

“Sustainable Aqua Ecotourism: Analyzing Conservation and Protection Management of Lake Lutayan”

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ABSTRACT

This study on the conservation and protection management of Lake Lutayan on the community of Sultan Kudarat provided a holistic understanding of how the community and government manages the lake lutayan. This study employed a descriptive research design. The study involved 398 participants from the community in the municipality of Lutayan. The respondents were residents, the public sector (government), the private sector (industry), and potential tourists (visitors), all of whom have varying levels of engagement with the lake's resources. It also employed a simple random sampling method. Results revealed the community has a growing awareness of biodiversity and commitment to conservation around Lake Lutayan. Hence, gaps remain in addressing the negative impacts of human activities. Governance is crucial, with well-supported policies, but improvements in zoning and fish cage regulations are needed for stronger environmental protection. Enhancing infrastructure, tax management, and cultural heritage preservation will further unlock the lake's economic and social potential while ensuring long-term sustainability. The researcher recommends strengthening environmental education and community engagement. It is to develop targeted education campaigns to bridge the gap between awareness and action regarding the impact of human activities on the lake.

Keywords: Aqua-ecotourism, Lake Lutayan, Community, Sultan Kudarat, Conservation, Protection

INTRODUCTION

Lake Lutayan, located in Sultan Kudarat, is a vital natural resource with immense potential for fostering community development. Renowned for its rich biodiversity and tranquil landscapes, the lake plays a crucial role in maintaining the local ecosystem and supports the livelihoods of the surrounding communities. This study examines community perceptions regarding awareness, practices, and governance of Lake Lutayan to inform future development initiatives that align with sustainable resource management principles.

While the lake's potential for sustainable tourism and community-driven development is significant, concerns persist about the effectiveness of current management and protection efforts. Addressing these issues is critical to safeguarding the lake's natural resources and ensuring the long-term viability of proposed tourism initiatives. By balancing community needs with environmental conservation, this study seeks to contribute to the development of strategies that promote sustainable, inclusive growth for Lake Lutayan and its surrounding areas.

The economic contributions of Lake Lutayan are evident in the activities that revolve around its use. The lake supports various livelihoods, including fishing, aquaculture, and tourism. These sectors provide direct employment and income for many residents, contributing to the overall economic stability of the community. Despite its potential, the management of Lake Lutayan has faced several challenges. Issues such as inadequate awareness about conservation practices, poor governance, and unregulated activities have threatened the lake's ecological balance. Effective management strategies and increased community participation are essential to mitigate these issues and promote sustainable use of the lake's resources. Understanding the current level of awareness, practices, and governance related to Lake Lutayan's conservation is critical for formulating strategies to protect the environment and support the community's socio-economic development (Lamsal et al., 2015).

This study investigates the conservation and protection community to lake lutayan Sultan Kudarat, offering a comprehensive understanding. By analyzing community perceptions, the research aims to guide the formulation of sustainable development strategies that maximize the lake's positive contributions while addressing potential challenges. The findings are intended to provide valuable insights for stakeholders, including policymakers and community leaders, to support informed decision-making and promote balanced, sustainable growth

Objectives of the Study

Lake Lutayan, one of the prominent lakes in Mindanao, is renowned for its abundant natural resources, breathtaking scenic landscapes, and immense potential for sustainable, community-driven aqua-ecotourism development. This study aims to evaluate the current management practices in the conservation and protection of Lake Lutayan, with a focus on key areas such as community awareness, sustainability practices, and governance mechanisms. By examining these aspects, the research seeks to provide actionable insights for promoting sustainable tourism while safeguarding the lake's ecological integrity and supporting the livelihoods of local communities.

1. To determine the socio-demographic profile of the respondents in terms of:
 - a. age;
 - b. sex;
 - c. civil status;
 - d. educational attainment;
 - e. monthly income;
 - f. source of income; and,
 - g. classification as stakeholders
2. To determine the level of management on conservation and protection of Lake Lutayan for sustainable aqua ecotourism in terms of:
 - a. awareness;
 - b. practices; and
 - c. governance.

LITERATURE REVIEW

Sustainable aqua-ecotourism development is closely linked to the effective management of environmental resources, which includes maintaining water quality, preserving aquatic habitats, and mitigating the impacts of human activities. Involving local communities in conservation efforts not only enhances environmental outcomes but also fosters a sense of stewardship and ownership (Guibrunet et al., 2021). In the context of Lake Lutayan, raising awareness about the importance of conservation, promoting sustainable practices among stakeholders, and implementing comprehensive governance frameworks are essential for the successful implementation of sustainable aqua-ecotourism. By adopting a community-driven approach, Lake Lutayan can serve as a model for integrating conservation with tourism, ensuring that both the environment and local livelihoods benefit from sustainable development practices.

Moreover, Conservation and protection of natural resources are fundamental to sustainable aqua-ecotourism, which aims to balance ecological preservation with community development. Lake Lutayan, known for its rich biodiversity and ecological significance, requires effective management strategies to safeguard its natural assets. The conservation of freshwater ecosystems like Lake Lutayan involves the integration of environmental policies, community engagement, and sustainable resource utilization. For instance, initiatives such as habitat restoration, strict enforcement of fishing regulations, and the promotion of eco-friendly tourism activities have been successful in enhancing the ecological health of similar lakes. Effective governance, characterized by transparent policies and active stakeholder participation, plays a critical role in the protection of such ecosystems, ensuring that conservation efforts align with local needs and ecological imperatives (Menbere & Menbere, 2018).

METHODOLOGY

Research Design

This study utilized a descriptive research design to examine the perceived impact of Lake Lutayan on the community of Sultan Kudarat. The descriptive component assessed the current management level in terms of awareness, practices, and governance related to the conservation and protection of the lake for sustainable aqua-ecotourism. It also evaluated the lake's perceived economic, environmental, and social impacts on the local community. Meanwhile, the correlational aspect analyzed the relationship between the management practices for the lake's conservation and the community's perceptions of its impacts. This approach provided a holistic understanding of how effective management strategies influence community perceptions of Lake Lutayan and its contribution to sustainable development.

Subjects of the Study

The study engaged 400 participants from the community surrounding Lake Lutayan to gain a comprehensive understanding of the lake's conservation and protection efforts, as well as its impacts on the community. The respondents included local residents, representatives from the public sector (government), members of the private sector (industry), and potential tourists (visitors), reflecting diverse levels of interaction with the lake's resources. Their participation was instrumental in evaluating the management of the lake in terms of awareness, practices, and governance for sustainable aqua-ecotourism development. The findings aim to support the development of more effective frameworks for sustainable aqua-ecotourism while balancing community needs and ecological preservation.

Instrument

This study used both surveys and personal stories to understand community views. We primarily relied on a structured questionnaire, as well as interviews and focus group discussions for deeper insights.

The questionnaire had two main parts. The first gathered demographic information to understand the background of respondents. The second assessed the management of Lake Lutayan's conservation efforts, focusing on awareness, practices, and governance. We measured agreement with various statements using a Likert scale and tested the questionnaire with a small group before its broader use.

Interviews and focus group discussions allowed participants to share their thoughts and experiences in their own words. The interviews explored individual opinions, while focus groups encouraged shared insights. This combination of qualitative data enriched our understanding of community perspectives on conservation efforts for Lake Lutayan.

Data Gathering Procedure

The data collection process adhered to a systematic approach, beginning with a formal request addressed to the Municipal Mayor's Office, under the leadership of Hon. Datu Pax Mangudadatu, as well as the Municipal Tourism Office. Upon securing approval, site visits were conducted.

Prior to the field survey, informed consent was obtained from all respondents to ensure ethical compliance and voluntary participation. The survey was conducted through face-to-face interviews, enabling the researcher or enumerator to engage directly with respondents, clarify any questions, and gather accurate data. Following the data collection, responses were analyzed using appropriate statistical techniques, ensuring a comprehensive and detailed examination of the findings.

Ethical Standards

This study strictly followed ethical standards. Participants were informed about the study's purpose, scope, and nature, with assurances of privacy and confidentiality. Participation was voluntary, with details on potential risks, costs, or benefits provided. Informed consent was obtained which included an information sheet and a

consent form confirming voluntary involvement.

RESULTS AND DISCUSSION

Table 1.1 Socio-Demographic Profile of the Respondents

Profile	Frequency	Percentage
Age		
below 25	66	17.70%
26-30	63	16.89%
31-35	85	22.79%
36-40	94	25.20%
41-45	20	5.36%
46-50	21	5.63%
51-55	14	3.75%
56-60	10	2.68%
Sex at birth		
Male	183	49.06%
Female	190	50.94%
Tribe		
Ilonggo	59	15.82%
Ilocano	45	12.06%
Maguindanaoan	269	72.12%
Religion		
Catholic	105	28.15%
Islam	268	71.85%
Civil Status		
Single	79	21.17%
Married	285	76.41%
Widow	2	0.54%
Separated	7	1.88%
Educational Attainment		
No formal schooling	40	10.72%
Elementary level	51	13.68%
Elementary graduate	52	13.94%
High School level	52	13.94%
Vocational	15	4.02%
High School graduate	25	6.70%
College level	60	16.08%

College graduate	78	20.91%
Years in Locality		
less than five (5) years	16	4.29%
10-14 years	99	26.54%
20 years above	225	60.32%
5-9 years	2	0.54%
15-19 years	31	8.31%
Members of the Family		
1-3 members	95	25.47%
4-6 members	115	30.83%
7-9 members	150	40.21%
10 above	13	3.49%
Monthly Income		
less than 5,000	278	74.53%
5000-10000	80	21.44%
10000-20000	15	4.02%
Livelihood		
Agriculture	237	63.54%
Tourism	35	9.38%
Service Industries	43	11.53%
Informal Sector	58	15.55%
Stakeholder		
Local Community	205	54.97%
Public Sector	58	15.55%
Private Sector	30	8.04%
NGO	30	8.04%
Tourist	50	13.40%

The demographic data for the sustainable community-driven aqua-eco tourism project in Lake Lutayan indicates a predominantly young to middle-aged population with balanced gender representation, emphasizing the need for inclusive planning that considers both male and female perspectives. The presence of the Maguindanaoan tribe necessitates integrating cultural sensitivities and local traditions into the project's development and marketing strategies. Additionally, involving the Ilonggo and Ilocano minorities can foster inclusivity and harmony within the community, ensuring comprehensive support and engagement.

The high proportion of Muslim respondents underlines the importance of incorporating Islamic cultural and religious considerations into the project to gain community acceptance and participation. The predominance of married individuals suggests a focus on family-oriented activities and amenities, which could attract residents. The educational attainment levels indicate the need for accessible information and educational programs tailored to different literacy levels, enhancing community engagement. Providing vocational training and employment opportunities within the project could further boost local support and economic benefits.

Moreover, data reveals a stable, long-established community with large families and low-income households,

indicating strong community ties and limited mobility. The predominance of larger families and low-income levels highlights economic challenges and the necessity for robust community support services. Policy implications include the need for social welfare programs, affordable housing initiatives, and economic development efforts to improve living standards and opportunities for residents.

The community's heavy reliance on agriculture indicates a rural setting dependent on seasonal and climate-sensitive activities for income. The presence of the informal sector and service industries shows some economic diversification, though agriculture remains central. This demographic composition suggests the need for policies supporting agricultural sustainability, income diversification, and stakeholder engagement in development initiatives. Enhancing tourism and service industries could provide additional economic opportunities, while collaboration with public and private sectors, as well as NGOs, could drive community development and resilience.

Table 2. Level of Management on Conservation and Protection of Lake Lutayan for Sustainable Aqua Ecotourism

Indicators	Mean	SD	Description
AWARENESS			
1. Sustainable management of lake is important for aqua ecotourism.	4.75	0.46	Strongly Agree
2. Poor lake shore habitat condition imparts a significant stress on lakes.	4.53	0.60	Strongly Agree
3. Local community should be involved in the management of lakes for sustainable aqua ecotourism.	4.52	0.58	Strongly Agree
4. There are laws and regulations in managing lakes for sustainable aqua ecotourism.	4.58	0.57	Strongly Agree
5. Human activities along lake shores can adversely affect ecosystem functions.	4.28	0.70	Strongly Agree
6. Environmental protection is essential for wellbeing.	4.45	0.63	Strongly Agree
7. Water resource is essential for livelihood and Environment's health.	4.64	0.52	Strongly Agree
8. Pollution through human activities cause problems for freshwater Resources.	4.53	0.72	Strongly Agree
9. Environmental and social concern is an important elements in preserving sustainable development.	4.83	0.44	Strongly Agree
10. Biodiversity is vital in order to sustain our human ecology.	4.92	0.34	Strongly Agree
Section Mean	4.60	0.31	Strongly Agree

The data in Table 1 highlights the level of management on the conservation and protection of Lake Lutayan for sustainable aqua-ecotourism, specifically in terms of awareness. Respondents demonstrated strong awareness, with the statement "Biodiversity is vital to sustain our human ecology" receiving the highest mean score of 4.92 and a standard deviation of 0.34. Conversely, the statement "Human activities along lake shores can adversely affect ecosystem functions" garnered the lowest mean score of 4.28 and a standard deviation of 0.70, reflecting strong agreement among respondents. Overall, the results indicate that respondents strongly agreed with the statements assessing management practices related to the conservation and protection of Lake Lutayan

The findings suggest heightened community awareness about the critical role of biodiversity in sustaining human ecology, pointing to significant support for biodiversity conservation initiatives. However, the relatively lower mean for the adverse effects of human activities suggests a potential gap in fully recognizing or addressing the impact of such activities on ecosystem functions. This underscores the need for targeted education and interventions to enhance community understanding and promote actions that minimize harmful

activities around the lake

Aligned with Wiredu et al. (2020), awareness of sustainable aqua-ecotourism is vital for managing and conserving aquatic ecosystems effectively. Communities and stakeholders with high awareness levels are more likely to adopt environmentally sustainable and responsible tourism practices. Regions where awareness campaigns emphasized the ecological and economic benefits of sustainable tourism experienced increased community participation in conservation efforts. Such initiatives foster stewardship, encourage sustainable practices, and reduce the environmental impact on lake ecosystems.

Table 2 continues...

PRACTICE			
1.I support local conservation efforts that protect aquatic ecosystems and enhance biodiversity.	4.99	0.09	Very Often
2.I promote sustainable fishing practices that ensures long term sustainability of the aquatic ecosystem.	4.83	0.38	Very Often
3.I participate in a volunteer clean up of the lake.	4.65	0.61	Very Often
4.I participate in educational programs or workshops on lake conservation.	4.70	0.46	Very Often
5.I help educate the visitors about the importance of minimizing their impact on the environment such as not touching or disturbing marine life, not littering or damaging the environment.	4.44	0.80	Very Often
6.I encourage the use of friendly transportation options such as boats powered by clean energy sources.	4.70	0.56	Very Often
7. I used various methods and efforts that can be made to conserve the biodiversity in Lutayan lake.	4.78	0.50	Very Often
8. I commit myself to following rules related to biodiversity and conservation in Lutayan lake.	4.74	0.44	Very Often
9. I follow traditional knowledge among indigenous people to preserve the environment and biodiversity	4.77	0.48	Very Often
10. I get limited resources to maintain the number of species of biodiversity in Lutayan Lake	4.74	0.54	Very Often
Section Mean	4.73	0.32	Very Often

The data on the level of management in the conservation and protection of Lake Lutayan for sustainable aqua-ecotourism, particularly in terms of practices, indicates frequent engagement in conservation activities among respondents. The highest mean score of 4.99 reflects a strong prioritization of local conservation efforts that protect aquatic ecosystems and enhance biodiversity, demonstrating a very high level of commitment to conservation. Meanwhile, the statement "I participate in a volunteer clean-up of the lake" received a slightly lower mean of 4.38, though it still indicates frequent participation. The overall mean of 4.73 reveals that respondents actively engage in practices such as promoting biodiversity, adopting sustainable fishing techniques, and participating in environmental education initiatives.

These results highlight a robust commitment within the community to conservation efforts, with practices that are well integrated into their behavior—a crucial factor for the sustainable management of Lake Lutayan's ecosystem. However, the slightly lower score for volunteer clean-up participation suggests an opportunity to further encourage and mobilize hands-on community involvement. Overall, the findings present a solid foundation for long-term conservation, with the potential to strengthen specific practices that preserve biodiversity and sustain environmental health in the lake.

As Aneseyee et al. (2022) observed, active community involvement in eco-tourism planning and decision-

making processes is essential for the success of sustainable aqua-ecotourism initiatives. Communities engaged in these efforts are more likely to adhere to sustainability guidelines and contribute to developing eco-friendly enterprises, such as accommodations, guided tours, and cultural exhibitions. These initiatives not only foster environmental stewardship but also provide significant economic benefits for the community. By cultivating a sense of ownership and shared responsibility, sustainable aqua-ecotourism ensures a balanced approach that integrates environmental conservation with socio-economic growth.

GOVERNANCE			
1.Established clear regulations and guidelines for tourist and tour operators to ensure they do not harm the environment.	4.71	0.64	High priority
2.Existence of environmental assessment protocol and or controls over development of site	4.54	0.58	High priority
3.Provide the necessary ordinances and barangay resolutions in support of the Lutayan lake	4.38	0.69	High priority
4.Conduct annual appraisal system for lake protection and the administrative responsibility system	4.43	0.69	High priority
5.Existence of local and or regional frameworks for tourism destination.	4.48	0.74	High priority
6.There is a program for control of fish cage construction.	4.45	0.66	High priority
7.Several resolutions and ordinances prohibit dumping of waste pollution materials and garbage into the lake.	4.41	0.68	High priority
8.Ordinances and resolutions passed by municipal governments prohibit and regulate construction of fish cages and related facilities in specific areas of Lutayan Lake	4.16	0.79	Moderate priority
9.Proper zoning and the involvement of and cooperation among the fisher folk and the LGUs.	4.14	0.77	Moderate priority
10.Existence of guidelines to be followed regarding proper zoning of fish cages in the aquaculture site	4.32	0.74	High priority
11.Collaboration with stakeholders to monitor and assess the impact of tourism on the lake's ecosystem	4.41	0.76	High priority
12.Conduct annual appraisal system for lake protection and the administrative responsibility system	4.21	0.78	High priority
13.The LGU has an ordinance to mainstream the population-in-need, cultural minorities and marginalized communities in decision making processes, policies, programs or projects for conservation of Lutayan lake.	4.34	0.81	High priority
14.There is a proper monitoring to limit the number of visitors in sensitive areas to minimize the impact on the environment	4.30	0.78	High priority
15.proper guidelines to be followed regarding proper zoning of fish cages in the aquaculture site	4.26	0.74	High priority
16.Provides education and training to local communities on how to maintain and preserve the lakes environment	4.27	0.77	High priority
17.There is a monitoring scheme for garbage disposal.	4.28	0.69	High priority
18.Policies, programs, projects or activities modified in response to citizen surveys.	4.36	0.70	High priority

Section Mean	4.36	0.42	High priority
Over-all Mean	4.52	0.24	High priority

The data on the management level of conservation and protection efforts for Lake Lutayan, particularly in terms of governance, highlights a strong emphasis on high-priority regulations and policies for sustainable aqua ecotourism. The highest mean score of 4.71 underscores the critical importance of establishing clear regulations for tourists and tour operators to prevent environmental harm. Other governance-related practices, such as the implementation of environmental assessment protocols, lake protection ordinances, and garbage disposal monitoring schemes, also received high priority ratings, with mean scores ranging between 4.16 and 4.54.

However, areas such as zoning and fish cage construction received relatively lower mean scores, suggesting these aspects—while still important—are perceived as moderate priorities compared to other governance measures. The overall section mean of 4.36 reflects a consistent recognition of the pivotal role governance plays in achieving Lake Lutayan's sustainability. It also highlights the strong collaboration between stakeholders, local communities, and local government units (LGUs).

These results reinforce the vital role governance plays in the sustainable management of Lake Lutayan. The strong prioritization of governance practices, such as the enforcement of strict regulations for tourists, environmental assessment protocols, and waste management, demonstrates the commitment of local government units and communities to protect the environment. However, the relatively lower prioritization of zoning and fish cage construction suggests potential gaps in policy enforcement or community engagement. Addressing these gaps through stronger stakeholder involvement and enhanced zoning practices could further bolster the lake's protection and ensure long-term sustainability.

Effective governance requires collaboration among various stakeholders, including local communities, government agencies, non-governmental organizations (NGOs), and private enterprises. Dash and Balamurugan (2024) emphasize that collaborative governance mechanisms are critical for managing natural resources, as they incorporate diverse interests and perspectives. In the context of lake management, this involves creating and enforcing regulations to control activities such as fishing, tourism, and land use around the lake, ultimately preventing overexploitation and ecosystem degradation. Active participation by local communities in governance processes is especially vital, as it fosters a sense of ownership, responsibility, and commitment to the sustainable management of their natural resources.

CONCLUSION

In conclusion, the findings highlight the community's growing awareness of the vital role biodiversity plays in sustaining human ecology, alongside a strong commitment to conservation practices around Lake Lutayan. However, there is a disconnect between this awareness and the adverse effects of human activities on the lake, pointing to a need for more targeted education initiatives and community-driven solutions.

Governance remains a cornerstone of Lake Lutayan's sustainability, with the majority of policies being well-supported by both the community and local government. Nonetheless, certain areas—such as zoning and fish cage regulations—require greater attention and stricter enforcement to address existing gaps in environmental protection. By strengthening governance in these areas, Lake Lutayan's ecosystem can be better safeguarded, ensuring the preservation of environmental health and the continuity of economic opportunities for future generations.

RECOMMENDATION

Based on the findings of the study, several recommendations are proposed to address the perceived impact of Lake Lutayan on the community of Sultan Kudarat. Strengthening environmental education and community engagement is essential, with targeted education campaigns to bridge the gap between awareness and action regarding the adverse effects of human activities on the lake. These initiatives should focus on reducing

harmful practices around the lake and fostering community-driven conservation efforts, such as organizing regular volunteer clean-up events and implementing waste management programs to encourage hands-on involvement.

Enhancing governance and policy enforcement is also crucial. Local government units should work closely with community stakeholders to ensure zoning laws and fish cage regulations are clearly communicated, routinely implemented, and aligned with environmental sustainability goals. Similarly, investing in sustainable tourism and economic development should be prioritized to unlock the lake's economic potential by developing eco-friendly accommodations, improving hospitality services, and promoting local crafts to establish a sustainable tourism infrastructure.

In addition, preserving cultural heritage and promoting eco-tourism should be integral to Lake Lutayan's development strategies. Encouraging eco-tourism activities that highlight the lake's natural and cultural significance, while protecting and enhancing local traditions and historical sites, is vital. Lastly, continuous monitoring and follow-up studies are necessary to assess the long-term effectiveness of conservation efforts and community engagements. Such efforts would help track progress, identify emerging challenges, and ensure that strategies remain adaptive and impactful over time. By addressing these areas, the sustainability of Lake Lutayan and the well-being of its surrounding community can be significantly improved.

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