





The Role of “Lubuk Larangan” as a Biology Learning Media for Conservation Material to Improve Environmental Literacy: Systematic Literature Review

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Article Information	Abstract
<p>Received: 2025-03-02</p> <p>Revised: 2026-03-10</p> <p>Accepted: 2026-04-17</p> <p>Published: 2026-04-30</p> <hr/> <p>Corresponding Author Ngade Wantara (ngadewantara.2024@student.uny.ac.id)</p> <hr/> <p>Distributed under   CC BY-SA 4.0</p>	<p>This study aims to examine the potential of Lubuk Larangan as a biology learning resource to support the development of students' environmental literacy. The study employed a Systematic Literature Review (SLR) method by analyzing scholarly articles obtained from major academic databases such as Google Scholar, Scopus-indexed journals, and national indexed journals. An initial search identified 100 relevant articles, which were then screened and evaluated using predefined inclusion and exclusion criteria, resulting in 11 articles selected for in-depth analysis. The findings indicate that Lubuk Larangan provides a meaningful contextual learning environment where students can directly explore ecological concepts such as ecosystems, biodiversity, and sustainable resource management. Integrating this local wisdom into biology learning supports the development of environmental awareness, critical thinking, and collaborative problem-solving skills. Moreover, the use of Lubuk Larangan aligns with the principles of 21st-century education that emphasize contextual, experiential, and community-based learning. This study therefore recommends integrating Lubuk Larangan into the biology curriculum as a strategy to strengthen environmental literacy and promote conservation values. Effective implementation requires collaboration among educational institutions, local communities, and government stakeholders to ensure sustainable conservation practices and meaningful environmental education in Indonesia.</p>

Keywords: *Lubuk Larangan; Biology learning media; Environmental conservation; Environmental literacy; Local wisdom.*

Abstrak

Studi ini bertujuan menganalisis potensi Lubuk Larangan sebagai sumber belajar biologi untuk mendukung pengembangan literasi lingkungan siswa. Penelitian menggunakan metode Systematic Literature Review (SLR) dengan menganalisis artikel ilmiah dari basis data akademik seperti Google Scholar, jurnal terindeks Scopus, dan jurnal nasional terindeks. Dari 100 artikel awal, proses penyaringan berdasarkan kriteria inklusi dan eksklusi menghasilkan 11 artikel yang dianalisis secara mendalam. Hasil penelitian menunjukkan bahwa Lubuk Larangan menyediakan lingkungan belajar kontekstual yang memungkinkan siswa mengeksplorasi konsep ekologi seperti ekosistem, keanekaragaman hayati, dan pengelolaan sumber daya berkelanjutan. Integrasi kearifan lokal ini dalam pembelajaran biologi juga mendukung pengembangan kesadaran lingkungan, berpikir kritis, dan keterampilan pemecahan masalah kolaboratif. Selain itu, pemanfaatan Lubuk Larangan selaras dengan prinsip pendidikan abad ke-21 yang menekankan pembelajaran kontekstual, pengalaman, dan berbasis komunitas. Oleh karena itu, studi ini merekomendasikan integrasi Lubuk Larangan dalam kurikulum biologi untuk memperkuat literasi lingkungan dan nilai konservasi. Implementasinya memerlukan kolaborasi antara lembaga pendidikan, masyarakat lokal, dan pemerintah guna mendukung praktik konservasi berkelanjutan dan pendidikan lingkungan yang bermakna di Indonesia.

Kata Kunci: *Lubuk Larangan; Media pembelajaran biologi; Konservasi lingkungan; Literasi lingkungan; Kearifan lokal.*

1. INTRODUCTION

Environmental problems have become a major global concern in recent decades. Issues such as ecosystem degradation, climate change, declining water quality, and biodiversity loss pose

significant challenges that require sustainable solutions. One strategic effort to address these problems is through environmental education, which aims to increase public awareness and knowledge about environmental conservation (Noverita et al., 2022). In this context, environmental literacy plays an important role in shaping responsible attitudes and behaviors toward the environment, particularly among younger generations who will become future decision-makers.

In Indonesia, the richness of natural resources and cultural traditions provides opportunities to integrate local potential into educational practices. One example is Lubuk Larangan, a traditional river conservation system managed by local communities based on customary rules (Hertati, 2021). In this system, certain river areas are temporarily prohibited from exploitation in order to maintain ecological balance and ensure the sustainability of aquatic resources (Prianto et al., 2024). This practice reflects a harmonious relationship between humans and nature while embodying conservation values that are relevant to biology education.

Integrating local wisdom such as Lubuk Larangan into biology learning can provide contextual and experiential learning opportunities for students. Biology education, which focuses on the study of living organisms and ecosystems, is closely related to environmental conservation and biodiversity protection (Sarumaha, 2024). Learning activities that involve real environmental contexts can help students understand ecological concepts more effectively while also developing environmental awareness, critical thinking, and problem-solving skills (Winarso et al., 2023; Nasution et al., 2024).

However, despite its potential, the use of local wisdom such as Lubuk Larangan as a learning resource in formal education remains limited. Many biology learning practices still rely on conventional teaching approaches that emphasize theoretical knowledge rather than contextual environmental experiences (Berek & Mau, 2024). In addition, limited resources and lack of teacher readiness to integrate local potential into the curriculum often hinder the implementation of contextual and environment-based learning (Alfafan & Nadhif, 2023).

Previous studies have discussed the ecological value of Lubuk Larangan as a community-based conservation practice and its role in maintaining biodiversity (Febriyanto et al., 2022; Alifiyah et al., 2024). Other research has emphasized the importance of environmental literacy in improving students' understanding of environmental issues (Anisa et al., 2021). However, studies that specifically synthesize the role of Lubuk Larangan as a contextual learning resource in biology education and its potential contribution to improving students' environmental literacy are still limited. This gap highlights the need for a comprehensive analysis that integrates perspectives from environmental education, biology learning, and local wisdom.

Furthermore, learning approaches based on local environmental contexts are aligned with the principles of 21st-century education, which emphasize critical thinking, collaboration, communication, and creativity (Megawati et al., 2023). Through learning activities connected to real environmental practices such as Lubuk Larangan, students can develop not only conceptual understanding but also the competencies needed to analyze environmental problems and participate in sustainable solutions (Darwati & Purana, 2021).

Based on these considerations, this study aims to analyze the potential role of Lubuk Larangan as a contextual biology learning resource to support the development of students' environmental literacy. Using a Systematic Literature Review (SLR) approach, this study synthesizes previous research to identify the opportunities, challenges, and implications of integrating Lubuk Larangan into biology learning. The findings are expected to contribute to the development of environmental education strategies that integrate local wisdom and support sustainable conservation practices in Indonesia.

2. METHOD

2.1. Research Design

This study employed a Systematic Literature Review (SLR) approach to identify, evaluate, and synthesize previous research related to the role of Lubuk Larangan as a biology learning resource

in improving environmental literacy. The SLR method enables researchers to systematically summarize existing studies and identify research gaps within a particular topic (Gultom et al., 2024; Muksin et al., 2024). The literature search was conducted using Publish or Perish software to retrieve relevant publications from the Google Scholar database. The search strategy used several keyword combinations, including "Lubuk Larangan," "biology learning," "environmental literacy," and "conservation education." The search was limited to articles published between 2015 and 2024 to ensure the relevance and recency of the literature.

2.2. Population and Sample

The selection of articles followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. In the initial stage, 100 articles were identified through the search process. These articles were then screened by reviewing titles and abstracts to determine their relevance to the research topic. Studies that were not related to biology learning, environmental education, or conservation practices were excluded. In addition, duplicate publications, non-scientific sources, and articles without full-text access were removed from the dataset.

2.3. Research Procedure

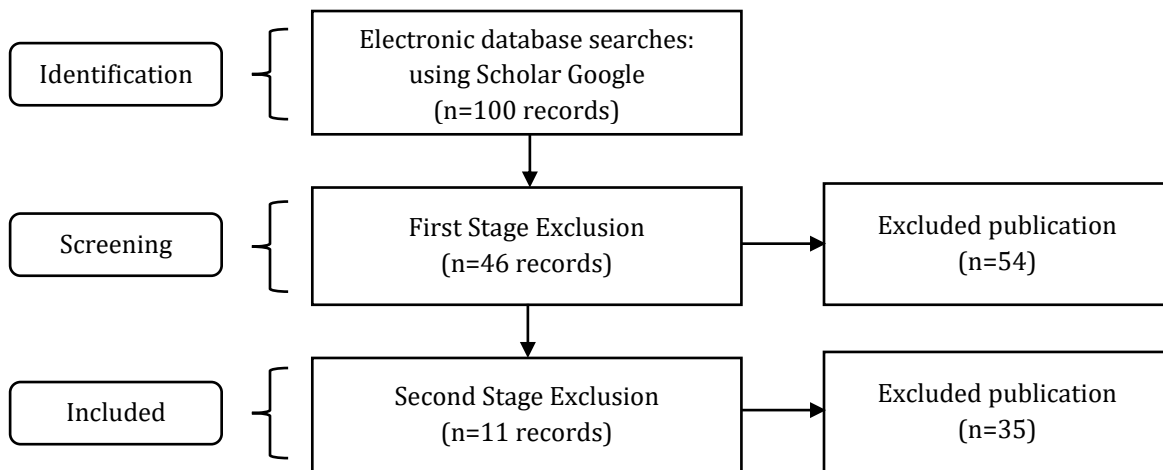


Figure 1. The literature selection process is explained using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart.

After the initial screening process, 46 articles remained for further evaluation. A full-text assessment was then conducted based on predefined inclusion and exclusion criteria, which are summarized in Table 1. These criteria include aspects such as topic relevance, publication type, accessibility, publication year, and research focus.

Based on this evaluation process, 11 articles met all the eligibility criteria and were selected for further analysis. The selected studies were analyzed using a thematic analysis framework to identify key themes, opportunities, challenges, and recommendations related to the integration of Lubuk Larangan into biology learning. The findings were subsequently synthesized to provide a comprehensive understanding of the potential role of Lubuk Larangan in supporting environmental literacy within biology education.

Table 1. Inclusion and Exclusion Criteria for Article Selection

Criteria	Inclusion Criteria	Exclusion Criteria
Topic relevance	Articles discussing <i>Lubuk Larangan</i> , community-based conservation, environmental literacy, or biology learning	Articles not related to conservation, environmental education, or biology learning
Publication type	Peer-reviewed journal articles	Conference abstracts, theses, dissertations, books, or non-scientific publications
Language	Articles published in English or Indonesian	Articles published in other languages

Accessibility	Articles with full-text access available	Articles without full-text access
Publication year	Articles published between 2015–2024	Articles published before 2015
Research focus	Studies related to environmental education, conservation learning, or local wisdom in education	Studies focusing only on ecological data without educational relevance

3. RESULT AND DISCUSSION

This section presents the findings derived from the analysis of 11 selected articles obtained through the Systematic Literature Review (SLR) process. The selected studies were summarized in Table 2, which provides information about the authors, publication year, and key findings related to the role of Lubuk Larangan in environmental conservation and biology learning. Rather than only presenting descriptive summaries, the analysis synthesizes the literature to identify several main themes regarding the potential of Lubuk Larangan as a contextual learning resource. These themes include: (1) the role of Lubuk Larangan in environmental conservation, (2) its social and cultural contributions, (3) its potential for integration into biology learning, and (4) its contribution to strengthening environmental literacy.

Table 1. Characteristics of Selected Articles Included in the Review

No.	Author	Title and Year	Key Findings
1.	Nasution, N.E.A., Rizka, C., Wardani, I.B., & Nurlim, R.	<i>Upaya dan Manfaat Pelestarian Sungai Masyarakat Panyabungan Barat Sumatera Utara Berbasis Kearifan Lokal Lubuk Larangan (2024)</i>	Highlights community-based river conservation through customary rules and its role in teaching ecosystem concepts and biodiversity conservation.
2.	Suryahartati, D., Oktaviarni, F., Windarto, Satoto, S., & Suhermi	<i>Local Customary Law: The Contribution of Adat Law in Preserving the Lubuk Larangan in Jambi (2021)</i>	Demonstrates the role of customary law in maintaining Lubuk Larangan and strengthening conservation awareness through traditional knowledge.
3.	Norsidi	<i>Pelestarian Daerah Aliran Sungai Berbasis Kearifan Lokal Lubuk Larangan Desa Lubuk Beringin Kecamatan Bathin III Ulu (2016)</i>	Shows how local wisdom improves watershed ecological functions and provides practical examples of sustainable watershed management.
4.	Rosdah, A.	<i>Kearifan Lokal Masyarakat Desa Sialang Jaya Dalam Tradisi Lubuk Larangan Di Kecamatan Rambah Kabupaten Rokan Hulu (2017)</i>	Describes seasonal fishing prohibitions that support fish regeneration and biodiversity conservation.
5.	Arizaldy, A., Solihat, R., Riandi, R., & Firman, H.	<i>Analysis of the Potential of Lubuk Larangan Local Wisdom in Science Learning in Junior High Schools (2021)</i>	Identifies Lubuk Larangan as a contextual learning resource for science education and environmental conservation.
6.	Ilyas, H., & Permatasari, B.	<i>Eksistensi Kearifan Lokal Lubuk Larangan Sebagai Upaya Pelestarian Sumberdaya Perairan Di Dusun Lubuk Beringin Kecamatan Bathin Ulu III Kabupaten Bungo (2018)</i>	Shows how community participation in Lubuk Larangan helps protect endemic aquatic species and supports sustainable resource management.
7.	Jufrida, Basuki, F.R., & Destinanda, A.	<i>Analisis Dan Integrasi Kearifan Lokal Lubuk Larangan Tantang Sakti Dalam Pembelajaran Sains (2020)</i>	Integrates local wisdom with scientific concepts to strengthen students' understanding of ecosystem balance and conservation.
8.	Wulandari, T., Kurniadi, M.D., Aldino, Arsih, F., & Lufri	<i>Analisis Konservasi Kearifan Lokal Lubuk Larangan Desa Baru Pusat Jalo (2023)</i>	Explains the role of Lubuk Larangan in maintaining fish populations and ecosystem stability while serving as a learning resource.
9.	Tantoro, S., & Yesi	<i>The Functions of Lubuk Larangan for the Community of Tanjung Belit Village (2018)</i>	Highlights ecological and social benefits of Lubuk Larangan in strengthening community awareness of ecosystem sustainability.
10	Gusmal, A., Taryoto, A.H., & Fatimah, F.	<i>Keberlanjutan Kearifan Lokal Lubuk Larangan di Kabupaten Pasaman Provinsi Sumatera Barat: Kasus Lubuk Larangan Bulaan Indah (2023)</i>	Emphasizes the sustainability of local traditions as an effective tool for community-based environmental conservation.

11.	Lubis, T., Dardanila, Nasution, T., Zulkarnain, Hasrul, S., Ramlan, & Abus, A.F.	<i>Tradition lubuk larangan as a local wisdom for ecocultural tourism river management through landscape anthropolinguistic approach in Mandailingnese (2021)</i>	Presents Lubuk Larangan as an ecocultural approach to river management linking conservation, culture, and environmental education.
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Based on the synthesis of the reviewed studies, several major themes were identified regarding the role of Lubuk Larangan in biology learning and environmental literacy. These themes are summarized in Table 3.

Table 2. Thematic Synthesis of Lubuk Larangan in Biology Learning and Environmental Literacy

Theme	Description	Contribution to Biology Learning	Contribution to Environmental Literacy	Supporting Studies
Community-based environmental conservation	<i>Lubuk Larangan</i> functions as a traditional conservation system that restricts fishing activities to maintain ecosystem balance and aquatic biodiversity.	Provides real examples for teaching ecosystem dynamics, biodiversity conservation, and sustainable resource management.	Enhances awareness of environmental protection and responsible resource use.	Norsidi (2016); Suryahartati et al. (2021); Nasution et al. (2024)
Social and cultural values	The management of <i>Lubuk Larangan</i> is based on customary rules, community participation, and cultural traditions.	Demonstrates the relationship between humans, culture, and ecosystems in environmental studies.	Encourages environmental responsibility and community-based stewardship values.	Tantoro & Yesi (2018); Gusmal et al. (2023); Nasution et al. (2024)
Contextual learning resource	<i>Lubuk Larangan</i> provides a real environmental setting that can be used for contextual and experiential learning in biology.	Supports field-based learning, ecological observation, and case studies on conservation practices.	Helps students understand the link between human activities and environmental sustainability.	Arizaldy et al. (2021); Jufrida et al. (2020); Wulandari et al. (2023)
Development of environmental literacy	Learning activities based on local traditions help students develop environmental knowledge, attitudes, and responsible behaviors.	Integrates ecological concepts with real-world environmental practices.	Improves environmental awareness, critical thinking, and participation in conservation activities.	Wulandari et al. (2023); Gusmal et al. (2023); Muntaha (2023)
Integration with 21st-century learning	Local wisdom-based learning encourages collaboration, problem solving, and critical thinking skills.	Supports inquiry-based and project-based learning in biology education.	Promotes active participation in solving environmental problems.	Pare & Sihotang (2023); Jufrida et al. (2020)

The analysis of the reviewed articles shows that Lubuk Larangan, a community-based conservation tradition in Indonesia, represents not only an environmental protection practice but also a form of local wisdom that integrates ecological sustainability, social values, and cultural traditions. Several studies highlight that this tradition has successfully protected aquatic ecosystems while strengthening community awareness and participation in environmental conservation (Nasution et al., 2024). The findings also indicate that Lubuk Larangan has strong potential to be utilized as a contextual learning resource in biology education because it connects scientific knowledge with real environmental practices.

3.1. The Role of Lubuk Larangan in Environmental Conservation

The reviewed studies consistently show that Lubuk Larangan functions as an effective community-based conservation strategy. This practice involves restricting fishing activities in certain river areas for a specified period agreed upon by local communities (Pasaribu, 2024). The restriction allows aquatic ecosystems to recover naturally and supports the regeneration of fish populations and other aquatic organisms. As a result, biodiversity and ecological balance can be maintained.

Several studies confirm the ecological benefits of this practice. Research conducted in Lubuk Beringin Village (Norsidi, 2016) and Jambi (Suryahartati et al., 2021) demonstrates that customary regulations in Lubuk Larangan effectively protect river ecosystems and prevent overexploitation of aquatic resources. Similarly, the study by Lubis et al. (2021) shows that Lubuk Larangan can function as part of an ecocultural approach to river management, combining ecological protection with cultural practices. These findings indicate that traditional conservation systems can play a significant role in maintaining ecosystem sustainability while supporting community participation in environmental management.

3.2. Social and Cultural Contributions

Beyond ecological conservation, Lubuk Larangan also contributes significantly to social cohesion and cultural preservation. The reviewed literature indicates that the management of Lubuk Larangan is based on collective decision-making processes involving community members, customary leaders, and local authorities (Nasution et al., 2024). The implementation of customary rules, including fishing restrictions and sanctions for violations, reflects shared community values and responsibilities.

In addition, traditional ceremonies associated with the opening of Lubuk Larangan strengthen cultural identity and social interaction among community members. Studies conducted in Pasaman Regency (Gusmal et al., 2023) and Tanjung Belit Village (Tantoro & Yesi, 2018) reveal that these traditions have evolved into important cultural events that involve multiple generations of the community. This cultural dimension reinforces the relationship between humans and nature and supports the sustainability of local conservation practices.

3.3. Potential and Opportunities for Integration in Biology Learning

The findings also reveal that Lubuk Larangan has significant potential to be integrated into biology learning as a contextual and experiential learning resource. Several studies highlight that local environmental practices can be used as real-life case studies to help students understand ecological concepts such as ecosystem dynamics, food chains, species interactions, and biodiversity conservation (Arizaldy et al., 2021; Jufrida et al., 2020).

Learning activities conducted in real environmental contexts enable students to connect theoretical knowledge with practical experiences. Field-based learning in Lubuk Larangan sites allows students to observe ecological processes directly and understand how traditional knowledge contributes to environmental sustainability. In addition, this approach aligns with the principles of contextual learning and 21st-century education, which emphasize critical thinking, collaboration, and problem-solving skills (Pare & Sihotang, 2023).

Through activities such as environmental observation, group discussions, and project-based learning, students can analyze the ecological impacts of conservation practices and propose solutions to environmental problems. Therefore, integrating Lubuk Larangan into biology education not only improves students' conceptual understanding but also promotes meaningful learning experiences.

3.4. Strengthening Environmental Literacy Through Local Traditions

Another important finding from the reviewed studies is the contribution of Lubuk Larangan to strengthening environmental literacy. Environmental literacy involves not only knowledge of ecological concepts but also awareness, attitudes, and behaviors that support environmental sustainability. Local traditions such as Lubuk Larangan provide practical examples of how communities manage natural resources responsibly. The reviewed studies suggest that learning

activities based on local traditions can help students understand the relationship between human behavior and environmental impacts (Muntaha, 2023). For example, by studying the management of Lubuk Larangan, students can learn how community regulations contribute to maintaining ecosystem balance and preventing environmental degradation.

Research conducted in Desa Baru Pusat Jalo (Wulandari et al., 2023) and Pasaman Regency (Gusmal et al., 2023) shows that the Lubuk Larangan system can serve as an effective model for environmental literacy education. By integrating local wisdom into environmental learning, students can develop ecological awareness and a sense of responsibility toward environmental conservation. This approach also encourages community participation and promotes sustainable environmental practices across generations.

Overall, the synthesis of the reviewed studies indicates that Lubuk Larangan has strong potential as a contextual learning resource that connects environmental conservation, cultural values, and biology education. The integration of this local wisdom into biology learning can contribute to improving students' environmental literacy while supporting the preservation of local conservation traditions.

4. CONCLUSION

Based on the findings of the systematic literature review, it can be concluded that Lubuk Larangan represents a form of local wisdom that contains strong ecological, social, and cultural values and has significant potential as a contextual learning resource in biology education. The reviewed studies indicate that this traditional conservation practice not only functions as a community-based environmental management system but also provides meaningful learning opportunities for students to understand ecological concepts and environmental sustainability. The integration of Lubuk Larangan into biology learning enables students to explore environmental concepts through real-world contexts, such as aquatic ecosystems, biodiversity conservation, and sustainable natural resource management. Through field-based and contextual learning approaches, students can directly observe ecological interactions and develop a deeper understanding of the relationship between human activities and environmental balance. This experiential learning process is aligned with the principles of 21st-century education, which emphasize critical thinking, collaboration, problem solving, and contextual learning. Furthermore, the findings highlight that incorporating local wisdom such as Lubuk Larangan into biology education can contribute to strengthening students' environmental literacy. This includes improving students' understanding of ecological principles, fostering environmental awareness and responsibility, and encouraging active participation in conservation practices. Therefore, Lubuk Larangan can serve as an effective educational model that not only supports academic learning outcomes but also contributes to the development of environmentally responsible future generations. Overall, this study demonstrates that the integration of local conservation traditions into formal education has the potential to bridge scientific knowledge with community-based environmental practices. Such an approach can support sustainable environmental education while preserving valuable local cultural heritage.

5. ACKNOWLEDGMENT

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