EFFORTS BY THE PEATLAND AND MANGROVE RESTORATION AGENCY TO FOSTER *ENVIRONMENTAL AWARENESS* AMONG STUDENTS IN DUMAI CITY

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Abstrak

Bencana Kebakaran Hutan dan Lahan Gambut serta abrasi merupakan masalah lingkungan yang perlu mendapatkan perhatian serius. Penelitian ini bertujuan untuk menganalisis upaya yang dilakukan oleh Badan Restorasi Gambut dan Mangrove dalam menumbuhkan kesadaran lingkungan khususnya tentang ekosistem gambut dan mangrove. Metode dalam penelitian ini yakni kualitatif dengan melakukan wawancara, observasi, dokumentasi serta studi kepustakaan. Temuan penelitian ini bahwa upaya Badan Restorasi Gambut dan Mangrove dalam menumbuhkan kesadaran lingkungan adalah melalui pendekatan sosialisasi serta edukasi secara kolaboratif. Badan Restorasi Gambut dan Mangrove bekerjasama dengan Pemerintah Kota Dumai khususnya Dinas Pendidikan dalam Projek Penguatan Profil Pelajar Pancasila (P5). Pembelajaran tentang ekosistem gambut dan mangrove menjadi muatan lokal unggulan dalam kurikulum P5. Bahkan Dumai menjadi daerah pertama di Provinsi Riau yang pertama melaunching Kurikulum P5 Gambut dan Mangrove. Intervensi kebijakan pada institusi pendidikan merupakan upaya laten yang dimaksudkan untuk menumbuhkan rasa cinta lingkungan terhadap ekosistem gambut dan mangrove serta kepedulian melestarikan di masa depan. Upaya ini penting untuk dilakukan karena potensi hilangnya ekosistem gambut di Kota Dumai semakin tinggi akibat alih fungsi lahan untuk kawasan industri. Demikian pula dengan masalah abrasi yang semakin mengkhawatirkan akibat kerusakan ekosistem mangrove baik secara alami maupun ulah manusia.

Kata Kunci: *Kesadaran Lingkungan, Sosialisasi, Pendidikan, Masyarakat*

Abstract

Forest and peatland fires, as well as coastal abrassion, are environmental issues that require serious attention. This study aims to analyze the efforts made by the Peatland and Mangrove Restoration Agency in building ecological awareness, specifically regarding peatland and mangrove ecosystems. The research employs qualitative methods through interviews, observations, documentation, and literature review. The findings indicate that the Peatland and Mangrove Restoration Agency's efforts to promote environmental awareness involve a collaborative approach to socialization and education. The Agency collaborates with the Dumai City Government, particularly the Department of Education, in the Pancasila Student Profile Strengthening Project (P5). Learning about peatland and mangrove ecosystems is incorporated as a local content highlight in the P5 curriculum. Dumai has even become the first region in Riau Province to launch the P5 Peatland and Mangrove Curriculum. Policy interventions in educational institutions are latent efforts aimed at fostering a love for the environment concerning peatland and mangrove ecosystems and ensuring future conservation. This effort is crucial due to the increasing potential loss of peatland ecosystems in Dumai City as a result of land conversion for industrial areas. Similarly, the problem of abrassion is increasingly alarming due to the degradation of mangrove ecosystems, both from natural causes and human activities.

Keywords: *Environmental Awareness, Socialization, Education, Society*

DOI:content, formatting, article

INTRODUCTION

The Peatland and Mangrove Restoration Agency (BRGM) was established based on the Presidential Regulation of the Republic of Indonesia Number 120 of 2020. Under this legal framework, there are two critical responsibilities for the Peatland and Mangrove Restoration Agency. First, to restore degraded peatland ecosystems and prevent forest and land fires. Second, rehabilitate mangroves to prevent abrasion. Damage to peatland and mangrove ecosystems is a significant issue requiring serious attention(Sapariah, 2019;Handoko et al., 2020). Not only does it have adverse environmental impacts, but such damage also triggers natural disasters that harm communities. During the dry

season, damaged peatlands are highly vulnerable to fires. If forest and land fires occur, they directly cause losses at regional, national, and international levels due to smoke(Wibowo, 2019). Similarly, mangroves have been extensively exploited over the past two decades, resulting in land loss due to abrassion(Yesi et al., 2022;Jalil et al., 2019).

Forest and peatland fires, along with coastal abrassion caused by mangrove ecosystem damage, are ecological disasters in Dumai City. This means that they are not just potential threats but have already occurred, particularly concerning coastal abrassion in several sub-districts, which is very concerning. From 2018 to 2023, Dumai City has consistently contributed to forest and peatland fire smoke, as reported by the Forest and Land Fire Monitoring System of the Ministry of Environment and Forestry of the Republic of Indonesia.

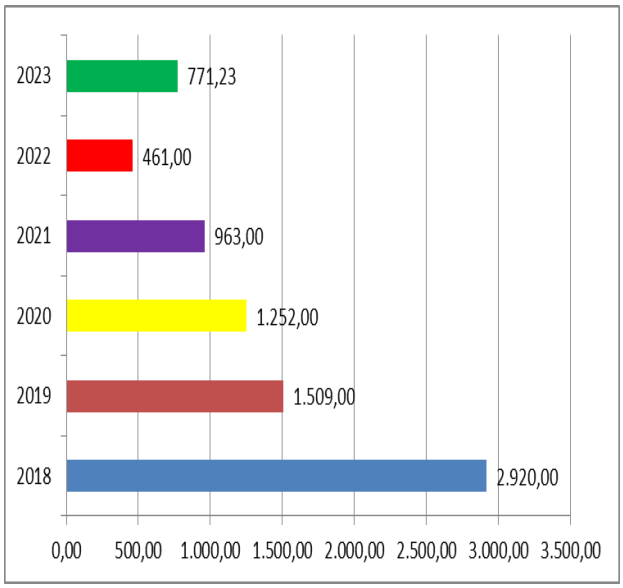

Chart 1: Extent of Forest and Land Fires in Dumai City in 2018-2023 (in hectares)
(Kementerian Lingkungan Hidup dan Kehutanan, 2024)

The most considerable extent of forest and land fires occurred in 2018. From 2019 to 2022, the extent of forest and land fires decreased due to various restoration interventions such as wetting and planting in burned and potentially burnable areas. Restoration efforts are conducted collaboratively between the Dumai City Government, the Peatland and Mangrove Restoration Agency, the community, and various organizations(Astika et al., 2022). However, in 2023, the extent of forest and land fires increased again. This is due to natural factors such as the dry season and continued unwise land management practices by particular communities(Rusadi & Nina Yuslaini, 2021). Another issue is related to mangrove damage and abrassion disasters. Research results show that from 1990 to 1999 and 1999 to 2008, there was dynamic change in both coastal expansion and reduction, while the period from 2008 to 2020 was predominantly characterized by coastal reduction. The accretion rate in Dumai City is 1.17 meters per year, while the abrassion rate is 2.04 meters per year. This rate of change results in a land gain of 60.82 hectares and a land loss of 760.20 hectares(Mulyadi et al., 2022).

Supporting peatland restoration and mangrove rehabilitation efforts goes beyond discussing only biophysical interventions(Arifudin et al., 2019). A crucial aspect is related to social factors. Environmental awareness is the individual and collective consciousness about the importance of the environment and the need to preserve it for the sustainability of human and other life forms on Earth. This awareness includes understanding the interaction between humans and the environment, as well as the impact of human actions on ecosystems(Asbullah, 2020). As knowledge and technology advance, humans increasingly realize that many activities, such as deforestation, fossil fuel use, and industrial waste disposal, have significant negative impacts on the environment. These impacts are not limited to global climate change but also include air, water, and soil pollution that threaten human health and biodiversity sustainability.

The process of enhancing environmental awareness often begins with education, both formal in schools and informal through community campaigns and activities. Environmental education plays a crucial role in shaping pro-environmental mindsets and attitudes from an early age. The Peatland and Mangrove Restoration Agency views ecological awareness as a long-term necessity and a means to support the contribution of the younger generation to ecological conservation. Therefore, based on the outlined background, the objective of this study is to analyze the efforts made by the Peatland and Mangrove Restoration Agency in fostering environmental awareness among students in Dumai City regarding peatland and mangrove ecosystems.

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METHOD

This study employs a qualitative method with purposive sampling for subject selection. The subjects of this research include representatives from the Peatland and Mangrove Restoration Agency, the Principal of State Junior High School 2 Dumai City, students, and the community. The primary and secondary data sources for this research are primary and secondary data. Data collection techniques include in-depth interviews with selected subjects, observation of activities at schools, and literature review of reports, journals, and other documents. The subsequent data analysis process involves stages of data reduction, presentation, and conclusion drawing.

RESULT AND DISCUSSION

Environmental awareness among students regarding peatland and mangrove ecosystems plays a crucial role in maintaining environmental sustainability and supporting the continuity of life(Rogayan & Nebrida, 2019). Peatland and mangrove ecosystems are two ecosystems with vital ecological functions but are highly vulnerable to damage from human activities. Therefore, equipping students with knowledge and awareness about the importance of preserving these ecosystems is a strategic step toward protecting the environment in the future(Sprague et al., 2021).

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Curriculum Development for Peatland and Mangrove Education for Elementary and Junior High School Students

The Pancasila Student Profile Strengthening Project (P5) curriculum in Dumai City, focusing on peatland and mangrove ecosystems, is designed to provide students with a deep understanding of the importance of these ecosystems and to develop their character and competencies in line with Pancasila values. The collaboration between the Peatland and Mangrove Restoration Agency and the Dumai City Government in the P5 project is a valuable initiative to enhance environmental awareness while supporting natural conservation. By involving students in conservation efforts, this program strengthens environmental education and instils Pancasila values in students, creating a generation more concerned and responsible toward the environment.

The development of the Pancasila Student Profile Strengthening Project (P5) curriculum, focusing on peatland and mangrove ecosystems, begins with identifying urgent environmental education needs. The curriculum development team, consisting of representatives from the Department of Education, the Peatland and Mangrove Restoration Agency (BRGM), academics, and environmental practitioners, holds initial meetings to align the program's vision and mission. The first step involves conducting literature reviews and field studies to understand the local conditions of peatland and mangrove ecosystems and the challenges faced. Subsequently, teaching materials are developed based on these findings, including basic knowledge about ecosystems, conservation techniques, restoration and rehabilitation, and relevant Pancasila values.

In preparing the Pancasila Student Profile Strengthening Project (P5) curriculum for both elementary and junior high school levels, the process starts with an introductory phase. In this phase, students are introduced to the basic concepts of peatland and mangrove ecosystems through engaging stories, images, and videos. Teachers use interactive learning methods such as educational games and group discussions to spark students' interest in the topic.

Figure 1: Junior High School Module Package B Program (Phase D)

Figure 2: Junior High School Module Package B Program (Phase D)

Figure 3: Primary School Module Package B Program (Phase C)

Figure 3: Primary School Module Package B Program (Phase C)

The second phase is exploration, where students engage in practical activities such as field observations and simple experiments. In this phase, students visit nearby mangrove and peatland areas to directly observe the existing flora and fauna and understand their ecological functions. The third phase is development, where students become involved in more concrete conservation projects, such as planting mangrove seedlings or creating miniaturized peatland ecosystems at school. These activities not only teach technical skills but also instill values of cooperation and responsibility. The fourth phase is application, where students apply the knowledge and skills learned in more complex and sustainable projects, such as mangrove tree adoption programs or environmental awareness campaigns in their school and community. The final phase is reflection and evaluation, where students and teachers collectively assess the learning outcomes and projects undertaken. In this phase, students reflect on their experiences, share what they have learned, and develop action plans for the future.

Junior High School 2 Dumai City, Elementary School 5 West Dumai, and Elementary School 2 East Dumai are exemplary schools for implementing P5. Teachers at these schools are provided with specialized training to implement this new curriculum effectively. During the trial period, various evaluation methods were employed, including classroom observation, quizzes, and group discussions, to measure students' understanding and engagement.

Feedback from students and teachers was systematically collected to identify strengths and weaknesses of the curriculum. Observations indicated that students displayed high enthusiasm for field activities and demonstrated a better understanding of the importance of ecosystem conservation. Teachers also provided valuable insights into difficulties faced in delivering content and managing practical activities. Based on these findings, the curriculum development team made adjustments, such as simplifying certain materials and enhancing logistical support for field activities. This trial highlighted the importance of involving all stakeholders in curriculum development, with the final goal being effective implementation across schools in Dumai City, thereby positively impacting environmental awareness and character building in students

Dissemination of Peat and Mangrove Education Mainstreaming into the Merdeka Curriculum

After the design of the peat and mangrove curriculum and the completion of the modules, the next step is to disseminate it to Elementary

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and Junior High Schools in Dumai City. Teachers are introduced to the learning modules that include material on the ecological functions, benefits, and threats to peat and mangrove ecosystems, as well as conservation and rehabilitation techniques. This material is integrated into various subjects such as biology, geography, and social sciences, allowing students to learn from multiple perspectives. The structured, systematic, and extensive dissemination aims to ensure that teachers are aware of the peat and mangrove curriculum. This activity also aims to encourage primary and junior high schools to implement the P5 peat and mangrove curriculum in their teaching and practice.

Dissemination and education about peat and mangrove ecosystems for students and schools not yet implementing the Pancasila Student Profile Strengthening Project (P5) are crucial for raising environmental awareness and preparing the younger generation for future ecological challenges. This education provides a deep understanding of the critical role of peat and mangrove ecosystems in maintaining environmental balance, preventing natural disasters such as floods and abrassion, and mitigating climate change.

For schools not yet implementing P5, this dissemination opens opportunities to integrate environmental content into their curriculum, allowing students to learn holistically about the importance of preserving these ecosystems. Effective dissemination activities involve various methods, from seminars and workshops to field visits, enabling students and teachers to gain direct and practical insights. These activities also introduce conservation and rehabilitation techniques that can be implemented in school projects, encouraging active student participation in environmental preservation efforts. Furthermore, this education helps build a more caring, responsible, and proactive student character, ready to contribute to environmental conservation. Thus, through comprehensive dissemination and education, schools not yet implementing P5 can begin adopting sustainable educational practices, making students agents of change in the conservation of peat and mangrove ecosystems.

Measuring the Success of the Peat Restoration Agency's Efforts in Raising Environmental Awareness

Field reviews indicate that students participating in the peat and mangrove curriculum model are quite enthusiastic. The Principal of Junior High School 2 Dumai City mentioned in an interview with researchers that students are interested in the peat and mangrove curriculum model because they are not only introduced to theory but also engaged in practical activities. For instance, students at Junior High School 2 Dumai City visited the Bandar Bakau ecotourism site to learn about mangrove species and their functions for coastal environments. They also acquired knowledge at school and then practiced processing pineapples as a local commodity in peatland areas. The new learning model incorporated into the peat and mangrove curriculum provides a comfortable learning environment for students.

They reported that the daily classroom routine sometimes leads to boredom. Through the peat and mangrove curriculum in P5, they experience enjoyable learning. Teachers have also complemented the P5 project practices with video documentaries using social media. This approach was chosen to further engage students in understanding the environment and to utilize their social media platforms to introduce what peat and mangroves are like in their region. Moreover, it is noteworthy that teachers and students at Junior High School 2 Dumai City are currently developing a health drink in the form of tea made from mangrove. This product results from students' creativity during their visit to the Bandar Bakau ecotourism site and discussions with the management there. However, the mangrove-based product is still under laboratory testing and has not yet been published. Meanwhile, products derived from peatland commodities have not progressed to serious production due to limitations in equipment and infrastructure.

The examples described can serve as early indicators of the potential success in fostering environmental awareness through the peat and mangrove curriculum. Developing environmental awareness in students is an ongoing process that varies depending on factors such as teaching methods, school environment, parental

involvement, and opportunities to participate in environmental activities(Barrón et al., 2022). Generally, this process does not happen quickly but requires years to be firmly embedded in students' behavior and values(Hajj-Hassan et al., 2024).

Environmental awareness can begin to develop early through consistent and repetitive education at the primary and secondary school levels. This process starts with introducing basic concepts about the environment and sustainability, which are then reinforced through direct experiences such as field trips, conservation projects, and extracurricular activities focused on the environment. Through these practical experiences, students not only learn the theory but also see and feel the real impact of their actions on the environment. Another crucial factor is the ongoing support from teachers and school programs that encourage active participation in environmental activities. Additionally, community participation and family involvement play significant roles in accelerating this awareness(Makhtar et al., 2021).

When students observe positive examples from those around them and engage in a community that cares about the environment, their awareness becomes stronger and more established. Although no precise timeframe can be determined, research indicates that well-integrated and sustainable environmental education programs in the curriculum can begin to show significant results within a few years, with long-term impacts on students' environmental attitudes and behaviors as they grow into adulthood.

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CONCLUSION

The Peat and Mangrove Restoration Agency's (BRGM) efforts to raise environmental awareness through the integration of peat and mangrove ecosystem education into the Pancasila Student Profile Strengthening Project (P5) have shown significant results. BRGM collaborated with the Education Office and various other stakeholders to develop a curriculum that includes both theoretical knowledge and practical experience related to these critical ecosystems. Through a series of activities such as seminars, workshops, and field visits, students were given the opportunity to understand the importance of peat and mangrove ecosystems and directly engage in conservation efforts. The implementation of the P5 curriculum focused on peat and mangroves has successfully enhanced students' understanding and environmental awareness. They not only learned about the ecological functions and benefits of these ecosystems but also participated in rehabilitation and conservation projects, which reinforced their engagement and responsibility towards the environment. These activities were also supported by teacher training, enabling more effective delivery of content and inspiring students to actively participate in environmental preservation.

The outcomes of these efforts are evident in the increased interest, innovation, creativity, and environmental awareness among students, as well as in their more proactive attitudes towards protecting and preserving peat and mangrove ecosystems. The program also promotes collaboration between schools, communities, and the government, creating a solid support network for sustainable environmental education. Overall, the Peat and Mangrove Restoration Agency's initiative to integrate peat and mangrove education into the Merdeka Curriculum through P5 has made a tangible contribution to developing a more environmentally conscious and committed younger generation dedicated to protecting these vital ecosystems.

The potential impact of the peat and mangrove curriculum in P5 for fostering environmental awareness is substantial. However, not all primary and secondary schools have adopted this curriculum to date. Therefore, massive dissemination and education efforts about the peat and mangrove curriculum must be undertaken and applied in daily teaching activities.

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