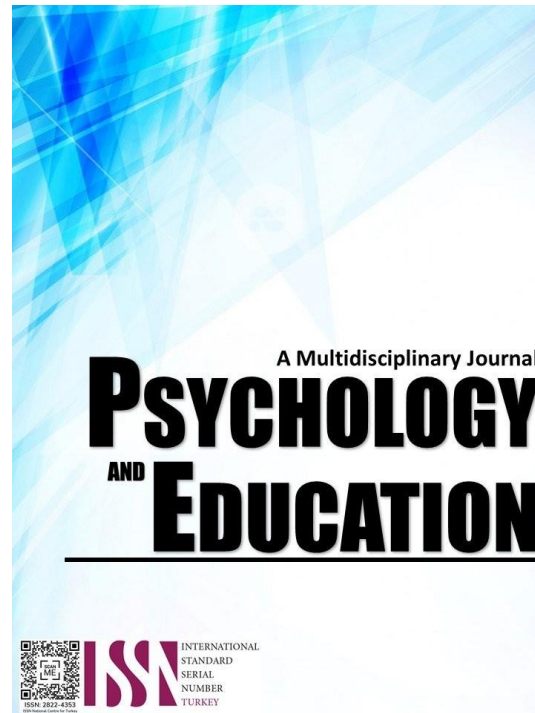


PERCEIVED IMPACTS OF LAKE LUTAYAN ON THE COMMUNITY OF SULTAN KUDARAT: A SUSTAINABLE AQUA-ECOTOURISM PERSPECTIVE



PSYCHOLOGY AND EDUCATION: A MULTIDISCIPLINARY JOURNAL

Volume: 30

Issue 3

Pages: 582-591

Document ID: 2025PEMJ2865

DOI: 10.5281/zenodo.14608022

Manuscript Accepted: 12-10-2024

Perceived Impacts of Lake Lutayan on the Community of Sultan Kudarat: A Sustainable Aqua – Ecotourism Perspective

Mary Grace S. Molina,* Maria Pia M.Sison

For affiliations and correspondence, see the last page.

Abstract

This study assesses the perceived impacts of Lake Lutayan on Sultan Kudarat's community through sustainable aqua-ecotourism. Using a descriptive-correlational design, data from 385 respondents—including residents, officials, industry representatives, and tourists—were analyzed. Findings reveal strong awareness of biodiversity's importance (mean score: 4.99) and high community engagement in conservation activities (mean score: 4.73). However, gaps persist in recognizing the direct impact of human activities on the ecosystem, with lower participation in volunteer clean-up efforts (mean score: 4.38). Additionally, governance practices for zoning and fish cage regulations need improvement. No significant correlation was found between management efforts and perceived economic, social, and environmental impacts ($r = .025$, $p > .05$), suggesting current strategies may not effectively translate into visible community outcomes. Based on these findings, several recommendations are proposed. Targeted education campaigns are essential to bridge the gap between awareness and action regarding the impact of human activities on the lake. Enhancing infrastructure and improving tax management are crucial to further unlock the lake's economic potential. Strengthening policy enforcement, particularly in zoning and fish cage regulations, is necessary to prevent over-exploitation and ensure the protection of the lake's ecosystem. Promoting local business development, such as eco-friendly tourism services and cultural preservation initiatives, can maximize Lake Lutayan's economic benefits and create job opportunities. Integrating cultural heritage preservation into development plans is vital to maintaining the lake's value as both an economic and cultural resource. Aligning management strategies with community expectations and ensuring that revenues are reinvested into conservation efforts will guarantee the long-term sustainability of Lake Lutayan's ecosystem and its contributions to the community.

Keywords: *aqua-ecotourism, lake lutayan, perceived impact, community, sultan kudarat*

Introduction

Lake Lutayan, located in the province of Sultan Kudarat, is a natural resource with significant potential for community development. Known for its rich biodiversity and serene landscape, the lake is an essential component of the local ecosystem and a vital resource for the livelihoods of surrounding communities. Recent studies underscore the importance of sustainable lake management, emphasizing integrated approaches to address ecological, economic, and social challenges (Pomar et al., 2022; Lamsal et al., 2015). Understanding the perceived impact of Lake Lutayan on the community is crucial for determining how it contributes to the economic, social, and environmental aspects of local life. This study explores these perceptions to guide future development initiatives that balance community needs with sustainable resource management. However, concerns regarding the effective management and protection of the lake's natural resources highlight the need for long-term sustainability.

Linking community perceptions to actionable governance insights is essential for several reasons. It ensures informed decision-making by incorporating the community's needs into policy development, enhances community engagement and participation, fosters a sense of ownership and responsibility towards conservation efforts, and helps build trust and social cohesion, which are crucial for the successful implementation of sustainable management practices.

The economic contributions of Lake Lutayan are evident in activities such as fishing, aquaculture, and tourism. These sectors provide direct employment and income for many residents, contributing to the community's economic stability. Despite its potential, the management of Lake Lutayan faces several challenges, including inadequate awareness about conservation practices, poor governance, and unregulated activities that threaten the lake's ecological balance. Effective management strategies and increased community participation are essential to mitigate these issues and promote the sustainable use of the lake's resources. Understanding the current levels of awareness, practices, and governance related to Lake Lutayan's conservation is critical for formulating strategies that protect the environment and support the community's socio-economic development.

Socially, Lake Lutayan serves as a cultural and recreational hub for the community. It hosts social gatherings, traditional events, and educational activities, fostering social cohesion and community pride. The lake's presence is intertwined with local culture and traditions, influencing community identity and social dynamics. This study will explore how these social aspects are perceived by the community, particularly in terms of their contributions to quality of life and well-being. Understanding these social perceptions can help policymakers develop initiatives that preserve cultural heritage while promoting social development.

Environmentally, Lake Lutayan plays a crucial role in the local ecosystem, supporting a diverse range of flora and fauna and contributing to biodiversity conservation. However, the lake faces environmental challenges such as pollution, overfishing, and habitat degradation, which can adversely affect both the ecosystem and the community that depends on it. This study will investigate

community perceptions of the lake's environmental health and the effectiveness of current conservation efforts. Insights from recent research on similar ecosystems highlight the need for sustainable management practices to address these issues effectively (Wiredu et al., 2020).

In summary, this study aims to provide a holistic understanding of Lake Lutayan's impacts on local economic, social, and environmental conditions. By assessing community perceptions, it seeks to inform sustainable development strategies that enhance the lake's contributions while mitigating negative impacts. The findings will be valuable for stakeholders, including policymakers and community leaders.

Research Objectives

Lake Lutayan is considered one of the major lakes in Mindanao. It has abundant natural resources with scenic views and the potential for sustainable community-driven aqua-ecotourism development. The primary objective of this study is to assess the perceived impact of Lake Lutayan on the community of Sultan Kudarat. Specifically, it aims to evaluate the level of management in the conservation and protection of Lake Lutayan for sustainable aqua-ecotourism, focusing on aspects such as awareness, practices, and governance.

Additionally, the study seeks to determine the perceived economic, environmental, and social impacts of the lake on the local community. Furthermore, it aims to explore the association between the level of management and the community's perceptions of these impacts, providing insights into how effective management practices can enhance sustainable development and community well-being. Thus, the researcher intends to find answers to the following questions:

1. To determine the level of management on conservation and protection of Lake Lutayan for sustainable aqua ecotourism in terms of:
 - 1.1. awareness;
 - 1.2. practices; and
 - 1.3. governance.
2. To determine the perceived impact of existing Lake Lutayan on the community in terms of:
 - 2.1. economic;
 - 2.2. environmental; and
 - 2.3. social.
3. To determine the association between the level of management on the protection and conservation of Lake Lutayan in terms of awareness, practices, and governance as to the perceived impact of Lake Lutayan.

Literature Review

Perceived Impact of Lake Lutayan on the Community

The perceived impact of natural resources, such as Lake Lutayan, on local communities is a multifaceted topic encompassing economic, environmental, and social dimensions. Studies have shown that bodies of water like lakes and rivers significantly contribute to the livelihoods and well-being of surrounding communities through direct and indirect means. Economically, these resources often serve as primary sources of income for local residents through fishing, agriculture, and tourism-related activities. In particular, the development of sustainable tourism in these areas can lead to increased employment opportunities, income generation, and infrastructure development, fostering regional economic growth. However, the benefits depend on effective management practices, community participation, and equitable resource distribution to ensure that all stakeholders benefit from such initiatives (Lee & Jan, 2019).

Methodology

Respondents

The study involved a total of 385 participants from the community surrounding Lake Lutayan. These participants were selected to provide a comprehensive perspective on the lake's conservation and protection efforts, as well as its impact on the community. The respondents were composed of local residents, public sector (government), private sector (industry) and potential tourists (visitors), all of whom have varying levels of engagement with the lake's resources. Their participation was crucial in assessing the level of management in terms of awareness, practices, and governance of the lake's sustainable aqua-ecotourism development. Furthermore, the study sought their perceptions of the lake's economic, environmental, and social impacts on the community. By correlating these perceptions with the management levels, the research aimed to identify potential areas for improvement in the lake's conservation and tourism strategies.

Instrument

In this part, the study utilized a structured questionnaire as the primary instrument for data collection. The questionnaire has two main sections: the first section focused on assessing the level of management on the conservation and protection of Lake Lutayan in terms of awareness, practices, and governance. The second section evaluated the perceived economic, environmental, and social impacts of

the lake on the community. The questionnaire consisted of closed-ended questions using a Likert scale format to gauge respondents' agreement or disagreement with various statements related to the study's objectives. To ensure the validity and reliability of the instrument, a pilot test was conducted with a small group of participants, and revisions were made based on their feedback.

Procedure

The procedures in data collection involve activities such as submission of letter request, exploratory visits and key informant interviews, Focus group discussion, informed consent, survey, and data analysis.

First, a letter of request will be sent to the Municipal Mayor's Office Hon. Datu Pax Mangudadatu and the Municipal Tourism Office will visit the area and conduct informant interviews. Once the request is approved, the researcher will conduct exploratory visits and key informant interviews to gather data on the current state of Lake Lutayan. As part of the informant interview, they are asked about the current state of the lake, as well as their future plans for its improvement.

Before conducting the field survey, respondents will be given informed consent; if they voluntarily agree to participate in the survey, the researcher/enumerator will hand them the survey questionnaire. In the survey, the face-to-face interview method will be used; with this strategy, the researcher/enumerator will be able to directly communicate with the target respondents and obtain the necessary information in accordance with the questionnaire. Furthermore, following the survey, data will be analyzed using appropriate statistical techniques.

Data Analysis

The study employed various statistical treatments to analyze the collected data and address the research objectives. Descriptive statistics, including mean, and standard deviation, were used to summarize the participants' responses and determine the level of management on the conservation and protection of Lake Lutayan in terms of awareness, practices, and governance and to assess the perceived economic, environmental, and social impacts of the lake on the community. Furthermore, inferential statistics such as Pearson correlation analysis were applied to examine the association between the management levels (awareness, practices, and governance) and the perceived impacts of the lake. This statistical approach allowed the researcher to identify significant relationships and draw meaningful conclusions regarding the effectiveness of the lake's management strategies and their impact on the community

Ethical Considerations

Ethical considerations form a major element in research. Imparting of original knowledge and to match it is the main aim of the research, truth and prevention of error. This ethical consideration requires accountability, trust, mutual respect and fairness among all the parties involved in the study (Chetty 2016). In data gathering, ethical treatment of participants will be considered. Some of the ethical considerations that this study will ensure for the participants are:

Guaranteeing that information provided will be unidentifiable by anybody other than the researcher.

Informed consent will be requested from the participants ensuring that they fully understand the nature of the study and the information that they will give in the survey will be held in utmost confidentiality.

Ensure that responses are not associated with the identity of the respondents, the survey will employ respondent's anonymity assurance indicated in the informed consent.

The researcher will ensure that the participant's contribution is completely voluntary and that they may withdraw from the research anytime.

All participants will be treated with great respect.

Moreover, this study will be free of bias and political interest. This study will be conducted solely to assess the impact of lake Lutayan in sustainability perspective as a basis for development of aqua ecotourism.

Results and Discussion

This section presents the outcome of the quantitative analysis of the research questions answers. The results are presented below.

Table 1. *Level of Management on Conservation and Protection of Lake Lutayan for Sustainable Aqua Ecotourism*

<i>Indicators</i>	<i>Mean</i>	<i>SD</i>	<i>Description</i>
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
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
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 in Table 1 shows the level of management on conservation and protection of Lake Lutayan for sustainable aqua-ecotourism in terms of awareness. Respondents exhibited strong awareness of the importance of biodiversity, with the statement "Biodiversity is vital to sustain our human ecology" receiving the highest mean of 4.92. Conversely, the statement "Human activities along lake shores can adversely affect ecosystem functions" received the lowest mean of 4.28, indicating a strong agreement among respondents but highlighting a gap in recognizing the direct impact of human activities on the ecosystem.

These results imply a high level of awareness among respondents about the importance of biodiversity, suggesting that initiatives focused on conservation may receive community support. However, the adverse effects of human activities point to a need for targeted education to enhance understanding and action toward minimizing harmful activities around the lake.

According to Wiredu et al. (2020), awareness of sustainable aqua-ecotourism is crucial for the effective management of aquatic

ecosystems. Communities with higher awareness are more likely to engage in practices that promote environmental sustainability and responsible tourism. Awareness campaigns on the benefits of sustainable tourism have significantly increased community participation in conservation efforts, fostering a sense of stewardship among residents.

Despite these positive aspects, gaps in community engagement and governance present challenges for long-term sustainability. Lack of robust community involvement in governance can lead to inadequate enforcement of regulations and insufficient monitoring of environmental impacts, resulting in issues such as pollution, overfishing, and habitat degradation. Addressing these governance gaps requires enhancing institutional capacity, fostering stakeholder collaboration, and ensuring community voices are involved in decision-making.

Without effective community engagement and strong governance frameworks, efforts to protect Lake Lutayan's resources may fall short, leading to environmental degradation and negative impacts on the local economy. Bridging these gaps through targeted interventions, capacity-building initiatives, and inclusive governance is crucial for achieving long-term sustainability of Lake Lutayan's resources.

In conclusion, while there is strong community awareness and support for biodiversity conservation, improving community engagement and governance is essential for the sustainable management of Lake Lutayan. Enhanced education, better coordination among stakeholders, and inclusive governance are key to fostering a sustainable future for the lake and its surrounding communities.

The data on the level of management on conservation and protection of Lake Lutayan for sustainable aqua-ecotourism indicates that respondents frequently engage in conservation activities to protect the aquatic ecosystem. The highest mean score of 4.99 suggests that local conservation efforts and biodiversity enhancement are highly prioritized, demonstrating a strong commitment to conservation. However, participation in volunteer clean-up efforts received a lower mean of 4.38, though still frequent, indicating room for improvement in mobilizing community involvement. Overall, a mean score of 4.73 reflects that respondents often engage in activities supporting biodiversity, sustainable fishing practices, and environmental education.

The results imply a strong commitment among respondents to actively participate in conservation efforts for Lake Lutayan, suggesting these practices are embedded in the community's behavior, which is essential for sustainable ecosystem management. However, the lower score for volunteer clean-up participation highlights a potential area for enhancing hands-on community involvement.

According to Aneseyee et al. (2022), community involvement in eco-tourism planning and decision-making is crucial for the success of sustainable aqua-ecotourism. Actively engaged communities are more likely to support sustainability guidelines and develop local businesses catering to tourists, promoting environmental stewardship and economic benefits.

Despite these positive aspects, gaps in community engagement and governance present challenges for long-term sustainability. Effective community engagement is essential for comprehensive and inclusive conservation efforts. Inadequate community involvement in governance can lead to poor regulation enforcement and insufficient environmental impact monitoring, resulting in issues like pollution, overfishing, and habitat degradation. Governance challenges, such as poor stakeholder coordination, limited resources, and lack of transparency, can hinder sustainable management practices.

Addressing these governance gaps requires enhancing institutional capacity, fostering collaboration among stakeholders, and ensuring active community participation in decision-making processes. Without effective engagement and governance frameworks, efforts to protect Lake Lutayan's resources may fall short, leading to environmental degradation, reduced biodiversity, and negative impacts on the local economy and social cohesion. Bridging these gaps through targeted interventions, capacity-building initiatives, and inclusive governance is crucial for achieving long-term sustainability of Lake Lutayan's resources.

In conclusion, while there is strong community commitment and awareness regarding biodiversity conservation, improving community engagement and governance is essential for the sustainable management of Lake Lutayan. Enhanced education, better stakeholder coordination, and inclusive governance are key to fostering a sustainable future for the lake and its surrounding communities.

The governance of Lake Lutayan for sustainable aqua-ecotourism shows a strong emphasis on regulations and policies for conservation. Establishing clear rules for tourists and operators to prevent environmental harm received the highest mean score of 4.71, while zoning and fish cage construction scored lower. This reflects a high priority for most governance practices, but also highlights areas needing improvement. Governance plays a vital role in managing Lake Lutayan's sustainability. The high scores indicate that regulations and policies are in place to protect the environment, but gaps in zoning and fish cage construction suggest areas for better policy enforcement and community engagement.

Effective governance involves collaboration among local communities, government agencies, NGOs, and private enterprises. Such collaboration ensures that multiple interests and perspectives are considered, empowering communities to take ownership of conservation efforts. However, gaps in community engagement and governance present challenges. Inadequate community involvement can lead to poor regulation enforcement and insufficient environmental impact monitoring, resulting in pollution, overfishing, and habitat degradation. Addressing these gaps requires enhancing institutional capacity, fostering stakeholder collaboration, and ensuring community participation in decision-making processes.

Without effective engagement and governance, efforts to protect Lake Lutayan may fail, leading to environmental degradation and negative impacts on the local economy. Bridging these gaps through targeted interventions, capacity-building initiatives, and inclusive governance is crucial for achieving long-term sustainability.

In conclusion, while there is strong community commitment to biodiversity conservation, improving community engagement and governance is essential for sustainable management. Enhanced education, better stakeholder coordination, and inclusive governance are key to fostering a sustainable future for Lake Lutayan.

Table 2. *Perceived impact of existing Lake Lutayan to the Community*

<i>Indicators</i>	<i>Mean</i>	<i>SD</i>	<i>Description</i>
Economic			
1. Develop local crafts that make use of native materials cultivated by local people	4.55	0.55	Strongly Agree
2. It generates income among owners of establishments	4.54	0.55	Strongly Agree
3. It constitutes additional revenues such as taxes for the government	4.28	0.71	Strongly Agree
4. It creates job opportunities among the residents of Lutayan Sultan Kudarat	4.62	0.49	Strongly Agree
5. It becomes a tourist attraction and improves the socio-economic of residents.	4.66	0.56	Strongly Agree
6. It attracts tourists to go to this place and acquire hospitality, and acquire tourism services	4.57	0.50	Strongly Agree
7. It has created or resulted to the creation of establishments	4.54	0.50	Strongly Agree
8. It provides additional job opportunities and employee compensation and bonus	4.58	0.61	Strongly Agree
Section Mean	4.54	0.39	Strongly Agree
Social			
1. Conservation of local culture and history	4.63	0.53	Strongly Agree
2. Culture of the locality is maintained	4.70	0.51	Strongly Agree
3. Historical structures are maintained as part of cultural heritage	4.73	0.49	Strongly Agree
4. Prohibit intoxication from liquor to both visitors and local people in the lake Buluan	4.28	0.88	Strongly Agree
5. It improves the lifestyle both of the local residents and tourists	4.29	0.81	Strongly Agree
6. Residents have a social commitment to their place.	4.35	0.83	Strongly Agree
7. It imposed quality human experiences for the residents and tourists	4.25	0.76	Strongly Agree
8. It brings social changes among the residents, tourists, and different organizations in Lutayan Sultan Kudarat.	4.46	0.67	Strongly Agree
9. Promotes social welfare	4.65	0.62	Strongly Agree
Section Mean	4.48	0.36	Strongly Agree
Environmental			
1. Infrastructure and signboards blend with the environment	4.52	0.72	Strongly Agree
2. Increase tourist and local communities' environmental awareness	4.52	0.65	Strongly Agree
3. Preserve the natural setting of the lake	4.23	0.64	Strongly Agree
4. No waste overflow and contamination of the environment	4.31	0.67	Strongly Agree
5. Maintenance of the carrying capacity of the environment	4.16	0.68	Agree
6. It enhances the conservation of marine biodiversity.	4.29	0.75	Strongly Agree
7. It makes people realize the importance of environmental conservation due to their sensitivity to environmental change and abuse	4.37	0.71	Strongly Agree
8. It affects the marine biodiversity and aquamarine life	4.32	0.71	Strongly Agree
9. Income and taxes from this business can be used for the conservation of the natural environment of Batangas	4.10	0.82	Agree
10. This promotes the aquamarine life of the Philippines to tourists	4.56	0.67	Strongly Agree
11. It relates to people and the natural environment	4.63	0.65	Strongly Agree
Section Mean	4.36	0.39	Strongly Agree
Over-all Mean	4.45	0.25	Strongly Agree

Table 2 highlights the perceived economic impact of Lake Lutayan on the community. The highest mean of 4.66 and standard deviation 0.56 correspond to the statement "It becomes a tourist attraction and improves the socio-economic of residents," indicating that respondents strongly agree with the positive socio-economic benefits brought by tourism. Another significant impact is the creation of job opportunities for the local community, as seen in the high mean of 4.62 and low standard deviation of 0.49, reflecting consistency in responses. The lowest mean 4.28 pertains to the statement about generating additional revenues through taxes, yet this still reflects a strong agreement. Overall, with a section mean of 4.54 and a standard deviation of 0.39, the community perceives Lake Lutayan as having a highly beneficial economic impact.

The data infers that Lake Lutayan holds significant potential as an economic driver for the local community, particularly through its role as a tourist attraction and job creator. The positive socio-economic impact highlights the community's recognition of tourism as a catalyst for economic growth. These findings imply further investment in tourism infrastructure, hospitality services, and local crafts could enhance these benefits. Additionally, the perception of tax revenue generation suggests an area for improvement, where better tax management or promotion of revenue-generating activities may be required to maximize the lake's economic contributions.

Moreover, the study of Gebremedhin et al. (2018) inferred that the economic impact of lakes extends beyond immediate financial gains.



Sustainable lake management promotes long-term ecological health, which is essential for maintaining the services that lakes provide. Healthy lakes contribute to clean water, biodiversity, and resilience against climate change, all of which have significant economic implications. For instance, clean water resources are vital for agriculture and drinking supplies, while diverse ecosystems can support activities such as eco-tourism and educational programs.

The table presents the perceived social impact of Lake Buluan in Lutayan, Sultan Kudarat. The highest mean of 4.73 and standard deviation of 0.49 corresponds to the statement "Historical structures are maintained as part of cultural heritage," indicating that respondents strongly agree on the importance of preserving historical landmarks. Another response is the maintenance of local culture, with a mean of 4.70, demonstrating that the cultural integrity of the locality is highly valued. The lowest mean, 4.25, pertains to the statement regarding imposing quality human experiences for residents and tourists, though it still indicates strong agreement. The overall section mean of 4.48 and standard deviation of 0.36 reflect a consistent and strong agreement that Lake Buluan positively contributes to the social well-being of both residents and tourists.

The results imply that the local community and tourists place significant importance on the preservation of cultural heritage and historical structures, which highlights the role of Lake Buluan in fostering social cohesion and cultural pride. Maintaining local culture suggests that future development efforts around the lake should prioritize cultural preservation. Additionally, the provision of quality human experiences indicates a positive reception to tourism-related activities. These findings suggest that investments in cultural preservation and community engagement can further enhance the social benefits of Lake Buluan for both residents and visitors, reinforcing its value as a social and cultural asset in the region.

The social impact of lakes' sustainability is multifaceted, encompassing community well-being, cultural heritage, and social cohesion. Lakes often serve as vital resources for surrounding communities, providing livelihoods through fishing, tourism, and recreational activities. Sustainable practices can enhance community health by preserving water quality, reducing pollution, and maintaining biodiversity. By fostering an environment that promotes recreational use and educational opportunities, sustainable lake management can strengthen community ties, promote environmental stewardship, and enhance the overall quality of life for residents (Angradi et al., 2019).

The table presents the perceived environmental impact of Lake Buluan in terms of conservation and sustainability. The highest mean of 4.63 and standard deviation of 0.65 corresponds to the statement "It relates to people and the natural environment," indicating that respondents strongly agree on the lake's significance in fostering a connection between people and nature. Another high mean, 4.56, reflects strong agreement on the lake's role in promoting the aquamarine life of the Philippines to tourists. The lowest mean, 4.10, pertains to the use of income and taxes for conserving the natural environment, though it still indicates agreement. Overall, with a section mean of 4.36 and a standard deviation of 0.39, the community perceives Lake Buluan as having a positive environmental impact. The overall mean of 4.45 further confirms the strong consensus on the lake's role in promoting environmental awareness and biodiversity conservation.

The findings imply that the environmental management of Lake Buluan is seen as highly effective, particularly in fostering a strong connection between people and the natural environment. The lake's role in promoting aquamarine life to tourists suggests that eco-tourism could be a valuable strategy for furthering both conservation and community engagement. However, the use of income and taxes for environmental conservation indicates a potential area for improvement. Strengthening the financial reinvestment into conservation efforts could enhance the long-term sustainability of the lake's ecosystem, ensuring that it continues to benefit both the environment and local communities.

Lakes maintain ecological balance and support biodiversity, making their sustainability a significant environmental concern. The environmental impact of lakes extends beyond their immediate surroundings, influencing regional climates, hydrology, and ecosystems. Lakes act as vital water reservoirs, providing essential resources for local flora and fauna. However, anthropogenic activities, such as urbanization, agriculture, and industrial development, can lead to pollution, habitat degradation, and biodiversity loss (Sterner et al., 2020).

Table 3. Association between the Level of Management of on Protection and Conservation of Lake Lutayan in terms of awareness, practices and governance as to the to the perceived impact of Lake Lutayan in terms of Economic, Social and Environmental

Variables	Mean	SD	1	1.1	1.2	1.3	2	2.1	2.2	2.3
1. Management	4.52	0.24	1							
1.1 Awareness	4.60	0.31	.503**	1						
1.2 Practice	4.73	0.32	.290**	-0.045	1					
1.3 Governance	4.36	0.42	.882**	.222**	-0.056	1				
2. Perceived Impact	4.45	0.25	0.025	0.007	0	0.027	1			
2.1 Economic	4.54	0.39	0.01	-0.007	0.044	-0.003	.331**	1		
2.2 Social	4.48	0.36	0.03	-0.003	0	0.038	.735**	-.126*	1	
2.3 Environmental	4.36	0.39	0.01	0.019	-0.031	0.017	.824**	-0.087	.523**	1

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

The Pearson r correlation result revealed no significant association between management efforts and perceived impacts of Lake Lutayan ($r = .025, p > .05$), indicating current strategies may not translate into visible community outcomes. This suggests a need to reevaluate or strengthen management strategies.

Despite strong community commitment to biodiversity conservation, gaps in engagement and governance challenge long-term sustainability. Inadequate community involvement can lead to poor regulation enforcement and insufficient environmental monitoring, resulting in pollution and habitat degradation. Addressing these gaps requires enhancing institutional capacity, fostering collaboration, and ensuring active community participation in decision-making processes.

Without effective engagement and governance, efforts to protect Lake Lutayan may fail, leading to environmental degradation and negative economic impacts. Bridging these gaps through targeted interventions, capacity-building, and inclusive governance is crucial for sustainable management.

In conclusion, improving community engagement and governance is essential for Lake Lutayan's sustainable management. Enhanced education, stakeholder coordination, and inclusive governance are key to fostering a sustainable future for the lake and its communities.

Conclusions

This study highlights a growing awareness among respondents of the crucial role biodiversity plays in sustaining human ecology. However, despite this awareness, negative impacts from human activities around lake shores indicate a gap in recognizing or addressing these harmful actions. There is a need for more targeted education and interventions to help the community fully grasp the consequences of their activities on Lake Lutayan's ecosystem.

Respondents show a strong commitment to conservation, particularly in sustainable fishing practices and biodiversity-related regulations, though there is room to increase hands-on participation in volunteer clean-up efforts. Mobilizing greater community involvement in waste management and environmental clean-ups could enhance long-term sustainability.

Governance is key to the sustainable management of Lake Lutayan, with policies and regulations supported by local governments and the community. While formal measures like tourism regulations and waste management are effective, lower priority given to zoning and fish cage regulations suggests weaknesses in policy enforcement. Strengthening these areas could further protect the lake's ecosystem.

Economically, Lake Lutayan is valuable for tourism and job creation, but improvements in infrastructure and tax management could enhance its contributions. Enhancing tourism services, developing local crafts, and promoting revenue-generating activities would maximize economic benefits. Integrating cultural preservation into development plans is also important for maintaining the lake's value.

Despite effective eco-tourism and community connections with nature, financial reinvestment in conservation could be improved. Current management may not fully translate into tangible benefits, indicating a need to realign strategies with community expectations and emphasize reinvestment in conservation for long-term sustainability.

To address these issues, a recommendation program is proposed: LGUs should enhance policy enforcement, infrastructure improvements, and awareness campaigns. Community members should increase clean-up participation and promote sustainable practices. NGOs can provide technical support and grants. Private enterprises should develop eco-friendly tourism services and sustainable business models. Academic institutions should conduct ongoing research and inform policy development. These strategies aim to bridge gaps in community engagement and governance, ensuring effective and sustainable conservation efforts for Lake Lutayan.

References

- Abdul Shakur, E. S., Sa'at, N. H., Alwi, I., & Omar, K. (2023). Eco-tourism and sustainable development: Are community ready?. *Community Development*, 54(5), 701-728. <https://www.tandfonline.com/doi/abs/10.1080/15575330.2023.2202410>
- Alampay, R. B. A. (2003). Sustainable Tourism. Challenges for the Philippines. Retrieved from https://www.academia.edu/27757816/Sustainable_Tourism_Challenges_for_the_Philippines
- Anastacio, N. J. C., & Brillo, B. B. C. (2020). Potentials for Ecotourism Development at the Tikub Lake: The Obscure Small Lake of Tiaong, Quezon, Philippines. *Asian Journal of Water, Environment and Pollution*, 17(4), 53-58. <https://content.iospress.com/articles/asian-journal-of-water-environment-and-pollution/ajw200051>
- Aneseyee, A. B., Abebaw, A., & Haile, B. T. (2022). Identification of suitable sites for the community-based ecotourism developments in Abijjata-Shalla Lakes National Park, Ethiopia. *Remote Sensing Applications: Society and Environment*, 26, 100750. <https://www.sciencedirect.com/science/article/pii/S2352938522000581>
- Angradi, T. R., Williams, K. C., Hoffman, J. C., & Bolgrien, D. W. (2019). Goals, beneficiaries, and indicators of waterfront revitalization in Great Lakes Areas of Concern and coastal communities. *Journal of Great Lakes Research*, 45(5), 851-863. <https://www.sciencedirect.com/science/article/abs/pii/S0380133019301170>

- Brundtland, G. H. (1987). *Our Common Future: Report of the World Commission on Environment and Development*. United Nations. Retrieved from <https://sustainabledevelopment.un.org/content/documents/publications/our-common-future.pdf>
- Dash, B., & Balamurugan, G. (2024). Sustainable tourism, livelihood and coastal governance: Chilika lake, India. *Ocean & Coastal Management*, 253, 107128. <https://www.sciencedirect.com/science/article/abs/pii/S0964569124001133>
- Gebremedhin, S., Getahun, A., Anteneh, W., Bruneel, S., & Goethals, P. (2018). A drivers-pressure-state-impact-responses framework to support the sustainability of fish and fisheries in Lake Tana, Ethiopia. *Sustainability*, 10(8), 2957. <https://www.mdpi.com/2071-1050/10/8/2957>
- Guibrunet, L., Gerritsen, P. R. W., Sierra-Huelsz, J. A., Flores-Díaz, A. C., García-Frapolli, E., García-Serrano, E., ... & Balvanera, P. (2021). Beyond participation: How to achieve the recognition of local communities' value-systems in conservation? Some insights from Mexico. *People and nature*, 3(3), 528-541. <https://besjournals.onlinelibrary.wiley.com/doi/abs/10.1002/pan3.10203>
- Heino, J., Alahuhta, J., Bini, L. M., Cai, Y., Heiskanen, A. S., Hellsten, S., ... & Angeler, D. G. (2021). Lakes in the era of global change: moving beyond single-lake thinking in maintaining biodiversity and ecosystem services. *Biological Reviews*, 96(1), 89-106. <https://onlinelibrary.wiley.com/doi/abs/10.1111/brv.12647>
- Ho, L. T., & Goethals, P. L. (2019). Opportunities and challenges for the sustainability of lakes and reservoirs in relation to the Sustainable Development Goals (SDGs). *Water*, 11(07), 1462. <https://www.mdpi.com/2073-4441/11/7/1462>
- Khaledi Koure, F., Hajjarian, M., Zadeh, O. H., Alijanpour, A., & Mosadeghi, R. (2022). "Ecotourism Development Strategies and the Importance of Local Community Engagement." *Environment, Development and Sustainability*, 25, 6849-6887. Retrieved from Springer
- Lamsal, P., Pant, K. P., Kumar, L., & Atreya, K. (2015). Sustainable livelihoods through conservation of wetland resources: a case of economic benefits from Ghodaghodi Lake, western Nepal. *Ecology and Society*, 20(1). <https://www.jstor.org/stable/26269717>
- Lee, T. H., & Jan, F. H. (2019). Can community-based tourism contribute to sustainable development? Evidence from residents' perceptions of the sustainability. *Tourism Management*, 70, 368-380. <https://www.sciencedirect.com/science/article/pii/S0261517718302115>
- Magcale-Macandog, D. B., Pleto, J. V. R., Campang, J. G., Predo, C. D., Natuel, F. A., Perez, M. G. L. D., ... & Laruya, J. M. (2023). Ecological carrying capacity modeling and sustainability assessment of the seven lakes of San Pablo City, Laguna, Philippines. In *Ecosystem and Species Habitat Modeling for Conservation and Restoration* (pp. 459-518). Singapore: Springer Nature Singapore.
- Menbere, I. P., & Menbere, T. P. (2018). Wetland ecosystems in Ethiopia and their implications in ecotourism and biodiversity conservation. *Journal of Ecology and the Natural Environment*, 10(6), 80-96. <https://academicjournals.org/journal/JENE/article-full-text/1599E9758292>
- Palmer, N., & Chuamuangphan, N. (2018). "Governance and Local Participation in Ecotourism: Community-Level Tourism Stakeholders in Chiang Rai Province, Thailand." *Journal of Ecotourism*, 17(3), 320-337. Retrieved from SHURA
- Pomar, M., Ali, E., & Ali, N. (2022). Practices of Agribusiness in Soccsksargen (Region Xii) and their Perceived Financial Performance: A Mixed Method. *International Journal of Management Excellence* (ISSN: 2292-1648), 16(2), 2312-2342. <https://techmindresearch.org/index.php/ijme/article/view/1216>
- Reed, M. S., Vella, S., Challies, E., De Vente, J., Frewer, L., Hohenwallner-Ries, D., ... & Van Delden, H. (2018). A theory of participation: what makes stakeholder and public engagement in environmental management work?. *Restoration ecology*, 26, S7-S17. <https://onlinelibrary.wiley.com/doi/abs/10.1111/rec.12541>
- Reyes, C. M., Albert, J. R. G., Tabuga, A. D., Arboneda, A., Vizmanos, J. F. V., & Cabaero, C. C. (2019). *The Philippines' Voluntary National Review on the Sustainable Development Goals*. Philippine Institute for Development Studies. Retrieved from <https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidsdps1910.pdf>
- Spears, B. M., Hamilton, D. P., Pan, Y., Zhaosheng, C., & May, L. (2022). Lake management: is prevention better than cure?. *Inland Waters*, 12(1), 173-186. <https://www.tandfonline.com/doi/abs/10.1080/20442041.2021.1895646>
- Sterner, R. W., Keeler, B., Polasky, S., Poudel, R., Rhude, K., & Rogers, M. (2020). Ecosystem services of Earth's largest freshwater lakes. *Ecosystem Services*, 41, 101046. <https://www.sciencedirect.com/science/article/pii/S2212041619300658>
- Sultan Kudarat Tourism. (2023). *Lutayan: Where History Whispers on Lake Buluan's Shores*. Sultan Kudarat Tourism. Retrieved from <https://sultankudarat.com/lutayan/>
- Wiredu, F., Takyi, S. A., Amponsah, O., & Tetteh, N. (2020). Toward sustainable ecotourism development: an assessment of the benefits and environmental threats of Lake Bosomtwe ecotourism facility. *African Geographical Review*, 39(1), 58-73. <https://www.tandfonline.com/doi/abs/10.1080/19376812.2019.1593203>



Affiliations and Corresponding Information

Mary Grace S. Molina, MS

Mindanao State University - Iligan Institute of Technology – Philippines

Maria Pia M. Sison, DiSDS

Mindanao State University - Iligan Institute of Technology – Philippines