Policy Integration for Sustainable Environmental Management of Lake Tana, Amhara Region, Ethiopia

Melkemariam Genet[1], Bamlaku Alamirew[2], Solomon Tsehay[3]

Abstract

This study analyzes the integration status of environmental protection policies for Lake Tana using a convergent mixed methods approach within a pragmatism research paradigm. Data was collected through observations, focus group discussions, document reviews, and interviews with policymakers and stakeholders. Content analysis and CapScan analysis were employed to assess the extent of policy integration pertinent to Lake Tana. The result shows significant gaps in policy integration particularly in policy design, implementation, and evaluation. Results further indicate that stakeholders lacked alignment on key issues, resulting in poor sectoral coordination and fragmented efforts. Integration challenges including poor stakeholder engagement, insufficient institutional capacity, and fragmented policy frameworks are exacerbated by varied levels of leadership, accountability, and monitoring. Furthermore, policymakers and experts emphasized the need for stronger institutional structures and enhanced coordination to tackle these issues effectively. The study suggests the need for increased political commitment, better stakeholder collaboration, financial alignment, and improved monitoring systems. It also suggests policy reforms to strengthen institutional frameworks and develop a unified strategy for the sustainable management of Lake Tana, contributing to a broader understanding of policy integration in environmental governance.

Keywords: Lake Tana, Policy Integration, Environmental protection

[1] Ph.D. Student, Amhara Leadership Academy, Department of Public Policy and Leadership, Bahir Dar, Ethiopia; Bahir Dar University – EiTEX, Department of BES, Bahir Dar, Ethiopia, Email: melkeagenet@gmail.com

[2] Yom Postgraduate College, Project Planning and Management Department, Addis Ababa, Ethiopia: Email: bamlakalamirew@gmail.com

[3] Addis Ababa University, College of Development Studies, Addis Ababa, Ethiopia, Email: tsehaysol2015@gmail.com

1. Introduction

Ancient civilizations such as the Indus, Roman, and Greek societies implemented early forms of environmental laws to prevent overexploitation, indicating that environmental management has a long history (Bueren, 2019). However, since the Industrial Revolution, rapid population growth, urbanization, and industrialization have led to significant environmental degradation (Choudhary & Chauhan, 2015; Nanda & Pring, 2013). In Ethiopia, environmental degradation has also become a pressing issue driven by deforestation, land degradation, and unsustainable agricultural practices (Tesfaw et al., 2023). These challenges have led to soil erosion, biodiversity loss, and declining water quality, significantly impacting rural livelihoods (Engdaw et al., 2024). To ameliorate these problems, the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs) have emphasized environmental sustainability through integrated policies and partnerships in water resource management and biodiversity protection (Duberry, 2019; Global Water Partnership, 2009; and Water Policy Group, 2021). Emerged in the 1990s, Environmental Policy Integration (EPI) become a critical strategy for embedding environmental concerns into broader policy frameworks to promote sustainable development (Nilsson et al., 2007; Tosun & Lang, 2017). EPI aims to address fragmented decision-making by mainstreaming environmental issues across sectors, thereby enhancing policy coherence and effectiveness (Persson, 2004).

Despite these efforts, researches indicate that the lack of coordinated action and effective policy integration remains a major barrier to sustainable development in Ethiopia (Dejene & Cochrane, 2019; Stave & Kopainsky, 2017). The problem of Lake Tana faces severe degradation due to sedimentation, deforestation, and the invasive water hyacinth, which disrupts its ecological balance and undermines local livelihoods (Dersseh et al., 2020; Goraw & Shimelis, 2017). Although the Lake Tana Protection Authority has attempted to mitigate these problems, poor policy coordination, weak stakeholder engagement, and inadequate institutional capacity have hindered progress (Stave & Kopainsky, 2017).

While existing studies have provided valuable insights into specific challenges such as sedimentation, water hyacinth proliferation, and wetland degradation (Dersseh et al., 2022; Goshu & Aynalem, 2017; Hanibal et al., 2020; Shimelis et al., 2017), a significant research gap remains pertinent to policy integration. Few studies have explored the need for holistic, policy-driven approach that integrates these concerns into cohesive strategies. This study seeks to address this gap by assessing the integration of environmental protection policies in the study area.

2. Theoretical Framework

Theoretical frameworks, such as those developed by Underdal (1980), have been expanded through empirical studies demonstrating how integrated policies can lead to more sustainable outcomes (Briassoulis, 2017; Nilsson & Persson, 2003). Policy integration theory stresses the importance of coherence among policies affecting the environment to ensure that different sectors work together toward common sustainability objectives (Hogl et al., 2016). This study employs a robust theoretical framework to analyze and propose solutions for the environmental policy integration challenges at Lake Tana, Ethiopia. The core of this framework rests on two fundamental theories: Policy Integration Theory and Sustainability Theory. Policy Integration Theory emphasizes the necessity of coherence and coordination across diverse policy sectors and governance levels (Candel & Biesbroek, 2016; Nilsson et al., 2012). In the context of Lake Tana, this translates to addressing the fragmented management of the lake by fostering both horizontal integration (coordination among sectors like agriculture, fisheries, tourism, and environment) and vertical integration (alignment of national, regional, and local policies). The theory aims to mitigate policy conflicts and inefficiencies that often lead to unintended environmental degradation, while also highlighting the critical role of stakeholder involvement to ensure policies are inclusive, informed, and supported by local communities (Briassoulis, 2017; Persson, 2007; Underdal, 1980).

Adding Policy Integration Theory, Sustainability Theory provides the ethical and aspirational goals for environmental management (ORCD, 2018). It promotes a balanced approach, integrating environmental protection, social

equity, and economic viability (Hoekstra & Kaptein, 2014; Runhaar et al., 2014). For Lake Tana, this means ensuring that management strategies preserve the ecological integrity of the lake while simultaneously supporting local livelihoods and economic activities. The theory addresses pillars of sustainability in; environmental sustainability, focusing on protecting water quality, biodiversity, and ecosystem services; social equity, ensuring equitable access to resources and benefits for all communities; and economic viability, promoting sustainable economic activities like eco-tourism and organic farming. By integrating these theoretical perspectives, the study ensures that policies not only promote long-term ecological health but also social well-being and economic resilience (Amare & Wubneh, 2017; Engdaw et al., 2024).

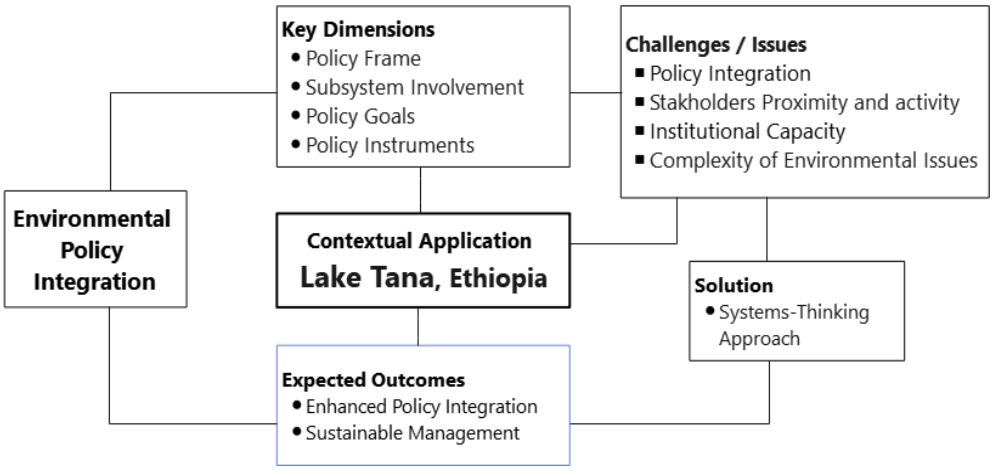

Figure 6. Conceptual Framework
Source: Adapted from Candel & Biesbroek (2016)

To operationalize these theories, the study adopts a conceptual framework (Figure 1) adapted from Candel & Biesbroek (2016). This framework provides a structured approach to analyzing and improving policy coherence and effectiveness in environmental governance. It focuses on four key dimensions: Policy Frames, which define how environmental issues are understood and prioritized; Subsystem Involvement, emphasizing the engagement of various actors and institutions; Policy Goals, focusing on the alignment of policy objectives; and Policy Instruments, involving the tools used to achieve policy goals. This framework addresses challenges such as

policy integration, stakeholder proximity and activity, institutional capacity, and the complexity of environmental issues. To overcome these challenges, the study proposes a systems-thinking approach, which aims to provide actionable solutions for improving environmental governance. Ultimately, the expected outcomes of this approach are enhanced policy integration and the sustainable management of Lake Tana.

3. Materials and Methods

3.1. Research Paradigm and Approach

This study adopts a pragmatism research paradigm, allowing for the flexible use of mixed methodologies to address the research objectives effectively (Creswell & Creswell, 2018). A convergent mixed methods approach was employed, integrating both quantitative and qualitative data to provide a comprehensive understanding of policy integration and environmental challenges in the Lake Tana area. This design enabled the simultaneous collection and analysis of diverse data types, offering a nuanced understanding of the research problem **(Chesnut et al., 2018)**. The integration of quantitative and qualitative data during the interpretation phase, as suggested by Cohen et al. **(2018)**, enhanced the depth and validity of the results.

3.2. Research Design

The research employed a convergent mixed-methods approach to investigate policy integration and stakeholder engagement. The qualitative component included document reviews, interviews, focus group discussions (FGDs), and workshops, while the quantitative component relied on structured questionnaire survey results. The integration of both methods during the interpretation phase provided a nuanced analysis, capturing measurable aspects of policy implementation alongside contextual insights from stakeholder perspectives.

3.3. Population and Sample

Key policies directly influencing the lake's environment were purposefully selected for document review to assess the status of policy integration. These policies included the Ethiopian Environmental Policy, the Ethiopian Water Resource Management Policy, and the ANRS strategies concerning environment, water, agriculture, tourism, and land. For the proximity map analysis, key stakeholders identified included the Ethiopian Environmental

Protection Authority, the Ministry of Water and Energy, ANRS bureaus, local communities, monasteries, universities, and non-governmental organizations (NGOs). A combination of purposive and census sampling methods was employed. Purposive sampling identified key institutions responsible for environmental governance, particularly the ANRS bureaus. Within these institutions, census sampling included all policymakers and experts engaged in strategy development and monitoring. This approach resulted in a total of 56 respondents from the following ANRS bureaus: Bureau of Agriculture (16), Environment Protection Bureau (13), Lake Tana Protection Agency (4), Land Administration Bureau (6), Tourism and Culture Bureau (11), and Water and Energy Bureau (6).

A structured questionnaire was administered both in person and via email, focusing on policy training, stakeholder mapping, and barriers to effective policy integration. Additionally, **12 workshop participants** (two from each of the six bureaus) contributed to the Capacity Scan (CapScan) framework analysis aimed at assessing governance capacity and identifying key factors influencing policy integration. Two focus group discussions (FGDs) were conducted. The first FGD comprised two groups, each with 12 participants, drawn from water hyacinth-affected areas, specifically the highly impacted kebeles of Lemba Arbaytu and Shihagomengie. The second FGD included 12 participants representing academic institutions, NGOs, and religious organizations, aiming to validate the policy integration framework for Lake Tana management.

3.4. Data Collection Tools and Methods

Data were collected using a combination of qualitative and quantitative tools and methods. The qualitative component involved document reviews, in-depth interviews, focus group discussions (FGDs), and observations. Document reviews focused on national and regional policies, including the National Environmental Protection Policy, the Ethiopian Water Resources Management Policy, and regional strategies from the ANRS. Interviews and FGDs provided insights into stakeholder roles, challenges, and opportunities for policy improvement.

Stakeholder mapping was conducted using a proximity map, categorizing stakeholders into four levels of involvement: directly accountable, routinely accountable, regular contact, and relatively remote. This qualitative tool helped visualize stakeholder relationships and roles, providing a foundation for further exploration through interviews and FGDs. A workshop was conducted to collect data using the Capacity Scan (CapScan) framework, designed to assess institutional capacity across four key dimensions: Leadership, Planning and Budgeting, Accountability, and Monitoring, Reporting, and Verification (MRV). Workshop participants included representatives from key bureaus involved in Lake Tana's governance, such as the Lake Tana and Other Water Bodies Protection and Development Agency, the Environment, Forest, and Wildlife Protection Bureau, the Bureau of Agriculture, the Water and Energy Bureau, the Land Administration Bureau, and the Tourism and Culture Bureau.

For the quantitative component, a structured questionnaire survey was administered to the **56 respondents** from key stakeholder bureaus. The survey focused on three main areas: training experiences of policymakers in policymaking and stakeholder mapping, the nature of existing environmental policies for Lake Tana, and key reasons for poor policy integration, such as lack of coordination, insufficient resources, and weak monitoring mechanisms.

3.5. Data Analysis

The data were analyzed using both qualitative and quantitative methods, consistent with the mixed-methods approach. Qualitative data were analyzed through content analysis and thematic analysis. Document reviews were evaluated using a Policy Integration Framework adapted from Candel & Biesbroek (2016), which assessed four dimensions of policy integration: Policy Frame, Subsystem Involvement, Policy Goals, and Policy Instruments. Interviews and FGDs were transcribed and analyzed to identify recurring themes, challenges, and opportunities for policy improvement. Stakeholder analysis, using proximity maps, visualized stakeholder relationships and roles, categorizing them into four levels of involvement.

Quantitative data were analyzed using descriptive statistics, such as frequency analysis, to summarize survey data. The CapScan Framework was applied to quantify stakeholder performance across four dimensions: Leadership, Planning and Budgeting, Accountability, and Monitoring, Reporting, and Verification (MRV). Additionally, CapScan results were complemented by qualitative insights from interviews and FGDs, exploring underlying reasons for identified gaps in institutional capacity. Stakeholder analysis using the proximity map further enriched the qualitative component by visualizing relationships and roles among key actors, enabling a nuanced understanding of stakeholder engagement in policy processes.

3.6 Ethical Considerations

Ethical considerations were rigorously adhered to throughout the study. Respondents' confidentiality was maintained, ensuring that the information provided did not expose any individual participants. Data handling was conducted with respect, avoiding any misinterpretation of responses. All research articles were properly acknowledged and cited in accordance with ethical research standards.

4. Results and Discussions

4.1. Stakeholder Analysis

Interviews conducted with the Lake Tana and Other Water Bodies Protection and Development Agency (LTWBPDA) provide a comprehensive overview of the diverse stakeholder landscape involved in the lake's conservation and development. Established in 2019 under the Amhara National Regional State (ANRS), LTWBPDA works to align with global sustainability goals by coordinating stakeholders, managing invasive species, controlling pollution, and promoting sustainable water use through research, awareness, and training. Using a Stakeholder Proximity Map, stakeholders are categorized into four groups: directly accountable, routinely involved, regularly contacted, and relatively remote. Institutions directly accountable for the lake's protection, including LTWBPDA, the ANRS Environment, Forest, and Wildlife Protection Bureau, and the Ethiopian Environmental Protection Authority, play a crucial role in conservation efforts. However, their effectiveness is often undermined by conflicting policies. For example, the

Bureau of Agriculture's emphasis on productivity has led to pollution and siltation, while poor land and urban administration practices have exacerbated environmental degradation. Similarly, the Ethiopian Ministry of Water and Energy and the ANRS Water and Energy Bureau significantly impact the lake through hydroelectric projects that disrupt natural water flow, increase extraction, and stress the ecosystem.

Beyond direct management institutions, routinely involved stakeholders such as tourism and transport offices influence both conservation and degradation. While they enhance the lake's economic potential, infrastructure projects like transport terminals often lead to pollution and ecological disruption. In contrast, monasteries around the lake act as environmental custodians, preserving biodiversity and maintaining low pollution levels. Regularly contacted stakeholders, including Bahir Dar, Debre Tabor, and Gondar Universities, contribute through research and policy recommendations, particularly on issues like water hyacinth control. However, these institutions face challenges in policy integration and implementation due to governance gaps. Relatively remote stakeholders, such as NGOs and affiliated groups, provide valuable support through research collaborations, even if their direct impact on lake management is more limited.

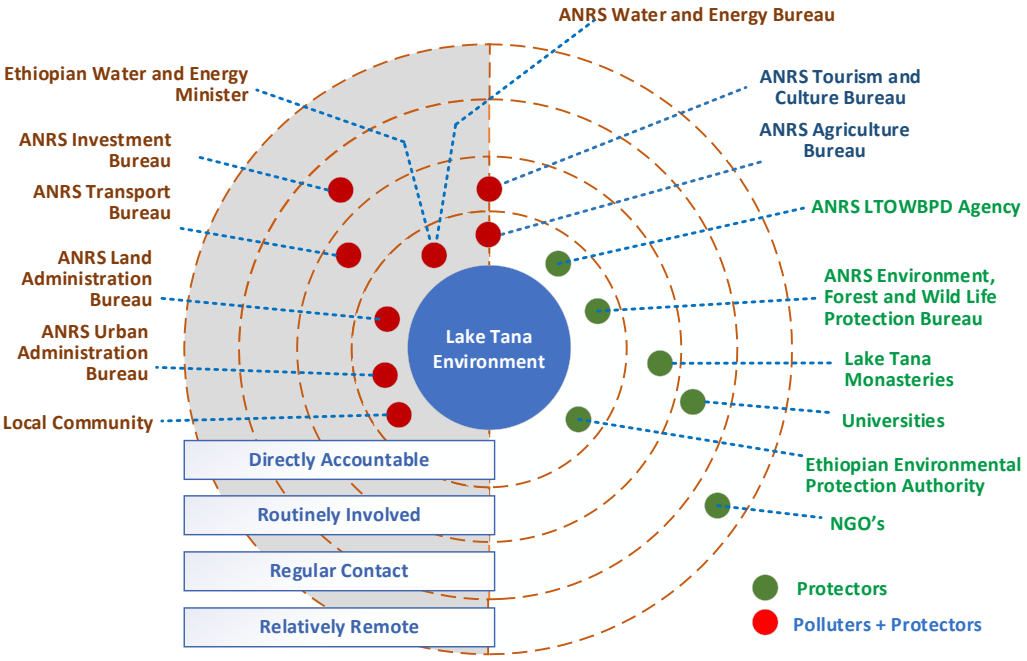

Figure 7. Key Stakeholder Proximity Mape of Lake Tana (Source: Authors' construction based on Stakeholder Proximity MapStated by Clayton (2024)

The Stakeholder Proximity Map (Figure 2) illustrates the varying degrees of involvement and their impact on Lake Tana's environmental and socio-economic health. Effective stakeholder collaboration is essential to addressing the lake's environmental issues, as weak coordination can hinder policy implementation and exacerbate ecological degradation. Given the diverse interests of stakeholders and the urgency of Lake Tana's environmental challenges, stronger inter-organizational collaboration is needed to ensure sustainable management and long-term conservation.

4.2. Assessment of National and Regional Policies and Strategies

Integrating policies for the environmental protection of Lake Tana is critical to addressing challenges like pollution, sedimentation, and habitat degradation. Analyses reveal gaps in policy application, leading to fragmented management. Effective strategies must align with the lake's unique ecological needs.

4.2.1. Analysis of Dimensions of Policy Integration

Policies were evaluated using four dimensions: policy frame, subsystem involvement, goals, and instruments. National policies (Environmental Protection Policy, Water Resources Management Policy) and regional strategies (ANRS Ten-Year Strategic Plan) provide broad frameworks but lack specificity for Lake Tana. Table 1 summarizes policy integration dimensions, showing strong integration in national policies but significant limitations in ANRS strategies, particularly in subsystem involvement and clear goal setting.

Table 5. Summary of Environmental Concerns Based on Policy Integration Dimensions (Document Review Result)

Policy	***Policy Frame***	***Subsystem Involvement***	***Policy Goals***	***Policy Instruments***
Environmental Protection Policy	*Clearly Stated*	*Clearly Stated*	*Clearly Described*	*Provides Mandates to Government Laws and Regional Courts*
Ethiopian Water Resources Management Policy	*Clearly Stated*	*Clearly Stated*	*Clearly Described*	*Offering Guidance to Legislative Bodies*
ANRS - Environment	*Clearly Stated*	*Described with Major Limitations*	*Clearly Described*	*Mentions Some Laws*
ANRS - Water	*Shallow Concern*	*Not Clearly Stated*	*Little Attention*	*Not Mentioned*
ANRS - Agriculture	*Clearly Stated*	*Moderately Described*	*Not Clearly Described*	*Mentions Some Instruments*
ANRS - Tourism	*Shallow Concern*	*Little Description*	*Not Clearly Described*	*Not Clearly Mentioned*
ANRS - Land	*Not Framed*	*Not Clearly Stated*	*Little Attention*	*Not Mentioned*

Source: Document review results, 2024

Table 2 illustrates deficiencies in both vertical and horizontal policy integration, revealing robust alignment at the national level alongside weak coordination in regional strategies. Enhanced collaboration between national

frameworks and regional implementation is imperative, with the Lake Tana Protection Agency playing a pivotal role.

Table 6. Summary of the Vertical and Horizontal Integration Levels of each Policy

Policy	Vertical Integration	Horizontal Integration
Environmental Protection Policy	***Strong**: Aligns effectively across all governance levels with clear mandates and comprehensive governance.*	***Strong**: Coordinates well across various sectors with clear goals and policy instruments.*
Ethiopian Water Resources Management Policy	***Strong**: Provides clear guidance and support across governance levels for effective water management.*	***Strong**: Demonstrates coherence and integration across relevant sectors with well-defined goals and instruments.*
ANRS Environment Protection Strategy	***Moderate**: Defined framework and clear goals, but limited subsystem involvement affects its effectiveness.*	***Moderate**: Partial coordination across sectors with constraints in subsystem involvement and policy instruments.*
ANRS Water Strategy	***Low**: Lacks adequate attention to policy framing and support, leading to ineffective management.*	***Low**: Minimal coordination and coherence across sectors, with inadequate goals and instruments.*
ANRS Tourism Strategy	***Minimal**: Shallow concern with poor alignment and support across governance levels.*	***Minimal**: Limited coordination and coherence across subsystems, affecting management effectiveness.*
ANRS Agriculture Strategy	***Moderate**: Some alignment and clear framework but lack comprehensive goals.*	***Moderate**: Reasonable integration across sectors but requires more coherence and comprehensive goals.*
ANRS Land Strategy	***Lowest**: Lacks clear framework and minimal alignment and support across governance levels.*	***Lowest**: Poor coordination and coherence across sectors, with absent goals and instruments.*

Source: Document review results, 2024

Effective policy integration requires cross-sectoral collaboration, yet many stakeholders struggle with holistic implementation. Improved coordination between national frameworks and regional execution, led by the Lake Tana and Other Water Bodies Protection and Development Agency, is crucial. Conflicting priorities, with economic growth often overshadowing sustainability, undermine efforts. Local communities, though reliant on the lake, inadvertently contribute to contamination. National stakeholder contributions remain minimal, according to agency directors.

4.2.2. CapScan Analysis

The CapScan analysis, conducted with six key regional stakeholders involved in Lake Tana's protection, reveals critical gaps across four pillars of policy integration: (1) leadership, (2) accountability, (3) planning and budgeting, (4) monitoring, reporting, and verification. The stakeholders, including the Lake Tana and Other Water Bodies Protection and Development Agency, the Environment, Forest, and Wildlife Protection Bureau, the Bureau of Agriculture, the Water and Energy Bureau, the Land Administration and Use Bureau, and the Tourism and Culture Bureau, show significant variations in their commitment and execution of environmental policies.

The findings from the CapScan framework indicate critical challenges in policy integration for the protection of Lake Tana, particularly due to the lack of strong political leadership and accountability. This fragmentation in institutional coordination has direct implications on the effective protection of Lake Tana. Without a cohesive and committed leadership structure, environmental policies are poorly executed, leading to ineffective environmental governance. According to Ostrom (2009), effective governance requires collaboration across different agencies, and the weak coordination between the Lake Tana Agency and other critical institutions, such as the Water and Energy Bureau and the Environment Bureau, suggests a systemic failure in policy integration that could limit sustainable resource management (ANRS-LTOWBPDA, 2023).

Likewise, the weak accountability structures undermine the role of stakeholder institutions. Donor coordination and stakeholder consultations, while present, remain largely in exploratory phases, showing limited progress. As Stave & Kopainsky (2017) argue, stakeholder engagement is key to adaptive environmental management, but this report shows that responsibilities remain poorly assigned across government levels, which restrains the progress of environmental initiatives for Lake Tana. The slow progress in stakeholder consultation and accountability will likely diminish the effectiveness of environmental policies and programs in protecting Lake Tana, creating gaps between policy intentions and practical implementation.

Table 7. Tana Stakeholders Offices CapScan Matrix Response

Pillars	Item	Level of Execution			
		Awareness	Exploration	Transition	Full Implementation
Leadership	1. Is there a clear political statement at the highest-level spelling out the government's commitment to policy integration for the protection of Lake Tana?	LT, L, T	A	E, W	-
	2. Is there a lead institution responsible for overseeing the implementation of policy, and strategy integration for environmental protection measures in the Lake Tana environment? (e.g. central unit, ministry, inter-ministerial committee, bureau, institute).	W	L, T	-	LT, E, A
	3. Is there a normative framework (e.g. legislation, directives, decrees) that supports the integration of environmental protection into existing and new sectoral strategies, plans, programs, or policies?	-	-	*	-
Accountability	1. Do you consult with key stakeholders for policy integration to protect Lake Tana?	A, L	LT	E, W, T	-
	2. Are there offices assigned with clear donor coordination platforms for Lake Tana? Is there any donor coordination for the value of life on land and water to protect the Lake Tana environment?	A, T	LT, L	W	E
	3. Do the various tiers of the government have clear assignments of responsibilities and mandates for the Lake Tana environment case?	LT, L	E, T	W	A
Planning and Budgeting	1. Have policies, strategies, and plans been integrated into the national strategy for environmental protection through the use of defined priority areas, time-bound actions, and performance indicators?	L, T	LT, E, A, W	-	-

Pillars	Item	Level of Execution			
		Awareness	Exploration	Transition	Full Implementation
	2. Are the goals in the plans, strategies, and policies for the environmental protection of Lake Tana integrated into the budgetary processes?	LT, A	E, W, L, T	-	-
	3. Does a sufficient budget been allocated to implement environmental protection policies of Lake Tana, if not, what alternatives do you use?	LT, T	W, L	E, A	-
Monitoring, Reporting, and Verification	1. Do the policies and strategies pertinent to the protection of Lake Tana have SMART objectives and clear indicators?	T	LT, W, L	E, A	-
	2. Is the performance of policies in environmental protection, especially in the case of Lake Tana, properly evaluated?	A	LT, W, L, T	E	-
	3. Is there a standard monitoring and reporting system for environmental protection around lake Tana?	-	LT, A, W, L, T	E	-
	4. Is there a central database system where quality data can be stored and retrieved?	A, L	W, T	LT, E	-

Key: [LT] Lake Tana and other Water Bodies Protection and Development Agency, [E] Environment, Forest, and Wildlife Protection Bureau, [A] Bureau of Agriculture, [W] Water and Energy Bureau, [L] Land Administration Bureau and, [T] Tourism and Culture Bureau, * All stakeholders

Source: Data Compilation, 2024

Results of the CapScan analysis indicates that the execution of the various pillars related to policy integration for the protection of Lake Tana is currently in different stages, ranging from awareness to full implementation. While some aspects of governance, accountability, and stakeholder involvement are progressing toward full implementation, other areas, such as standardized monitoring systems and budget allocations, are still in the process of being

developed or refined. This indicates that although progress has been made, further efforts are needed to integrate policies effectively and ensure the long-term protection of Lake Tana's environment.

A) Leadership

In the Leadership pillar, Lake Tana and Other Water Bodies Protection and Development Agency (LT) is in the awareness and exploration stages, recognizing the importance of leadership and institutional responsibility but still in the early phases of policy development and formalization. Similarly, the Environment, Forest, and Wildlife Protection Bureau (E) is in both the transition and exploration stages, showing progress in leadership commitment but facing significant challenges in securing resources and formalizing its role in policy execution. The Water and Energy Bureau (W) is positioned in the transition stage, where efforts are underway to assume leadership but full responsibility and effective monitoring are still lacking. The Land Administration Bureau (L), in the exploration stage, faces challenges in aligning its strategies with environmental protection goals and lacks significant influence in policy implementation. The Tourism and Culture Bureau (T) is also in the exploration stage, with limited involvement in leadership and needing stronger integration into broader environmental strategies.

B) Accountability

For the Accountability pillar, which focuses on stakeholder consultation, donor coordination, and clear assignment of responsibilities, Lake Tana and Other Water Bodies Protection and Development Agency (LT) is in the awareness stage, where initial steps towards accountability are recognized. The Environment, Forest, and Wildlife Protection Bureau (E) is in both the transition and exploration stages, still working to secure adequate resources and implement effective accountability measures. The Water and Energy Bureau (W), also in the transition stage, faces difficulties in integrating SMART objectives and performance indicators, limiting its ability to manage environmental responsibilities effectively. The Land Administration Bureau (L), in the exploration stage, has yet to define its role in donor coordination and accountability for environmental protection, while the Tourism and Culture Bureau (T), also in the exploration stage, struggles to establish accountability structures for policy integration.

C) Planning and Budgeting

In the Planning and Budgeting pillar, Lake Tana and Other Water Bodies Protection and Development Agency (LT) is active in the exploration and awareness stages, but still faces challenges in securing dedicated budgets for environmental protection despite efforts to integrate environmental protection goals into national strategies. The Environment, Forest, and Wildlife Protection Bureau (E) is in the transition stage, working on aligning environmental protection goals with national budgeting processes but has not yet achieved full implementation. Similarly, the Water and Energy Bureau (W) is in the transition stage, trying to incorporate environmental protection into its budgeting processes, but lacks full financial allocation for these efforts. The Land Administration Bureau (L) is in the transition stage as well, with some progress made but still facing challenges in securing financial resources for environmental protection. The Tourism and Culture Bureau (T) is in the exploration stage, with limited engagement in financial frameworks for environmental protection, indicating a need for further development in this area.

D) Monitoring, Reporting and Verification

Monitoring and evaluation are essential for ensuring the effectiveness of environmental protection policies and adapting to changing conditions. However, the results indicate that there are inconsistencies in monitoring, reporting, and verification stemming from the lack of standardized systems, ongoing stakeholder exploration, and the absence of a central database. As studies argue, these limitations hinder progress tracking and accountability enforcement (Soares, 2015; Swartling et al., 2007). Additionally, other studies also validate that the absence of SMART objectives impedes effective policy evaluation, further undermining sustainability efforts to protect Lake Tana (Oostena et al., 2018).

According to the CapScan analysis, the Monitoring, Reporting, and Verification pillar shows significant gaps in the establishment of standardized systems for tracking policy performance. Lake Tana and Other Water Bodies Protection and Development Agency (LT) is in both the awareness and exploration stages, recognizing the need for monitoring and reporting systems but still in the process of developing these structures. The Environment,

Forest, and Wildlife Protection Bureau (E) is in the transition and exploration stages, engaging in some performance evaluations but still lacking a consistent and formalized monitoring system. The Water and Energy Bureau (W) is in the transition stage, refining its approach to policy monitoring but not yet fully implementing a comprehensive monitoring system. The Land Administration Bureau (L), positioned in the exploration stage, faces challenges in establishing effective monitoring and reporting systems due to a lack of centralized data, hindering progress in tracking environmental protection efforts. Similarly, the Tourism and Culture Bureau (T), also in the exploration stage, lacks a formalized system for monitoring or reporting, limiting its ability to evaluate policy outcomes.

4.3. Challenges in Integrating Policies for Lake Tana's Protection

Integrating effective policies for the protection of Lake Tana involves overcoming complex administrative, financial, and operational challenges. Despite the critical importance of safeguarding this vital water body, efforts face several significant obstacles, which can be categorized into issues related to policy design and implementation, monitoring and evaluation, and financial and capacity constraints.

4.3.1. Policy Design and Implementation Issues

Effective policy integration for Lake Tana faces significant challenges in policy design and execution, including limited knowledge among policymakers, fragmented stakeholder participation, and weak political commitment. The research reveals major gaps in training, most of (50%) policymakers lack formal training in policymaking and 59% in policy integration and stakeholder mapping. These deficiencies hinder the ability to manage environmental policies and coordinate with stakeholders effectively, leading to ineffective policy development and implementation. Key informants argued that there is a critical need for public awareness campaigns and training for both local communities and stakeholders to improve their role in sustainable management and protection of Lake Tana.

Additionally, proper stakeholder mapping and role clarification are essential to enhance coordination and integration across sectors, ensuring all key actors, including government bodies, NGOs, and the private sector, are effectively involved in environmental protection efforts. As Metcalfe (1994)

argues, a better knowledge foundation for policymakers and experts is essential for environmental policy integration to address existing environmental issues. Soares (2015) further underscores the need for robust frameworks and targeted capacity-building initiatives to address these gaps and enhance policy integration efforts. Addressing these issues requires targeted capacity-building initiatives and stronger political commitment to improve policymaking skills and policy integration.

Table 8. Training Experience of Policymakers of the Key Lake Tana Stakeholders Response (n=56)

Training Types	No (%)	Yes (%)
Policymaking	50	50
Policy Integration and Stakeholder Mapping	59	41

Source: Data Compilation, 2024

The effectiveness of environmental policies is further compromised by inadequate stakeholder engagement. Results indicate that 91% of participants believe the current policies are neither adequate nor inclusive, and 98% highlight insufficient stakeholder consultation during policy development. The high percentage of respondents who feel that certain stakeholders were excluded (95%) and the 82% advocating for policy revisions demonstrate a clear disconnect between policy objectives and stakeholder needs. These findings emphasize the urgency for policymakers to address the shortcomings of the current policy framework, emphasizing the importance of genuine stakeholder engagement, inclusivity, and responsiveness to ensure the preservation and sustainability of Lake Tana's ecosystem.

Table 9. Responses on the Existing Environmental Policy Nature for Lake Tana(n=56)

No	***Items***	***Yes (%)***	***No (%)***
1	*Do you think the current policy is adequate and inclusive to accommodate the problems of Lake Tana?*	*9*	*91*
2	*Do you think that all relevant stakeholders have been adequately consulted during the preparation of the policy?*	*2*	*98*
3	*Do you feel that there are some stakeholders left unconsulted during policymaking processes?*	*95*	*5*
4	*Do you feel that the current policy related to Lake Tana should be revised?*	*82*	*18*

Source: Data Compilation, 2024

A comprehensive stakeholder analysis is crucial for identifying influential actors and understanding their relationships, which can uncover potential collaboration opportunities. Findings from this study indicate that the absence of a structured stakeholder mapping process has hindered the ten-year strategic plan (2021–2030) for Lake Tana, particularly in aligning sectoral institutions and addressing competing interests. Interviews with key stakeholders revealed concerns about unclear roles, weak inter-agency coordination, and fragmented policy implementation, corroborating similar findings in environmental governance studies (Swartling et al., 2007). The CapScan framework analysis further highlighted gaps in stakeholder engagement, reinforcing the need for a structured, multi-level integration mechanism.

Discussions with key regional stakeholders emphasized that the absence of formally established organizations at the Kebele level significantly limits effective collaboration and alignment of environmental initiatives. Focus group discussions (FGDs) with community representatives confirmed that uncoordinated local governance weakens environmental policy execution, affecting resource allocation and enforcement mechanisms. These findings

align with broader governance challenges in decentralized environmental management (Hoekstra & Kaptein, 2014). Similarly, document reviews of regional environmental strategies revealed inconsistencies in stakeholder engagement, particularly in decision-making processes, further obstructing inclusive policy formulation. The combined evidence underscores the necessity of developing a robust stakeholder analysis framework that accounts for both top-down policy directives and bottom-up engagement strategies to enhance collaboration and improve implementation outcomes, as also highlighted by Trein et al (2020).

Key informant interviews provided critical insights into the challenges associated with the existing policy framework for protecting Lake Tana. Participants highlighted a gap between policy formulation and practical implementation, noting that while policies exist, their application often lacks effectiveness in addressing specific environmental concerns. A recurring theme was the limited involvement of key stakeholders during policy development, leading to coordination challenges and misaligned priorities among agencies. This top-down approach often excludes local community perspectives, further complicating implementation. Additionally, findings suggest that the newly established office (Lake Tana Protection Agency) faces institutional constraints in terms of capacity and operational efficiency, which limits its ability to enforce and monitor environmental policies effectively. Respondents underscored the importance of strengthening stakeholder engagement mechanisms to enhance policy coherence and foster integrated environmental management strategies. The need for a long-term, sustainability-focused approach was emphasized, as current policies tend to prioritize immediate economic interests over comprehensive ecological protection. Improved stakeholder mapping and cross-sectoral collaboration were identified as key factors in advancing more effective and inclusive policy interventions for Lake Tana’s conservation.

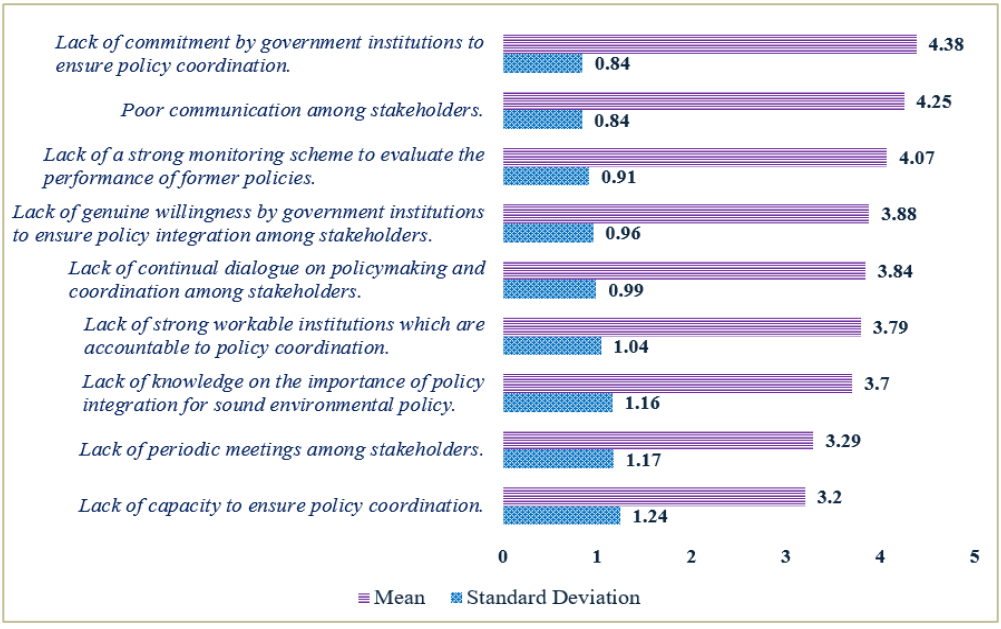

Figure 8. Key Reasons for Poor Policy Integration for Lake Tana Environmental Protection Management. (Source: Data Compilation, 2024)

The responses from policymakers among Lake Tana stakeholders highlight the key reasons for poor policy integration regarding Lake Tana's environmental protection management. Based on the result (figure 3)the highest-rated challenges are a lack of institutional commitment from the government, poor communication among stakeholders, and an inadequate monitoring scheme. Additional factors include insufficient dialogue, weak institutional accountability, limited knowledge on policy integration, infrequent meetings, and a lack of coordination capacity. These barriers, coupled with a perceived lack of genuine willingness from government bodies to integrate policies, significantly hinder effective policy integration and implementation.

4.3.2.Monitoring, Evaluation, and Financial Constraints

Monitoring and evaluation are crucial for assessing the impact and effectiveness of policies, yet significant gaps persist in the protection policies for Lake Tana. Many regional stakeholders exhibit limited awareness and experience in monitoring and reporting, as highlighted by the CapScan Matrix, which underscores the urgent need for improved management

practices. Effective public policy integration necessitates robust monitoring and evaluation procedures (OECD, 2015). However, field observations and interviews have revealed a concerning absence of rigorous national and regional impact evaluation research within institutions involved with Lake Tana stakeholders. Furthermore, these stakeholders' strategies often lack dedicated sections for monitoring and evaluating environmental impacts, and the deficiency of a strong monitoring scheme is among the most cited reasons for poor policy integration regarding Lake Tana's environmental protection.

Key Informant Interviews have identified several critical issues related to monitoring, evaluation, and financial constraints in the context of protecting Lake Tana. There is a significant lack of clear policy execution guidelines, hampering effective monitoring and evaluation of existing environmental policies. Additionally, the Lake Tana Protection Agency lacks the necessary capacity and efficiency to coordinate evaluation efforts, complicating the monitoring process. The emphasis on short-term economic gains further undermines long-term financial planning, which is essential for sustainable environmental protection. Moreover, the absence of sustained projects dedicated to the lake's protection results in inadequate financial resource allocation, ultimately hindering both monitoring and evaluation activities. Strengthening these aspects is crucial for improving policy integration and ensuring effective environmental management.

4.3.3. **Governance and Institutional Capacity Issues**

Governance and institutional capacity present significant challenges to effectively protect Lake Tana. Findings (figure 3) indicate that weak institutional commitment, poor stakeholder communication, and inadequate monitoring mechanisms hindering policy integration. Additionally, the lack of specific regulations, such as a well-defined buffer zone, allows unregulated activities that threaten the lake's environment, leaving it vulnerable to degradation. Financial and human resource constraints further impede the ability of responsible agencies to enforce policies and manage the lake sustainably. Addressing these governance deficits is crucial for strengthening environmental policy frameworks, as emphasized by Solomon (2017).

Key Informant Interviews reveal that the absence of a dedicated institution for managing Lake Tana exacerbates these issues. The Lake Tana Protection Agency lacks the necessary capacity and efficiency, and high-level officials

often overlook research outputs in policymaking, rendering the existing Protection Office ineffective. Poor coordination among stakeholders and conflicting priorities further complicated governance efforts, with key offices like the Investment Office neglecting essential environmental concerns. The absence of sustained protection projects underscores the urgent need for improved governance structures and enhanced institutional capacity. Effective governance, supported by adequate resources, is essential for implementing successful environmental policies (Briassoulis, 2017; Oostena et al., 2018). Strengthening governance frameworks and building institutional capacity are vital to ensuring the long-term sustainability of Lake Tana.

5. Conclusions and Implications for Policy

4.1 Conclusions

This study on policy integration for Lake Tana's environmental protection highlights the urgent need for coordinated stakeholder efforts to address key issues like deforestation, wetland degradation, pollution, and invasive species. Despite existing policies, ineffective integration has led to fragmented management, compromising the lake's ecological integrity and value to local communities. Key challenges include insufficient policy integration, poor stakeholder coordination, low engagement, and fragmented goals. The study reveals gaps in policy design, implementation, and evaluation, largely due to weak leadership, accountability, and monitoring systems. Although awareness of environmental protection exists, it hasn't translated into comprehensive action or robust monitoring frameworks.

Significant barriers, including fragmented policies and limited institutional capacity, hinder effective conservation. To address these, the study calls for stronger stakeholder engagement, enhanced institutional capacity, and improved monitoring systems. Effective coordination between regional and national policies is vital for a unified strategy. While national policies like the Ethiopian Environmental Policy provide a foundation, they require better integration to meet Lake Tana's unique challenges. The CapScan results in underscore weaknesses in leadership, financial planning, and accountability, threatening both the lake’s ecological health and its socioeconomic benefits.

Stronger political commitment and targeted reforms are needed to ensure sustained policy implementation and protect this vital ecosystem.

4.2 Implications for Policy

The study presents several recommendations to improve policy integration for Lake Tana's environmental protection. Key suggestions include engaging all stakeholders and enhancing coordination by forming joint committees or task forces. It emphasizes the importance of increasing awareness and capacity building through targeted training programs and public education campaigns. Community involvement in policy development and implementation is crucial for sustainable outcomes. The study also highlights the need for a comprehensive framework that integrates environmental and socio-economic considerations across sectors like agriculture and tourism. Establishing a centrally coordinating body to align efforts among key stakeholders is essential. Supporting research and innovation with a focus on long-term impacts of policy integration is recommended to ensure sustainable conservation efforts. These recommendations aim to develop a robust, integrated policy framework that prioritizes environmental protection and socio-economic well-being. System thinking is necessary to improve policy coordination and achieve effective conservation of Lake Tana. By implementing these strategies, Lake Tana's environment can be protected while also supporting the overall well-being of the surrounding communities.

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