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# Literature Study: Sustainable Natural Resources Management as a Solution to Environmental Problems in Indonesia

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**ABSTRACT**

Environmental problems in Indonesia, including deforestation, land degradation, water pollution, and biodiversity decline, present serious challenges to sustainable development. This study examines sustainable natural resource management as a solution through a comprehensive literature review. The findings reveal that participatory approaches, green technology implementation, and evidence-based policies can significantly reduce environmental degradation. The research highlights the crucial role of multi-stakeholder collaboration between government, private sector, and local communities in formulating effective sustainability policies. Importantly, the study demonstrates that integrating strict regulations with community empowerment and technological innovation offers the most promising path toward sustainable resource management. The research implications are threefold: First, it provides policymakers with a framework for developing integrated environmental policies. Second, it underscores the need for capacity building in local institutions to implement sustainable practices. Third, it identifies technology adoption as a critical factor for effective environmental monitoring. These findings contribute to ongoing discussions about sustainable development by offering practical solutions that balance economic growth with environmental preservation. The study concludes that a holistic approach combining policy reform, technological advancement, and community participation is essential for addressing Indonesia's environmental challenges while ensuring long-term sustainability.

## INTRODUCTION

Indonesia has abundant natural resources, including tropical forests, vast waters, and mineral and energy reserves (Lestari & Rahayu, 2020; Suharto et al., 2021). These natural resources play an important role in the country's economic development, both in the agriculture, fisheries, forestry, and energy sectors (Ariani & Setiawan, 2019; Siahaan & Kurniawan, 2022). However, the uncontrolled use of natural resources has led to various environmental problems, such as deforestation, ecosystem damage, water and air

pollution, and biodiversity loss (Rahman et al., 2021; Wijaya et al., 2020). In addition, the imbalance between the exploitation of natural resources and the carrying capacity of nature has worsened environmental conditions and added pressure to the sustainability of people's lives, especially those who depend on natural resources (Yusuf & Pramudya, 2021; Lestari, 2020).

As global awareness of the importance of environmental conservation increases, the concept of sustainable natural resource management (MSAB/Manajemen Sumber Daya Alam Berkelanjutan) is becoming increasingly relevant (Ariani et al., 2019; Sharma & Verma, 2020). MSAB refers to efforts to manage natural resources in a way that not only meets current human needs, but also ensures that future generations can utilize the same natural resources without sacrificing environmental quality (WCED, 1987; Yule & Nash, 2018). In the Indonesian context, the implementation of MSAB is critical to address the environmental challenges faced, including high deforestation, coral reef damage, and land and water degradation (Hidayat et al., 2021; Siahaan & Kurniawan, 2020; Widodo & Hadid, 2022).

The implementation of *MSAB* involves three main aspects, namely economic, social, and environmental sustainability, which are interrelated and must be maintained in balance (Balcerzak et al., 2022). Therefore, *sustainable natural resource management* requires a holistic approach that involves various parties, ranging from the government, the community, to the private sector. In the Indonesian context, this management must also take into account social and cultural diversity as well as political dynamics that influence decision-making in the use of natural resources.

This research conducted a critical analysis of the previous two studies to identify the gaps and contributions given. Margono et al. (2014), in their study entitled "Historical Analysis of Deforestation in Indonesia," revealed the high rate of deforestation in Indonesia due to plantation expansion and land conversion, but lacked a focus on solutions based on community participation or technology. This research fills this gap by offering a multi-stakeholder collaborative approach and the use of satellite monitoring technology for deforestation mitigation. Meanwhile, Agus & Sutaryo (2021), in a study entitled "The Role of Communities in *Sustainable Natural Resources Management*," emphasized the importance of local community participation, but did not discuss in depth the role of structural policies and green economic integration. The study complements their findings by recommending policy reform, sustainable certification, and the transition to a green economy.

This research aims to identify the challenges faced by Indonesia in *sustainable natural resource management*, analyze the implementation of the concept of *sustainable natural resource management* in Indonesia, assess the role of the government, community, and private sector in *sustainable natural resource management*, and prepare policy recommendations to overcome environmental problems related to natural resource management in Indonesia. The benefit is to provide evidence-based policy recommendations to address environmental degradation, while filling gaps in previous research with an integrated approach that combines technology, community participation,

and a robust regulatory framework. Thus, this research is expected to be a reference for policymakers and practitioners in achieving sustainable development in Indonesia. The results of the research are expected to contribute in the form of evidence-based policy recommendations, integrating technological aspects, community participation, and a strong regulatory framework. Thus, this research can be a valuable reference for stakeholders in formulating more effective sustainable development strategies in Indonesia.

## METHOD

This study uses a *descriptive qualitative method* with a *literature study* approach to analyze various previous studies related to *sustainable natural resource management* in Indonesia. The data collection technique is carried out through a systematic review of secondary sources in the form of scientific journals, as well as publications of environmental organizations. Literature searches were conducted through academic databases such as Google Scholar and ScienceDirect using keywords related to *sustainable natural resource management* and *environmental policy*.

For the data analysis technique, this study applies *thematic synthesis analysis* which includes four main stages. First, the identification of key themes from the relevant literature. Second, the categorization of findings based on economic, social, and environmental aspects. Third, a critical evaluation of the advantages and limitations of previous studies. Finally, the preparation of policy recommendations based on the identified findings. This analytical approach allows researchers to not only identify research gaps but also formulate more comprehensive and applicable solutions.

## RESULTS AND DISCUSSION

This study identified a number of psychological barriers that prevent the people of Jakarta from adopting more efficient energy conservation behaviors. Based on the literature review conducted, the results of the study show three main psychological barriers that arise in the Indonesian environment.

### Challenges of Natural Resources Management in Indonesia

Based on a literature review, there are a number of major challenges in sustainable natural resource management in Indonesia. Some of these key challenges include:

1. Deforestation and Land Conversion: Deforestation in Indonesia has reached a very high rate, which is largely due to the expansion of oil palm plantations, mining, and agricultural land clearing (Margono et al., 2014). This not only damages forest ecosystems, but also exacerbates global climate change.
2. Land Degradation and Erosion: Unsustainable agricultural practices, such as monoculture and deforestation, lead to land degradation that leads to erosion and decreased soil fertility (Bappenas, 2017). This has a direct impact on agricultural productivity and national food security.
3. Marine Pollution and Fisheries: Mining, oil processing, and plastic pollution in the ocean threaten Indonesia's marine ecosystem, which is rich in coral reefs and marine

biodiversity. Marine pollution and uncontrolled fishing also reduce the quality of fishery resources (WWF Indonesia, 2020).

4. Inequality of Access and Social Justice: Although Indonesia is rich in natural resources, inequality in the distribution of economic benefits often occurs. This leads to social injustice and economic inequality, which risks exacerbating poverty among people who depend on natural resources directly (Agus & Sutaryo, 2021).

**Implementation of MSAB in Indonesia**

In the face of these challenges, the concepts and principles of MSAB must be applied more effectively. Some of the implementation steps that can be taken include:

1. Policy Reform and Regulatory Strengthening: To reduce the rate of deforestation and land degradation, there is a need for stricter policy reforms against environmentally damaging business licenses and strict enforcement of the law. This policy must be accompanied by a transparent and accountable supervisory mechanism (MoEF, 2023).
2. Utilization of Technology in Natural Resources Management: Satellite- and drone-based monitoring technology can be used to monitor land changes in real-time and detect illegal activities, such as illegal logging and forest fires (Bappenas, 2017). These technologies can also be used to improve efficiency in natural resource management, such as precision agriculture that reduces the use of pesticides and excess fertilizers.
3. Empowerment of Local Communities and Indigenous Communities: One of the important steps in the implementation of MSAB is to increase the participation of local communities and indigenous communities in natural resource management. Education and counseling on the importance of environmental sustainability are very important to increase their awareness and involvement in preserving nature (Agus & Sutaryo, 2021).
4. Collaboration between Government, Private Sector, and Community: Collaboration between government, the private sector, and communities is essential to create sustainable natural resource management. For example, the private sector can adopt sustainability certifications, such as the RSPO for palm oil, which ensures that production is carried out in an environmentally friendly and sustainable manner (WWF Indonesia, 2020).

**Solutions to Environmental Problems in Indonesia**

Based on literature analysis, some solutions that can be applied to overcome environmental problems in Indonesia include:

1. Capacity Building of Natural Resources Managers: Capacity building of institutions responsible for natural resource management, such as the Ministry of Environment and Forestry, and Bappenas, is needed so that they can be more effective in formulating policies and conducting supervision (MoEF, 2023).

2. Ecosystem Rehabilitation and Renewable Natural Resource Management: Forest rehabilitation programs and conservation area management should be prioritized to maintain ecosystem sustainability and ensure that natural resource utilization remains within sustainability limits.
3. Transition to a Green Economy: Indonesia's economic shift to a green economy that focuses on renewable energy, environmentally friendly agriculture, and sustainable management of natural resources will help create a balance between economic growth and environmental protection (WWF Indonesia, 2020).

The discussion of this study reveals important findings related to sustainable natural resource management in Indonesia. The results of the analysis show that the main challenge still lies in the high rate of deforestation which reaches 1 million hectares per year, especially due to the expansion of oil palm plantations and mining activities (Margono et al., 2014). In addition, the problem of land degradation and marine pollution further worsens environmental conditions and threatens biodiversity (Bappenas, 2017; WWF Indonesia, 2020). The key findings of this study confirm the importance of a collaborative approach between the government, the private sector, and local communities, where the active participation of indigenous peoples has been shown to increase the effectiveness of conservation programs (Agus & Sutaryo, 2021). The use of modern technologies such as satellite and drone monitoring has also been identified as an important solution to increase transparency in environmental monitoring (Bappenas, 2017). This research further highlights the need for a transition to a green economy through sustainable certification and the development of renewable energy as a long-term solution (WWF Indonesia, 2020). These findings not only fill in gaps in previous research by providing more structured policy recommendations, but also offer a holistic framework that integrates aspects of regulation, technology, and community empowerment. The resulting policy implications emphasize environmental regulatory reform, the integration of digital technology in monitoring, and environmental education programs to increase public awareness. With the implementation of these solutions, Indonesia is expected to be more effective in achieving sustainable development while preserving natural resources for future generations.

## CONCLUSION

Based on the results of the literature review conducted, it can be concluded that *sustainable natural resource management* (*MSAB*) is a very important solution to overcome environmental problems in Indonesia. Given the wealth of natural resources that Indonesia has, *sustainable management* is key to ensuring that these resources can still be used by future generations without damaging the ecosystem and environmental quality. Some of the key findings from the study include: Indonesia faces several major challenges in *natural resource management*, such as high deforestation, land degradation, marine ecosystem damage, and unequal distribution of economic benefits from natural resources. This research succeeded in achieving its objectives by identifying the main challenges in *sustainable natural resource management* in Indonesia, analyzing the

implementation of existing policies, and evaluating the roles of various stakeholders. The findings of the study confirm that a holistic approach that combines aspects of regulation, technology, and community participation is key to addressing complex environmental issues. In the future, this research opens up opportunities for the development of further studies on the effectiveness of the application of digital technology in environmental monitoring, the economic impact of the transition to renewable energy, as well as optimal collaboration models between the government, the private sector, and local communities. Thus, this research not only makes a significant academic contribution but also offers a solid foundation for further policy-making and research in the field of *sustainable development*.

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