

Cultural significance and socioeconomic values of Sinarapan (*Mistichthys luzonensis*) in Lakelet Manapao, Barangay San Ramos, Buhi, Camarines Sur

Delloro, Mark ✉

Ateneo de Naga University, Philippines (mdelloro@gbox.adnu.edu.ph; mark.delloro@cbsua.edu.ph)

Eboña, Jennifer

Central Bicol State University of Agriculture, Philippines (jennifer.ebona@cbsua.edu.ph)

Mamangon, Nineveh

Central Bicol State University of Agriculture, Philippines (nineveh.mamangon@cbsua.edu.ph)

Bausa, Alvir

Central Bicol State University of Agriculture, Philippines (alvir.bausa@cbsua.edu.ph)

Parato, Maritess

Central Bicol State University of Agriculture, Philippines (maritess.parato@cbsua.edu.ph)

Received: 25 April 2026

Revised: 12 May 2026

Accepted: 13 May 2026

Available Online: 14 May 2026

DOI: 10.5861/ijrse.2026.26178



ISSN: 2243-7703
Online ISSN: 2243-7711

OPEN ACCESS

Abstract

Sinarapan (*Mistichthys luzonensis*), the smallest commercially harvested food fish in the world, is endemic to the Bicol Region, with Lakelet Manapao in Buhi, Camarines Sur, as its last natural habitat and sanctuary. Past research focused on its biology, population, and conservation, but little on its cultural and socioeconomic value. This study explored these values, providing information for sustainable management and policy. Using a descriptive case study, data from 12 local respondents via Likert-scale questionnaires were analyzed with descriptive statistics. Results showed that Sinarapan has high cultural importance, with a weighted mean of 4.43, is seen as a cultural symbol and a source of community pride, and is linked to social continuity. Despite high awareness of conservation efforts, the sanctuary isn't fully integrated into local traditions. Socioeconomically, the weighted mean was 2.77, indicating neutrality; respondents reported limited economic benefits and did not perceive improvements in market activity, demand, or job creation due to fishing bans. Conservation has a limited traditional income without viable alternatives. The study highlights Sinarapan as a cultural asset with limited economic benefits. For conservation, strategies should balance ecological and cultural needs, developing sustainable livelihoods for the community.

Keywords: Sinarapan, cultural significance, socioeconomic values, conservation, ecological

Cultural significance and socioeconomic values of Sinarapan (*Mistichthys luzonensis*) in Lakelet Manapao, Barangay San Ramos, Buhi, Camarines Sur

1. Introduction

Particularly in developing nations like the Philippines, endemic freshwater species are essential to ecosystems, cultural symbols, and sources of income (Soliman, 1994). The “smallest commercially harvested food fish,” *Mistichthys luzonensis*, or sinarapan, is one such species found only in the Bicol Region's Lakes Buhi and Bato, as well as the lakeslets at Katugday and Manapao in Camarines Sur (Soliman, 1994; FishBase, 2025). Lakelet Manapao serves as a sanctuary to prevent extinction due to overfishing, habitat loss, and competition from introduced species (Soliman, 1994; Senate of the Philippines, 2008). In Buhi, Camarines Sur, sinarapan has been a traditional food and cultural symbol since the 1940s, deeply rooted in local customs, cuisine, and community identity. Every July, it plays a key role in the Sinarapan Festival, celebrating both the species and local traditions (Slow Food Foundation, 2025). Beyond its cultural importance, sinarapan is vital to the economy, supporting fishing households through trade, consumption, and processing into salted or dried products sold locally and regionally (Soliman, 1994). Small-scale fisheries are essential for rural economies and food security, underscoring the need to recognize their value for balanced development and conservation (FAO, 2021).

Although sinarapan is ecologically and socially significant, most research has focused on its biology, population, and conservation efforts, with limited attention to its cultural and economic impacts on local communities (Soliman, 1994). There is little understanding of how it influences livelihoods and social traditions in the Lakelet Manapao region. This study seeks to fill these gaps by exploring the cultural and socioeconomic importance of sinarapan to promote sustainable management and policy development. Although Lakelet Manapao is a protected sanctuary, little is known about its cultural and economic significance, making conservation of sinarapan difficult. It is difficult to develop management strategies that account for local requirements and values when data on their contributions is lacking. The effectiveness and durability of conservation efforts may be diminished as a result, making them appear constrictive or cut off from communities. Documenting how sinarapan promotes local culture, social cohesion, income, and food security—and how these elements shape community views—is essential.

2. Methodology

Research Design - This study investigated the non-market value of Sinarapan (*Mistichthys luzonensis*) in San Ramon, Buhi, Camarines Sur, using a descriptive case study. This method captured both quantitative and qualitative data, enabling a thorough analysis and offering in-depth insights into pricing trends, market behaviors, and socioeconomic impacts.

Background of the Study Site - Barangay San Ramon is an elevated community in Buhi, Camarines Sur. To the East is Mount Malinao, to the West is Mount Asog and Iriga City, to the North are the mountain ranges of Sagñay and Buhi, and to the South are the low-lying ranges of Polangui, Albay. Agriculture, including rice cultivation and coconut harvesting, is the community's primary source of income (Kopra). However, because Lake Buhi is close to Barangay San Ramon, some residents still depend on tilapia fishing there, even though Lakelet Manapao is a fish sanctuary that forbids the harvesting of Sinarapan.



Figure 1. Satellite image of Barangay San Ramon, Buhi, Camarines Sur

Respondents - A total of twelve (12) respondents residing in or near Lakelet Manapao and Buhi participated in the survey.

Field Sampling Procedure for Non-Market Value - The researchers first visited Lakelet Manapao to study its ecological and physical features. They recorded what they saw during the examination. Finally, they evaluated local knowledge, viewpoints, threats, and conservation efforts in Sinarapan through community interviews using a Likert-scale questionnaire.

Data Analysis - Calculating the weighted mean involves multiplying each data point by its assigned weight, summing the products, and dividing by the total weight. This approach is efficient when specific values in a dataset are more significant or occur more frequently. The numerical scores of a Likert-type scale can be interpreted into descriptive response categories using the figure. First, decide which score—a group mean, an individual response, or another metric—you wish to examine. Next, ascertain which of the following intervals the score falls into: 1 for severely disagree, 2 for disagree, 3 for neither/nor, 4 for agree, and 5 for highly agree. Once the range has been determined, express the score's meaning clearly using the relevant word, ranging from “strongly disagree” to “agree”. This method standardizes the discussion and communication of quantitative data, ensuring consistency and clarity in the presentation of information.

3. Result and Discussion

This section presents the study's findings on the cultural significance and socio-economic values of Sinarapan (*Mistichthys luzonensis*) in Lakelet Manapao, Buhi, Camarines Sur. The results are organized according to the research objectives and are discussed in relation to the existing literature and related studies.

Table 1
Likert-type Scale of Cultural Significance

CULTURAL SIGNIFICANCE	WEIGHTED MEAN	INTERPRETATION
Sinarapan contributes to Buhi's cultural identity.	4.92	Strongly Agree
Sinarapan contributes to our sense of community pride.	4.92	Strongly Agree
The Sinarapan Sanctuary opened opportunities for recreational activities.	4	Agree
The status of the Sinarapan fish from parts of the lake affected community morale and identity.	4.75	Strongly Agree
I am aware of the Sinarapan sanctuary and other local conservation projects in Lake Buhi.	4.67	Strongly Agree
The Sinarapan Sanctuary has led to the celebration of cultural events (e.g, Festivals, local rituals, and local celebrations).	2.75	Neutral
The Sinarapan ecosystem is crucial to our community.	5	Strongly Agree
AVERAGE	4.43	Strongly Agree

The table's mean score of 4.92 ('Strongly Agree') indicates broad agreement that Sinarapan (*Mistichthys luzonensis*) is essential to the development of Buhi's cultural identity and the forest community's sense of pride. It is intricately entwined with the local way of life, representing Buhi's history, customs, and everyday existence. Most people feel that Sinarapan increases locals' sense of pride and self-worth by fostering community and identity. Despite its cultural significance, Sinarapan Sanctuary's role in cultural events is rated "Neutral" (mean of 2.75) in the poll. Responses indicate that Buhi's festivals may not fully feature Sinarapan, offering an opportunity to enhance their cultural significance by more deeply integrating it into local celebrations. Data from surveys reveal that Sinarapan significantly shapes Buhi's cultural identity and pride. Although its role in cultural events is currently minor, there is potential to reinforce this connection. Future research could investigate community perspectives on Sinarapan and explore strategies to incorporate it more effectively into traditions and festivities.

The weighted mean of 4.43 shows that Sinarapan is highly important to the culture and social life of Buhi residents in Camarines Sur. Respondents strongly feel that the species is a key part of their local identity and fosters a shared sense of pride within the community. This finding supports Soliman and Sergio's (1997) view that endemic freshwater species are not only biological resources but also crucial cultural symbols of a community's heritage. Being internationally recognized as the "smallest commercially harvested food fish" differentiates Buhi from other towns and boosts regional and local pride (FishBase, 2025; Senate of the Philippines, 2008).

Participants highlighted that the well-being and survival of Sinarapan greatly influence their morale and sense of identity, with an average score of 4.75. This fish is deeply connected to the community's history and everyday life, functioning as a staple food and a cultural tradition since the 1940s (Slow Food Foundation, 2025). Community-conserved natural resources are crucial to their social fabric; their prosperity symbolizes continuity, whereas threats to these resources threaten their collective heritage. A perfect score of 5.00 for the statement about the Sinarapan ecosystem reflects the community's strong belief that cultural survival relies on ecological health. This aligns with the concept of biocultural diversity, which highlights the connection between culture and nature and underscores the importance of conserving both (Maffi & Woodley, 2010). In Lakelet Manapao, residents consider habitat protection essential for maintaining their traditions and way of life.

The study highlights a notable discrepancy. Respondents agree that the sanctuary provides recreational opportunities (mean score of 4.00), but remain neutral about its participation in cultural events (mean score of 2.75). This indicates that, although the annual Sinarapan Festival celebrates the species and local heritage, the sanctuary is not deeply integrated into these cultural activities. It is also observed that management plans for protected areas often emphasize biological conservation exclusively, neglecting cultural practices. As a result, the sanctuary is perceived more as a protected site rather than a component of the community's cultural identity. On a positive note, participants showed a high level of awareness (Mean = 4.67), indicating successful education and outreach about the sanctuary. Soliman (2001) pointed out that awareness is the initial step toward community participation in conservation efforts. Nevertheless, awareness by itself is not enough; for conservation to be sustainable, communities must recognize the value of these initiatives and have meaningful opportunities to participate.

Table 2
Likert-type Scale of Socio-Economic Values

SOCIO-ECONOMIC VALUES	WEIGHTED MEAN	INTERPRETATION
The Sinarapan Sanctuary increased the market opportunities for the Sinarapan Fish.	3.17	Neutral
The number of settlers and vendors selling Sinarapan fish in Buhi increased.	2.25	Disagree
The demand for Sinarapan fish in Buhi has increased.	2.5	Disagree
The Sinarapan Sanctuary increased job opportunities for local people.	3	Neutral
The Sinarapan Sanctuary opened alternative livelihood opportunities for community members.	2.92	Neutral
Average	2.77	Neutral

While the cultural value is substantial, the socioeconomic impact received an average neutral score of 2.77. This indicates that the community perceives the Sinarapan Sanctuary as having little positive influence on their livelihoods, market participation, and income sources. The result highlights the complex link between conservation initiatives and economic development, particularly when protection measures restrict access to resources traditionally used for livelihood.

Participants disagreed with the idea that the sanctuary has caused an increase in vendors, market activity, or demand for Sinarapan. This is closely related to the legal protection of Lakelet Manapao, where harvesting this species is strictly prohibited to prevent extinction (Senate of the Philippines, 2008). Historically, Sinarapan has been a vital economic resource, providing income and food for local households through direct consumption, local trade, and processing into salted or dried forms, which are sold across Bicol. The harvesting ban has effectively cut off this traditional income source, leading to a decline in market activity. This supports Moeliono's (2014) assertion that strict conservation policies often involve trade-offs—they may safeguard ecological health. However, they can also limit economic prospects for local communities that depend on the resource.

Neutral evaluations of job creation and alternative livelihoods suggest that the sanctuary has not caused economic decline nor driven growth. In the Philippines, conservation initiatives frequently face challenges due to limited funding and insufficient planning for sustainable income-generating activities. At Lakelet Manapao, there is significant untapped potential in eco-tourism and cultural heritage development. Effective protected area management usually requires community involvement in activities like tour guiding and selling local products. Without engaging communities, conservation efforts may be viewed as restrictions rather than opportunities.

It is important to recognize that these findings do not imply the sanctuary has no economic worth. As stated by the Food and Agriculture Organization [FAO] (2021), small-scale fisheries and native species possess both direct and indirect values. While conservation actions might restrict immediate economic gains, they contribute to the local and national economy via tourism, research, and ecological functions. Nonetheless, these advantages are frequently intangible or long-term and may not be apparent in residents' everyday economic experiences.

4. Synthesis and Implications

This study reveals a contradiction: Sinarapan is considered essential to local culture and identity, yet its economic significance is viewed as limited. This duality poses challenges and opportunities for sustainable management of the species and its habitat. A strong cultural connection offers a solid base for conservation efforts. When communities see a resource as essential to their identity and heritage, they are more likely to support protective measures, even if it entails personal sacrifices. This supports Soliman's (2001) view that community-based management is vital to Sinarapan's survival, as local stewardship is often more effective and sustainable than regulation alone.

On the other hand, the absence of perceived socioeconomic benefits threatens long-term sustainability. According to the United Nations Development Program [UNDP] (2015), conservation efforts are most successful when they offer tangible advantages to local communities living near and managing the resources. Without viable economic options, local families facing ongoing difficulties may lose support for the sanctuary, leading to noncompliance or reduced involvement in conservation activities. To close these gaps effectively, policy and management actions should target two main areas: first, improving resource distribution to ensure all relevant sectors receive sufficient support; and second, launching strategic training initiatives to boost workforce skills and knowledge. Concentrating on these aspects will help develop a unified strategy that addresses present shortcomings while fostering long-term sustainability and progress.

Linking Culture and Conservation: Initiatives should focus on strengthening the connection between the sanctuary and local cultural traditions. This may include establishing interpretive centers, hosting educational tours, or incorporating the site into the annual Sinarapan Festival. Such efforts will transform the sanctuary from a restricted space into a lively representation of the community's heritage, enhancing its cultural significance and

fostering a sense of ownership among community members. Enhancing Sustainable Livelihoods: Local authorities and conservation organizations should collaborate to identify and establish livelihood options that do not harm the species or its habitat. Potential alternatives include eco-tourism projects, producing memorabilia or food products that celebrate Sinarapan without using the fish itself, and skill development programs that help community members benefit indirectly from the area's conservation efforts.

5. Conclusion

This research analyzed the cultural and economic significance of Sinarapan (*Mistichthys luzonensis*) in Lakelet Manapao, Buhi, Camarines Sur, aiming to support sustainable management and policy development. The following conclusions are drawn from the gathered data. Sinarapan holds cultural importance and pride in Buhi, representing their heritage with a 4.43 mean. It is vital to their social fabric, highlighting their uniqueness as home to the world's smallest commercial food fish. Residents see Sinarapan's survival as linked to ecosystem health and traditions, showing a strong cultural-environmental bond. Though conservation awareness is high, the protected area is not fully integrated into local events, indicating room for a stronger connection.

The study found the Sinarapan Sanctuary offers minimal economic benefits, with a neutral rating of 2.77. Respondents disagreed on whether it boosted market activity, vendor numbers, or fish demand, due to regulations that prevent harvesting to protect species. Perceptions of job creation and alternative livelihoods remained neutral, indicating that conservation measures have neither harmed the economy nor created new income opportunities. This illustrates a common issue in protected area management: conservation restricts resource use without providing sufficient alternatives.

The study reveals a dual perspective on Sinarapan's worth: it is a vital cultural treasure, but the local community considers its economic value to be modest. This duality provides a solid foundation for conservation efforts but also presents a challenge. The community's cultural ties encourage support for its preservation and habitat protection, as it is seen as part of their heritage. Nonetheless, the limited perception of economic gain might threaten their long-term dedication if their needs remain unmet. In conclusion, conserving Sinarapan and managing Lakelet Manapao depend on balancing ecological, cultural, and economic interests. Success requires integrating local community values and participation to protect the species, preserve culture, and enhance quality of life.

Practical Educational Implications - To improve knowledge of biodiversity, ecology, conservation, and species preservation, the study uses regional examples. It highlights the importance of the Sinarapan Festival and the cultural legacy of Buhi, as well as the habitat needs of the Sinarapan and concerns like overfishing and habitat degradation. By highlighting the relationships between regional economies, conservation initiatives, and natural resources, the study supports sustainable development and encourages community engagement and biocultural awareness. Educators can use these insights to create guides, case studies, and courses that are more relevant by drawing on examples from specific communities. For use in educational pamphlets, posters, or digital content, information about Lakelet Manapao as a protected area, its legal status, and community viewpoints can be assembled.

Strategies that improve research abilities and link concepts to real-world problems, such as educational visits to Lakelet Manapao and conservation activities with local leaders, are supported by data. To address local issues, students could also develop minor projects, such as awareness campaigns or sustainable livelihood initiatives. Education campaigns should emphasize that conservation involves more than protecting the environment; it also includes maintaining cultural identity and improving quality of life. Balancing ecological, cultural, and economic goals helps students understand sustainable development. Limitations, such as limited information on economic benefits and cultural integration, highlight areas for further research.

Significant findings for Practitioners/Teachers, Students, and Schools - Lesson relevance and community relatability improve through evidence-based, context-specific resources you acquire. Local data serve as examples. Research links science, culture, economics, and values, aiding comprehensive teaching. Results promote

stewardship, preservation, and responsible citizenship by connecting ecological health and cultural pride. Schools, LGUs, and community organizations can collaborate to address needs identified by research, such as stronger links between the sanctuary and festivals. This info can be used to advocate for more funding for sustainable development, preservation, and environmental education in local legislation and schools.

Your identity and links to the community are strengthened as you become more conscious of your surroundings and cultural heritage. You acknowledge the significance of sinarapan and investigate conservation problems, their impacts on livelihoods, and possible remedies that promote sustainable development. You recognize that community involvement is essential to effective conservation and hold yourself accountable for safeguarding the environment and culture. You can conduct in-depth research for personal projects, whether you are looking for gaps or drawing conclusions. Professionals, leaders, and community members benefit from this experience by learning how to balance environmental preservation, cultural preservation, and sustainable growth.

The findings highlight the importance of schools in promoting culture, community, and environmental preservation. Include environmental education, practical skills, and local history in the curriculum that represent regional concerns and customs. Participate in ecotourism and cultural events, and work with NGOs and the government. To improve community ties, plan festivities and discussions, safeguard Lake Manapao and Sinarapan, and encourage sustainable livelihoods.

Recommendation

Local Government Units (LGUs) of Buhi and Camarines Sur

Incorporate Cultural Heritage into Conservation Initiatives: Research shows Sinarapan is crucial to the town's identity, so the local government should enhance ties between the Sinarapan Sanctuary and cultural events. Currently, its role is limited despite the Sinarapan Festival. Management should develop it as a cultural heritage site with exhibits and information centers on its history and ecology. Combining conservation with cultural activities encourages community ownership.

Develop Sustainable Economic Alternatives: Negative perceptions of market opportunities and livelihoods imply that conservation rules limit income sources and options. Local and national agencies should develop livelihood programs like eco-tourism, craft production, and small enterprise support. Properly managed protected areas can boost the local economy, revenue, and employment while protecting natural resources.

Enhance Policy Execution and Support: Previous studies show enforcement struggles stem from limited funding and capacity (Soliman, 2001). The local government should allocate sufficient funds to protect Lakelet Manapao. Policies need local input to balance conservation and community interests.

Community Leaders and Residents

Foster Active Involvement and Stewardship: The study shows high awareness and positive perceptions of Sinarapan and its ecosystem. Community leaders should leverage this strong identity to increase participation in sanctuary management. Creating community monitoring groups or environmental clubs can promote rule compliance and incorporate local knowledge into conservation. Communities that view resources as part of their heritage are the best protectors.

Promote Local Culture: Community members should highlight Sinarapan as a cultural symbol by sharing local stories and knowledge with visitors and the younger generation. This helps preserve cultural heritage and support the species and its habitat (Slow Food Foundation, 2025).

Environmental Agencies and Conservation Organizations

Design Strategies that Harmonize Ecology and Economy: Research shows conservation is often seen as limiting. Agencies like DENR and BFAR should adopt management approaches that recognize ecological and

socioeconomic values, including conducting feasibility studies for sustainable activities, such as educational tours and birdwatching, that generate income while protecting habitats. Moeliono (2014) says that effective conservation requires sharing benefits fairly so that local communities do not bear all the costs.

Enhance Information, Education, and Communication (IEC) Campaigns: While awareness is widespread, understanding of conservation's long-term economic benefits remains limited. Agencies should develop educational resources highlighting the non-use values and benefits of preserving Sinarapan, such as ecosystem stability, research, and heritage. A better understanding can build community support even without immediate financial gains.

Researchers and Academe

Broaden Future Research: This study focused on residents' views of Lakelet Manapao. Future research should include merchants, officials, and tourists for a fuller understanding of the species' importance. Additionally, assessing the sanctuary's economic impact on tourism and ecosystem services will provide crucial data for budget and policy decisions (FAO, 2021).

Conduct Longitudinal and Comparative Research: Periodic studies of perceptions and values are necessary to track their evolution over time, especially as policies change. Comparing Lakelet Manapao with other freshwater sanctuaries can also identify best practices to improve protected-area management nationwide.

AI Use Disclosure. We used Grammarly and Co-Pilot, the latest versions, for paraphrasing, correcting grammatical errors while preserving original meaning, and idea generation. All outputs were reviewed, verified, and edited by authors, including fact-checking sources and validating results. No confidential or personally identifiable data was entered in AI tools. The authors take full responsibility for the content.

6. Reference

- Areas: An assessment guide. Adbingdon: Routledge. *International Journal of the Commons*, 8(1), 263.
<https://doi.org/10.18352/ijc.496>
- Camarines Sur: Insights from its biology and population dynamics. *SEAFDEC/AQD Repository (Southeast Asian Fisheries Development Center)*, 113–122. <http://hdl.handle.net/10862/829>
- Financing small-scale fisheries in the Philippines. (2021). FAO. <https://doi.org/10.4060/cb8029en>
- Froese, R. and D. Pauly. Editors. 2026.FishBase. (2026) World Wide Web electronic publication.
www.fishbase.org,
- Maffi, L., & Woodley, E. (2012). *Biocultural Diversity Conservation*. Routledge.
<https://doi.org/10.4324/9781849774697>
- Moeliono, M. M. M. (2014). Kettunen, M. and P. ten Brink (eds.) 2013. Social and Economic Benefits of Protected
- Senate of the Philippines. (2008). An act declaring Lake Manapao in Buhi, Camarines Sur as a protected sanctuary for the conservation of Sinarapan and other endemic species (Senate Bill No. 2145). Senate of the Philippines.
- Slow Food Foundation. (2025). Ark of Taste: Sinarapan. Retrieved from <https://www.fondazione Slow Food.com>
- Soliman, V. S. (1994). Conservation and management of Lake Manapao (Philippines), a “Sinarapan” (*Mistichthys luzonensis*) sanctuary: Status, problems and solutions. *SIL Communications*, 1953-1996, 24(1), 279–283. <https://doi.org/10.1080/05384680.1994.11904049>
- Soliman, V. S., & Sérgio, M. (2001). Managing “sinarapan” *Mistichthys luzonensis* Smith in Lake Buhi, United Nations Development Programme [UNDP]. (2015). Mainstreaming biodiversity into local development planning. New York: UNDP.