected and integrated with modern scientific approaches. Customary rights of indigenous communities present a unique challenge that must be acknowledged and protected from the threats of extractive industries and illegal fishing practices, which can damage ecosystems and disrupt traditional management systems.

On the other hand, modern fisheries management is essential for improving community welfare. The modernization of fisheries has resulted in higher catches, leading to increased income for fishing communities. Therefore, collaborative governance is necessary to bridge the gap between traditional, wisdom-based fisheries management and modern scientific approaches. This ensures that the utilization of fishery resources can be optimized without compromising sustainability.

4.2. Local Wisdom in Fisheries Management

Local wisdom, also known as indigenous knowledge or traditional ecological knowledge, refers to the accumulated knowledge, practices, and beliefs of local communities regarding their environment and natural resources. This knowledge is typically passed down through generations and deeply rooted in the community's culture and social structure. Local wisdom encompasses a broad range of insights, including knowledge about fish behavior, migration patterns, spawning areas, and the ecological impacts of fishing practices. It includes traditional fishing techniques, resource management practices, and social norms that promote the sustainable use of natural resources. Local ecological knowledge represents a collective perception held by specific groups about their environment. It is the result of culturally inherited knowledge and persistent interaction between individuals and their biophysical surroundings [26].

Integrating local wisdom into fisheries management can lead to more effective and equitable outcomes. Local knowledge provides valuable insights that complement scientific assessments, especially in areas that are difficult for outsiders to access. Through collaboration between scientists and fishers, a more comprehensive understanding of fish stock status and ecosystem dynamics can be developed, supporting more informed management decisions [8]. The integration of local wisdom also enhances the legitimacy and acceptance of management policies by ensuring alignment between these policies and the values and priorities of local communities [13].

Local wisdom also plays a crucial role in enhancing compliance with fisheries regulations. When communities are actively involved in the management process and perceive the regulations as fair and legitimate, they tend to be more compliant. This reduces the need for costly law enforcement actions and strengthens a shared sense of responsibility in resource management [27]. Local wisdom is the community's ability to perceive, assess, and act wisely within their environment. It holds significant influence in people's lives because it contains values and norms that govern human behavior in

interacting with nature and the environment [28]. Furthermore, local wisdom can serve as a foundation for building social capital and strengthening community resilience. Local wisdom can serve as a vital instrument for the conservation and preservation of natural resources [29]. Communities with strong social networks and shared identities are better equipped to collectively manage resources and adapt to changing environmental conditions [30].

Local knowledge is often recognized for its multiple functions applicable in various contexts, with one of the most frequently discussed roles being its contribution to natural resource conservation. By empowering local communities to participate in decision-making and management processes, collaborative governance can foster a sense of ownership and stewardship that supports long-term sustainability [15]. Local wisdom embodies social values and serves as a source of thought and behavioral guidelines aimed at preserving ecosystem resources [31]. Humans derive wisdom from three main sources: cultural values (local wisdom), modern governmental regulations, and religious perspectives [16].

In Bangkalan Regency, East Java, local wisdom is still felt and preserved by the community[17]. This is evident through the activities of the people, especially fishermen, in conserving coastal resources and the marine environment. In conclusion, collaborative governance and local wisdom are important elements to achieve sustainable fisheries management. By encouraging collaboration among stakeholders and integrating local knowledge into decision-making, an effective and equitable management system can be developed. As in other coastal areas, the fishing and service traditions of the Bugis-Makassar contain deep local wisdom about navigation, weather, and fish behavior. This knowledge is passed down through oral stories and direct practice. The challenge in Makassar is how to preserve and integrate this local wisdom in a modern context, where fishing technology is increasingly advanced and the pressure on resource exploitation is growing.

4.3. Collaborative Governance and Local Wisdom

Collaborative governance emphasizes the importance of cooperation and joint decision-making among diverse stakeholders, including government institutions, local communities, and non-governmental organizations, in managing natural resources. According to Stephan Balogh, the definition of collaborative governance includes three aspects: system context, drivers, and collaboration dynamics [32]. On the other hand, local

wisdom refers to the traditional knowledge, practices, and beliefs of local communities related to their environment and natural resources. Integrating local wisdom into the collaborative governance process can enhance the effectiveness and legitimacy of fisheries management by incorporating traditional ecological knowledge, encouraging community participation, and fostering a sense of ownership and stewardship among local resource users [33]. Integrating local wisdom into the framework of collaborative governance requires a deep understanding of the socio-cultural context, power dynamics, and institutional arrangements that shape resource management practices. The convergence of collaborative governance and local wisdom forms a holistic strategy for fisheries management that not only recognizes the ecological complexity of aquatic ecosystems but also integrates the deep socio-cultural dimensions underlying community connections to natural resources.

This integrated approach acknowledges that sustainable fisheries management depends not only on scientific or technical interventions but also on the active participation and empowerment of local communities. Based on analyses conducted in previous studies, the potential success of applying local wisdom lies in integrating the sasi system into a broader co-management framework, with recognition of indigenous peoples' rights and their involvement in decision-making. The challenges include differences in perspectives between traditional and scientific knowledge, as well as difficulties in creating fair and effective collaboration mechanisms. In other regions, such as Makassar, success can be achieved by combining Bugis-Makassar maritime local wisdom with modern technology in fisheries management, for example in mapping fishing areas and monitoring fish stocks. In this implementation, failure may occur if local knowledge is marginalized in the decision-making process or if there is an imbalance of power between traditional fishermen and the fishing industry.

4.4. Challenges and Opportunities

Despite its potential benefits, the implementation of collaborative governance in fisheries management faces several challenges. These challenges include difficulties in building trust and consensus among diverse stakeholders, the lack of capacity and resources within local communities to participate effectively, and the persistence of centralized, top-down management approaches. Several strategies can enhance the effectiveness of collaborative governance in fisheries management. These strategies include strengthening institutional frameworks, increasing community empowerment,

and developing adaptive learning and knowledge sharing. Climate change, globalization, and the rise of industrial activities pose serious threats to the sustainability of small-scale fisheries, thereby necessitating collaborative approaches to enhance adaptive capacity and resilience [34]. Integrating scientific knowledge with local ecological knowledge can improve the accuracy and relevance of fisheries management decisions, while transparency and accountability can help build trust and strengthen legitimacy.

Monitoring and law enforcement are essential for improving information flow and securing property rights, thereby enabling more effective fisheries resource management [18]. This involves the need for continuous monitoring and evaluation to assess the impact of collaborative governance initiatives, identify best practices, and adjust management strategies in response to changing environmental and socio-economic conditions. Through proactive engagement, adaptive management, and continuous learning, collaborative governance can serve as a catalyst for sustainable fisheries management that benefits both ecosystems and the communities that depend on them [35].

Based on previous literature studies, the implementation of collaborative governance and local wisdom in Papua faces particular challenges such as a lack of infrastructure and access to information, which can hinder communication and coordination among stakeholders. The limited institutional capacity to support effective co-management processes, as well as pressures from extractive industries (e.g., mining) and the fishing industry, pose threats to the sustainability of traditional fisheries. These challenges in Papua can be minimized by strengthening customary institutions to play a larger role in fisheries management through developing co-management models based on local wisdom and the sasi system, combined with the use of technology to enhance monitoring and law enforcement. Besides Papua, the implementation of collaborative governance and local wisdom is also applied in other coastal areas such as Makassar, where different challenges exist. These include unresolved conflicts between traditional fishermen and modern fishing fleets over access to fisheries resources. Coastal area degradation caused by pollution, reclamation, and infrastructure development, as well as a lack of awareness about the importance of fisheries sustainability among the general public and policymakers, are challenges that must be addressed by the government with the involvement of various stakeholders. This is essential so that the goal of sustainable fisheries management can be realized.

In addition to the challenges faced, opportunities that can be pursued by local governments include the development of sustainable fisheries-based ecotourism to increase

local community income. Strengthening regulations and law enforcement to protect fisheries resources from overexploitation is also important. Furthermore, enhancing collaboration between universities, research institutions, and local governments can support sustainable, science-based fisheries management.

5. Conclusion

Through a qualitative literature review method, this study highlights that the collaborative approach not only addresses the limitations of centralized systems but also strengthens ecological sustainability and social justice by involving the traditional knowledge of local communities. Some key findings include:

a) The Essence of Collaborative Governance: This approach bridges central authority with local realities through genuine partnerships between the government, communities, and stakeholders. Its success depends on establishing inclusive, transparent co-management organizations that are focused on conflict resolution.

b) The Role of Local Wisdom: Traditional knowledge about ecosystems, fishing techniques, and sustainable social norms serves as a critical foundation in decision-making. Its integration with scientific data enhances the accuracy of policies and their legitimacy in the eyes of the community.

c) Convergence of Collaboration and Local Wisdom: This holistic strategy combines ecological complexity with socio-cultural dimensions, emphasizing that fisheries sustainability requires active participation and empowerment of the community.

d) Challenges and Opportunities: Although facing obstacles such as capacity gaps, resistance from centralized systems, and power dynamics, the collaborative approach can be strengthened through institutional reinforcement, increased literacy, and adaptation to climate change and globalization.

The emerging policy implications highlight the need for a flexible institutional framework supported by local governments and NGOs, as well as capacity-building initiatives for fishermen and resource managers. Additionally, this article emphasizes the importance of adaptive learning, continuous monitoring, and the integration of cross-sectoral knowledge to respond to environmental and socio-economic dynamics. Thus, multistakeholder collaboration that respects local wisdom is not only an effective solution for sustainable fisheries management but also a catalyst for resilient and equitable community development.

6. Recommendations

This study provides practical and implementable recommendations for local governments as follows:

1. **Establishment and Strengthening of a Flexible Institutional Framework through:**
   (a) The creation of regional regulations or local policies that explicitly recognize and support collaborative governance in fisheries management.
   (b) The formation of forums or co-management councils involving representatives from local government, fishing communities, customary leaders, academics, NGOs, and the private sector.
   (c) Providing adequate administrative and financial support for the operation of co-management forums.
   (d) Ensuring that the institutional framework is adaptive and responsive to changes in ecological, social, and economic conditions.
2. Initiation and Capacity Building through:
   (a) Organizing training sessions and workshops to improve the knowledge and skills of fishermen, fisheries managers, and co-management forum members in collaborative governance, sustainable fisheries management, and local wisdom.
   (b) Facilitating the exchange of knowledge and experiences among fishing communities related to good fisheries management practices and relevant local wisdom.
   (c) Enhancing financial literacy and entrepreneurial skills of fishermen to support livelihood diversification and reduce pressure on fisheries resources.
   (d) Utilizing information and communication technology (ICT) to facilitate communication, coordination, and information sharing among stakeholders.
3. Integration of Local Wisdom and Scientific Knowledge:
   (a) Conducting an inventory and documentation of local wisdom related to fisheries management in the area, including knowledge about fish species, habitats, migration patterns, and traditional fishing practices

(b) Forming a multidisciplinary team consisting of fisheries experts, ecologists, anthropologists, and representatives from fishing communities to integrate local wisdom and scientific data in fish stock assessments, management planning, and decision-making.

(c) Developing a clear protocol for the validation, verification, and utilization of local wisdom in fisheries management.

(d) Ensuring that local wisdom is recognized and respected on an equal footing with scientific knowledge in the decision-making process.

4. Implementation of Adaptive Co-Management:

(a) Applying an adaptive co-management approach, which is a flexible and iterative management process that allows for the adjustment of management strategies based on monitoring and evaluation results.

(b) Developing a participatory monitoring system that involves fishers and other stakeholders in collecting data on fish stocks, ecosystem conditions, and the socio-economic impacts of management actions.

(c) Conducting periodic evaluations of the effectiveness of management actions and making necessary adjustments based on the evaluation results.

(d) Promoting continuous learning and knowledge sharing among stakeholders.

5. Strengthening Multi-Stakeholder Collaboration:

(a) Building and maintaining strong, trust-based relationships among stakeholders

(b) Facilitating open and transparent dialogue among stakeholders to identify problems, seek solutions, and resolve conflicts.

(c) Encouraging active participation and fair representation of all stakeholder groups, including marginalized or underrepresented communities.

(d) Establishing partnerships with NGOs, universities, and research institutions to gain technical, financial, and scientific support.

6. Response to Environmental and Socio-Economic Changes:

(a) Integrating considerations of climate change, globalization, and other driving factors of change into fisheries planning and management.

(b) Developing adaptation strategies to help fishing communities cope with the negative impacts of environmental and socio-economic changes.

(c) Promoting livelihood diversification and the development of alternative economic opportunities to reduce dependency on fisheries.

(d) Enhancing the resilience of fishing communities to shocks and stressors.

By adopting these implementation steps, local governments can create conducive conditions for effective and sustainable collaborative governance in fisheries management, ultimately benefiting both the ecosystem and the communities that depend on it.

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