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Analysis of Forest Area Changes in Langkat Regency

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ABSTRACT

This study aims to examine the Analysis of Forest Area Change in Langkat Regency. The method used in this study is an exploratory descriptive method, namely by holding collection, analysis and interpretation activities that aim to make a description. The data collected in this study consists of primary data and secondary data. In this study, the data collection technique uses several methods, including: Literature studies in general are the study of books related to the problem that is the subject of the research object. Data Reduction, Data Display and Conclusion Drawing / Verification. Deforestation and Conversion Research Results: Langkat Regency, like many other regions in Indonesia, has experienced significant deforestation and forest conversion for agriculture, plantations, and infrastructure development. Environmental Impacts: Changes in forest areas have an impact on the environment, including declining soil quality, declining biodiversity, and changing hydrological patterns. Management and Conservation: Forest management and conservation efforts are important to mitigate the negative impacts of forest area change. Policies and Regulations: Effective implementation of policies and regulations is essential to regulate land use and protect forest areas. Role of Local Communities: The involvement of local communities in forest management and decision-making related to land use can help ensure that changes are made taking into account ecological and social interests.

Keywords: Changes in Forest Areas and Langkat Regency

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1. INTRODUCTION

A forest is a unified ecosystem in the form of a stretch of land containing biological natural resources dominated by trees in the natural communion of the environment, which cannot be separated from each other (Article 1 number 2 of Law Number 41 of 1999 concerning Forestry). Forests in Indonesian forestry law in Article 6 paragraph (2) of Law Number 41 of 1999 concerning Forestry, the government determines forests based on their main functions, namely conservation forests, protected forests and production forests. In Article 1 number 7, production forests are forest areas that have the main function of producing forest products. Article 1 number 8 protected forests are forest areas that have the main function of protecting the life support system to regulate water systems, prevent floods, control erosion, prevent seawater intrusion, and maintain soil fertility. And Article 1 number 9 Conservation forests are forest areas with certain characteristics, which have the main function of preserving plant and animal diversity as well as their ecosystems.

Table 1.1
Number of Forest Areas in Langkat Regency

District	Sum		
	2021	2022	2023
Bohorok	87109	83277	83312.62
Sirapit	-	-	-
Salapian	1454	2335	2381.56
Kutambaru	17681	15623	14713.57
Sei Bingai	12226	11293	11329.24

Kuala	516	470	489.73
Finish	-	-	-
Binjai	-	-	-
Stabat	-	-	-
Wampu	-	-	-
Attack Rod	63241	62429	62478.71
Seberang Palm	-	130	140.27
Padang Tualang	-	-	-
Hinai	-	-	-
Secanggang	8107	6199	6607.73
Tanjung Pura	14354	9932	9562.42
Gebang	10266	4585	4628.99
Babalan	8783	683	728.19
You are Lepan	18553	16398	16520.79
Western Brandan	5244	2724	2839.12
Besitang	59667	51726	51478.44
Milk Base	9270	11899	11417.23
Pematang Jaya	10790	3981	4033.39
Langkat Regency	327261	283684	282662

Source : BPS Langkat Regency

This is also stated by Wiratno (2013) through his book entitled From Illegal Loggers to Leuser Conservation (Leuser Ecotourism Development) that since the establishment of the Tangkahan Ecotourism Area, management has been carried out by the surrounding community by preserving the forest land. There has been a change in actions and mindsets by the youth since the 2000s so that the next generation can feel and see the forest and fauna in the Tangkahan area. With a change in mindset and the transition from illegal logging habits, the people from the two villages agreed to develop tourism known as the Tangkahan Ecotourism Area and form the Tangkahan Tourism Institute (LPT). According to the official website of Gunung Leuser National Park (TNGL), Tangkahan as part of TNGL is under the rules and conservation interests that have an economic impact on the region, in this case the villages around the Tangkahan Ecotourism Area.

According to data obtained from the official website of Gunung Leuser National Park, Tangkahan is a name determined to show the boundaries of the management area within the scope of the cooperation agreement (*Memorandum of Understanding*) signed by the Gunung Leuser National Park Center and the Tangkahan Tourism Institute on April 22, 2002 and July 23, 2006 covering an area of 17,500 hectares, which refers to the provisions of the Regulation of the Minister of Forestry Number P.19/Menhut-II/2004 regarding the collaboration of Nature Conservation Areas and Nature Reserve Areas. The diversity of ecotourism potential, one of which can be seen from the existence of Tangkahan ecotourism in Langkat Regency, was also emphasized by the Head of the Langkat Regency Tourism and Culture Office (Head of the Langkat Regency Disparbudkab). That the existence of the tourism sector and its development will have an impact on the economic growth of the community, especially people who live around tourist attractions. With the development of the tourism sector in an area, it has an impact on increasing regional income and creating jobs. This also supports the vision and mission of the Regent of Langkat in realizing sustainable Langkat tourism, namely "Making Langkat advanced, prosperous and religious, through the development of environmentally sound tourism and infrastructure". These two things support the development of sustainability-based tourism or sustainable tourism, one of which is in Tangkahan Ecotourism.

In order to obtain optimal benefits from forests and forest areas for the welfare of the community, in principle, all forest areas can be utilized while still paying attention to their nature, characteristics and vulnerabilities, and are not allowed to change their main functions, without conducting an in-depth and comprehensive study. To realize a balance in forest utilization, a forestry law system is needed as an instrument for the protection and management of forest areas that is clear, firm and comprehensive, in order to ensure certainty, justice and the usefulness of the law as a basis for efforts to prevent the acceleration of forest area destruction, as well as an instrument to realize welfare and prosperity for the people of Indonesia, (Agus P. Silaen, 2018).

In forest management activities, forest management activities and the preparation of forest management plans, forest utilization activities and the use of forest areas, forest rehabilitation and reclamation activities, and nature conservation forest protection activities are carried out. Forest management activities and the preparation of forest management plans are important and fundamental first steps in forest management activities. Both activities are useful for determining the direction of future management and projecting various management activities in the future. The implementation of the preparation of these two activities is carried out based on the actual conditions of the forest area, therefore different forest functions and characteristics result in different forest management and forest management plans (Hasti, et al. 2016). The forest management process in forest management activities, according to Erdi et al. (2017), aims to map forest areas functionally based on considerations of the carrying capacity of forest areas which include ecological and biophysical aspects as well as socio-economic considerations of the communities around the area. These considerations are in accordance with the ecology of the landscape/landscape which is based on three principles: ecology, economy, and ethics or social problems. The balance of these three principles is a strategy to maintain forest areas as a life support system.

2. LITERATURE REVIEW

According to Arief (2016), a forest is a collection of trees that grow tightly along with climbing plants with colorful flowers that play a very important role in life on this earth. According to Fitriana (2018), a forest is an area in which various plants and animals are found. Areas classified as forests are spread all over the world, covering a very large area. According to Noor (2016), Land can be defined as a space on the earth's surface that is naturally limited by certain physical properties and land forms. According to Salim (2013) The use of forest land is an effort to make forest areas usable and beneficial for the welfare, society, nation, and state.

According to Wahyu Hidayat, (2015) Land use has implications for contributing to the increase in land cover/use area from one or several categories of cover/use followed by a decrease in the area of other categories in a certain period. The conversion of forest land to other land uses is a phenomenon that has been happening for a long time in the world and has direct impacts including air pollution, reduced biodiversity, and global warming with a decrease in CO2 binders. According to Sugiyarto (2017), the use/management of forest land will quickly change soil conditions and functions, and then will change the structure and function of biota/organisms, whose life is highly dependent on the carrying capacity of the soil.

METHOD APPROACH

The research method can be interpreted as a natural way to obtain valid data, with the aim of being able to determine, develop, and prove, a certain knowledge so that it can in turn be used to understand, solve, and anticipate in certain fields (Sugiyono, 2019). The method used in this study is an exploratory descriptive method, namely by holding collection, analysis and interpretation activities that aim to make a description. The method of data collection is not only limited to collecting and compiling data, but includes analysis and discussion of the data.

Data is information or information about something related to the purpose of research because the main purpose of research is to obtain data (Sugiyono, 2010 in Muntaha, 2012). The data collected in this study consists of primary data and secondary data. Primary data is data taken directly from the research subject using measurement tools or data collection tools directly on the subject as the source of information sought (Azwar, 2017). According to (Sugiyono 2018), secondary data is a data source that does not directly provide data to data collectors, for example through other people or through documents. Secondary data in this study were obtained from reports, journals, magazines, internet sites and literature that supported this study.

In this study, the data collection technique uses several methods, including: Literature studies in general are the study of books related to the problem that is the subject of the research object. According to (Arikunto, 2016), observation is a way of collecting data or information that must be carried out by making observation efforts directly to the place to be investigated. Interview is a data collection technique by communicating with data sources. The communication is carried out by oral dialogue (question and answer), both directly and indirectly.

According to Nazir (2013), data analysis is the process of grouping, sorting, manipulating, and summarizing (shortening) raw data that has been collected by researchers, so that the data becomes easier to read and understand. Researchers in analyzing data, using the steps proposed by Miles and Huberman in Sugiyono (2015) stated that: *Data Reduction* , *Data Display* and *Conclusion Drawing / Verification.*

3. DISCUSSION

Changes in the Function of Forest Areas Partially in Langkat Regency

The partial change in the function of forest areas is carried out to strengthen and optimize the function of forest areas. Changes in the function of forest areas are partially carried out in forests with the following main functions: a) conservation forests; b) protected forests; and c) production forests. Partial changes in the function of forest areas are carried out through changes in functions: a) between the main functions of forest areas; or b) in the tree function of the forest area. Changes in the main functions of forest areas include changes in the functions of:

1. Conservation forest areas become protected forest areas and/or production forest areas;
2. Protected forest areas become conservation forest areas and/or production forest areas; and
3. Production forest areas become conservation areas and/or protected forest areas.

Changes in the main functions of forest areas are carried out in the following areas: a) conservation forests; or b) production forests. Changes in the function of conservation forest areas to protected forest areas and/or production forest areas must comply with the provisions; a) Failing to meet all criteria for protected forest areas in accordance with the provisions of laws and regulations; and b) meet the criteria for conservation forests or production forests in accordance with the provisions of laws and regulations. The change of the function of production forest areas into conservation forest areas and/or protected forest areas must meet the following provisions: a) do not meet the criteria for all production forest areas in accordance with the provisions of laws and regulations; and b) meet the criteria as a conservation forest or protected forest in accordance with the provisions of laws and regulations.

The existence of conservation forests is very important because biological natural resources and their ecosystems as part of natural resources consisting of animal nature, vegetable nature or in the form of natural phenomena, both individually and together have functions and benefits as environmental shaping elements, whose presence cannot be replaced. A number of legislative products that protect conservation areas other than the UUK include Law Number 5 of 1990 concerning the Conservation of Biological Natural Resources and Their Ecosystems, Law Number 23 of 1997 concerning Environmental Management (UULH) which has been replaced by Law Number 32 of 2009 concerning Environmental Protection and Management and Law Number 26 of 2007 concerning Spatial Planning. Forest inventory is carried out to find out and obtain data and information about forest resources, natural wealth potential, and the environment in a complete way. Forest inventory is carried out by conducting a survey on the status and physical condition of the forest, flora and fauna, human resources, and social conditions of the community in and around the forest. Inventory is very necessary to be carried out as the basis for inaugurating forest areas, preparing forest resource balances, preparing forestry plans, and as a forestry information system. And if there is a change in the designation and function of forest areas, it must be determined by the government based on the results of integrated research. Changes in the designation of forest areas that have an important impact and have a wide scope and strategic value, are determined by the government with the approval of the House of Representatives. And the provisions on procedures for changing the designation of forest areas and changing the function of forest areas are regulated by government regulations (Shahadat & Subarudi, 2012).

Forest Area Control in Langkat Regency

Controlling the use of forest areas in Langkat Regency is an important process to ensure that forests can be maintained and managed sustainably. This involves various aspects, including regulation,

monitoring, and community involvement. Forest area control in Lalat Regency, located in North Sumatra Province, Indonesia, is an important issue because the region has tropical forests that are rich in biodiversity and serve as important for local and global ecosystems: Here are some of the key steps in controlling the use of forest areas:

1. **Zoning and Mapping**: Assigning zones or areas with different purposes, such as conservation areas, production areas, and protected areas. Accurate mapping helps in better planning and managing land use.
2. **Regulations and Regulations**: Develop and implement regulations governing the use of forest areas. This includes licensing for activities such as tree felling, agriculture, and development, as well as restrictions to protect sensitive ecosystems.
3. **Monitoring and Law Enforcement**: Overseeing the continuous use of forest areas and enforcing laws to prevent violations. Technologies such as satellites and drones are often used for more effective monitoring.
4. **Conservation and Rehabilitation**: Undertaking conservation efforts to protect threatened species and ecosystems, as well as rehabilitation to restore damaged or degraded forest areas.
5. **Community Involvement**: Involving local communities in the management and protection of forest areas. Education and extension programs can help communities understand the importance of forests and ways to protect them.
6. **Sustainable Management**: Implementing sustainable management practices, such as responsible harvesting and environmentally friendly agricultural techniques, to ensure that forest areas can provide long-term benefits without damaging ecosystems.
7. **Research and Data**: Conduct research to understand the condition of forest ecosystems, the impacts of various activities, and how climate change affects forests. This data is important for making informed and evidence-based decisions.

Forest area control in Langkat Regency requires a holistic and sustainable approach to ensure that forests can continue to provide ecological, economic, and social benefits to communities and the environment.

1. **Forest Protection**
   a. **Conservation Areas**: Langkat has several conservation areas, such as Gunung Leuser National Park, which is part of the Leuser Ecosystem. Control in this area involves monitoring and law enforcement to prevent encroachment, illegal logging, and wildlife poaching.
   b. **Reforestation and Restoration**: Reforestation and forest restoration programs are essential for restoring areas that have been degraded. This involves replanting native trees and restoring ecosystem function.
2. **Natural Resources Management**
   a. **Regulation and Permitting**: Forest management requires strict regulation of permits for the use of natural resources. This includes permits for logging, land use, and other activities that impact forests.
   b. **Community Empowerment**: Involving local communities in forest management can help protect forest areas. Programs such as sustainable forest use and agroforestry can improve community welfare while preserving forests**.**
3. **Law Enforcement**
   a. **Policies and Regulations**: Local and central governments must implement and enforce regulations that protect forests from damage. This includes sanctions for violators and coordination efforts between various related agencies.
   b. **Patrols and Surveillance**: Regular patrols and an effective surveillance system are needed to prevent illegal activities such as illegal logging and forest encroachment.
4. **Education and Awareness**
   a. **Awareness Campaign**: Raising awareness about the importance of forests and the impact of forest destruction on ecosystems and human lives is an important part of forest area control.
   b. **Training and Education**: Provide training to forest management officers and communities on conservation and good management techniques.
5. **Collaboration and Cooperation**

a. **Inter-Agency Cooperation**: Forest area management often involves various government agencies, non-governmental organizations (NGOs), and local communities. Good coordination and cooperation between these parties is very important.
b. **International** Partnerships: Given the importance of forests to the global climate, partnerships with international organizations for technical and financial support are also very beneficial.

Changes in forest areas in Lalat Regency, like in many other areas, can bring various benefits and impacts. Here are some of the possible benefits:

1. **Improved Accessibility and Infrastructure**: With the transformation of forest areas into more open areas, there is usually the development of infrastructure such as roads, bridges, and other public facilities. This can improve accessibility and connectivity between regions.
2. **Economic Development**: Converting forests into farmland, plantations, or industrial areas can open up new economic opportunities, create jobs, and increase local people's incomes. For example, the development of oil palm or rubber plantations can be a major source of income.
3. **Improved Community Welfare**: With new economic opportunities, local communities could experience improvements in quality of life and well-being, such as increased incomes and access to basic services.
4. **Potential for Planned Conservation**: Well-planned forest changes can include conservation areas that protect some important ecosystems, and good management can maintain a balance between development and conservation.
5. **Tourism Development Opportunities**: If done wisely, the development of forest areas can support the tourism industry by creating new destinations, such as ecotourism that focuses on conservation and environmental education.

However, it is important to consider that changes in forest areas can also have negative impacts such as deforestation, biodiversity loss, and other environmental impacts. Therefore, careful planning and sustainable management are needed so that these benefits can be felt optimally without sacrificing the existing ecosystem.

Positive and Negative Impacts of Forest Area Changes in Langkat Regency

Changes in forest areas in Langkat Regency can have a positive impact if managed wisely and sustainably. Here are some of the positive impacts that may occur:

1. **Improving the Local Economy**: Converting forests to agricultural, plantation, or industrial land can open up new economic opportunities, such as jobs in the agricultural, plantation, and processing industries. This can increase the income and quality of life of local communities.
2. **Infrastructure Development**: Changes in forest areas are often accompanied by the development of infrastructure such as roads, bridges, and public facilities. This can improve accessibility and connectivity between regions, as well as facilitate the distribution of goods and services.
3. **Improved Social Welfare**: With new economic opportunities and infrastructure development, local communities could experience improvements in social welfare, including better access to healthcare, education, and public facilities.
4. **Increased State and Regional Revenue**: New economic activities such as commercial agriculture, plantations, or industry can generate additional revenue for local governments through taxes and levies. This income can be used for regional development and social programs.
5. **Tourism Development**: If done with good planning, changes in forest areas can support tourism development, such as ecotourism or adventure tourism. This can attract tourists and provide additional economic benefits to the local community.
6. **Improvement of Technology and Knowledge**: The development of new areas often drives the adoption of new technologies and increased knowledge in resource management. This could include more efficient agricultural techniques, better forest management methods, or other sustainable practices.
7. **Economic Diversification**: With the change in forest areas, the local economy can become more diversified. This reduces dependence on one type of resource and increases the economy's resilience to market fluctuations or natural disasters.

8. **Improved Quality of Life**: Good development can improve people's quality of life by providing better facilities and services, such as decent housing, access to education and health, and recreational and social opportunities.

While there are potential positive benefits, it is crucial to ensure that forest area changes are carried out with good planning and management to minimize their negative impacts. The implementation of sustainable practices, community participation, and protection of areas with high conservation value are key to achieving positive benefits while maintaining the balance of the ecosystem.

Changes in forest areas in Langkat Regency can bring various significant negative impacts. Here are some of the possible impacts:

1. **Loss of Biodiversity**: The conversion of forests to farmland, plantations, or settlements often leads to the loss of natural habitat for flora and fauna. This can threaten forest-dependent species for survival and reduce overall biodiversity.
2. **Deforestation and Environmental Damage**: Deforestation for various purposes can lead to deforestation that reduces the ecological functions of forests, such as carbon sequestration, local climate regulation, and maintenance of the water cycle. It can also lead to soil and water pollution due to the use of pesticides and fertilizers.
3. **Soil Erosion and Soil Quality Degradation**: Forests that are cut down or converted can result in greater soil erosion because the roots of trees that previously held the soil are lost. This can result in a decrease in soil quality and sedimentation in rivers that damage aquatic ecosystems.
4. **Changing Weather and Climate Patterns**: Forests play an important role in regulating the local and global climate. Deforestation can alter rainfall and temperature patterns, as well as contribute to global climate change through increased greenhouse gas emissions.
5. **Impact on Local Communities**: Indigenous peoples or local communities that depend on forests for their livelihoods, such as hunting, gathering, or farming, may experience a decline in resources and a loss of forest-related cultures and traditions.
6. **Forest Fire Risk**: Forest areas that have been converted or not managed properly can increase the risk of forest fires, which can spread and cause further damage to the environment and public health.
7. **Social and Economic Impacts**: Often, changes in forest areas can lead to land conflicts, especially if land rights are unclear or unrecognized. Rapid and unplanned development can also lead to social and economic injustices for local communities.
8. **Decreased Water Quality**: Forest loss can reduce the natural ability of forests to absorb and filter rainwater, which can lead to a decrease in water quality and exacerbate pollution problems.

To mitigate these negative impacts, it is important to apply the principles of sustainable development, conduct careful planning, and involve various stakeholders in decision-making. Good forest management and the implementation of effective conservation policies can help mitigate negative impacts and maintain ecosystem balance.

4. CONCLUSION

Based on the results of the research and discussion in the previous chapter, it can be concluded as follows:

1. **Deforestation and Conversion of Functions**: Langkat Regency, like many other regions in Indonesia, has experienced significant deforestation and conversion of forests for agriculture, plantations, and infrastructure development. These changes are often caused by economic needs and population pressures.
2. **Environmental** Impacts: Changes in forest areas have an impact on the environment, including declining soil quality, declining biodiversity, and changing hydrological patterns. Forest loss also contributes to local and global climate change, such as increased carbon dioxide emissions.
3. **Management and Conservation**: Forest management and conservation efforts are important to mitigate the negative impacts of forest area change. Governments, communities, and the private sector need to collaborate in planning and implementing sustainable conservation strategies.

4. **Policies and Regulations**: Effective implementation of policies and regulations is essential to regulate land use and protect forest areas. Strict law enforcement against illegal logging and forest encroachment is a crucial step.
5. **Role of Local Communities**: The involvement of local communities in forest management and decision-making related to land use can help ensure that changes are made taking into account ecological and social interests.

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