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ANALYSIS OF CHANGES IN FOREST AREA TO OIL PALM PLANTATION LAND IN KUANTAN SINGINGI REGENCY, RIAU PROVINCE

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Abstrak

This study was conducted in Jake Village, Kuantan District, Kuantan Singingi Regency, Riau, where the forest area decreased from 166,618 hectares in 2019 to 165,340 hectares in 2023. This decline is largely caused by the conversion of forest land into oil palm plantations, which, while providing significant economic benefits, also threatens the sustainability of natural forests. The main focus of this research is to thoroughly analyze the land-use change from forest to oil palm plantations, including the identification of driving factors, the impacts generated, and the formulation of strategies for future improvement and development. A qualitative approach was employed, with primary data collected through semi-structured interviews with five informants directly relevant to the land conversion phenomenon. The study found that forest conversion is driven by transmigrant communities' desire for higher income, supported by regional autonomy policies that facilitate regulation and investment. Oil palm cultivation increases income, creates employment, accelerates infrastructure development, and strengthens export positions, but it also causes environmental degradation, reduced water resources and soil fertility, loss of biodiversity, social conflicts, and dependency on global CPO prices. Therefore, oil palm development needs to be sustainable through legal certainty in permits, harmonization of customary and state regulations, ISPO/RSPO standards, strengthening farmer institutions, business diversification, product downstreaming, fulfillment of basic community needs, and environmental conservation. This integrated strategy allows palm oil to become a source of welfare without compromising the environment.

INTRODUCTION

Population growth, both nationally and internationally, is influenced by high birth rates and declining death rates. This increase is accompanied by rising living costs, largely met through the use of natural resources. Exploitative human behavior can put pressure on environmental carrying capacity, putting environmental quality at risk of further decline (Salim, 1986). Development brings significant changes to social and economic aspects, consumption patterns, and the environment. These changes can be both positive and negative. For example, the use of pesticides can increase agricultural productivity, but on the other hand, it also causes pollution and environmental degradation that harm ecosystems (Salim, 1986). Therefore, a balance is crucial between economic development and environmental sustainability.

Forests, as a natural resource, have vital functions, including production, conservation, and preservation. Law No. 41 of 1999 concerning Forestry emphasizes that forests serve as a life support system and a source of prosperity for the people. Forest management must consider sustainability to ensure that social, economic, and ecological benefits are maintained for future generations (Law No. 41 of 1999). Environmental damage often occurs as a result of human activities during development. High-intensity development drives the exploitation of natural resources, both for industrial and agricultural needs, triggering significant changes in land use. Without proper management, this situation has the potential to lead to environmental degradation (Law No. 32 of 2004).

In the context of regional autonomy, Kuantan Singingi Regency in Riau Province utilizes the potential of forest resources for economic growth through the development of oil palm plantations. However, if oil palm plantation activities do not consider environmental aspects, this can have negative impacts on the ecosystem and surrounding communities. Therefore, this study focuses on analyzing the conversion of forest areas to oil palm plantations in Kuantan Singingi Regency to understand the driving factors, impacts, and sustainable management strategies (Law No. 32 of 2004).

RESEARCH METHOD

This study uses a descriptive qualitative approach supported by a SWOT strategic analysis combined with the IFAS–EFAS matrix, quadrant diagrams, and TOWS to formulate a sustainable oil palm plantation management strategy. The research location is in Jake Village, Kuantan Tengah District, Kuantan Singingi Regency, Riau Province**,** chosen because it is a new area with a high intensity of forest conversion to oil palm plantations. Field research was conducted in July–September 2024, while data processing was conducted in June–September 2025.

The research subjects were determined by purposive sampling and involved five main categories: local oil palm farmers, local communities/transmigrants, environmental activists, oil palm companies, and local governments. Data collection techniques included in-depth interviews, field observations, and documentation studies of official documents, statistical data, and related literature. Data analysis was conducted using the Miles & Huberman (1994) model, which consists of data reduction, data presentation, and conclusion drawing. This was then combined with a SWOT

analysis to identify internal and external factors and formulate strategies. Data validity was maintained through triangulation of sources and methods, member checking, peer debriefing, and the use of supporting references. These steps ensure the research results are valid and provide a comprehensive overview of the driving factors, impacts, and strategies for oil palm plantation management in Kuantan Singingi Regency.

RESULTS AND DISCUSSION

The conversion of forests to oil palm plantations in Kuantan Singingi Regency is driven by a combination of transmigration, economic motivations, the role of communities, corporations, investors, and support from local government policies. From the transmigration era until the early 2000s, local communities and migrants began to independently clear oil palm plantations to increase income, followed by companies and individual investors who expanded further. Economic factors were the primary driving force, characterized by high and stable prices for fresh fruit bunches (FFB), market availability, marketing guarantees from plantation companies, and the creation of new jobs that directly benefited the community. Furthermore, regional autonomy policies accelerated forest conversion through the granting of land use permits, thus encouraging the growth of the local palm oil industry. However, despite the economic opportunities opened up, these policies also triggered socio-ecological impacts, including reduced forest cover, the loss of local commodity diversity, and the emergence of agrarian conflicts due to the marginalization of customary rights of indigenous communities. The conversion of forests to oil palm plantations in Kuantan Singingi Regency has had complex impacts, encompassing social, economic, and environmental aspects. From a social perspective, various land conflicts have arisen due to overlapping ownership, customary land claims, and company concessions. Most of these conflicts have been resolved through deliberation, but some cases have escalated to legal proceedings, creating tensions between residents and with companies. Economically, oil palm plantations have been shown to increase community incomes by an average of millions of rupiah per hectare per month, creating numerous jobs for both farmers and laborers, and boosting prosperity and purchasing power, although they have also made communities highly dependent on fluctuations in fresh fruit bunch (FFB) prices. Environmentally, oil palm expansion has led to a decline in water quality and quantity, the loss of several springs, increased soil dependence on chemical fertilizers, river pollution from factory waste, and changes in water systems that cause droughts during the dry season and floods during the rainy season, as well as a reduction in biodiversity due to forest fires. These conditions demonstrate that while oil palm provides significant economic benefits, its sustainability still leaves socio-ecological issues that require serious attention.

management in Kuantan Singingi Regency faces serious challenges due to the high rate of conversion of forest land to plantations. Interviews indicate that although oil palm contributes significantly to community income, its socio-ecological impacts are quite complex, such as agrarian conflicts, soil and water degradation, and reduced biodiversity. Therefore, oil palm management strategies need to be directed towards a sustainable concept that balances economic, social, and environmental aspects ([Obidzinski et al., 2014]; [Dharmawan, 2021]).

In terms of strengths, palm oil offers advantages in the form of high economic value, market certainty, and the potential to improve community welfare. However, weaknesses include over-reliance on palm oil, low economic diversification, and minimal environmental management regulations at the local level. Opportunities exist through the implementation of sustainable certification standards such as ISPO and RSPO, which can increase competitiveness while maintaining environmentally friendly practices. However, threats remain, such as ecosystem damage, prolonged social conflict, and volatility in Fresh Fruit Bunch (FFB) prices on the global market (Pacheco et al., 2017).

Recommended management strategies include: (1) increasing community capacity through technical training in sustainable oil palm cultivation, (2) implementing strict regulations regarding land clearing to prevent deforestation, (3) strengthening village institutions in resolving land conflicts, and (4) encouraging local economic diversification so that it is not solely dependent on oil palm. Synergy between communities, companies, and local governments is needed to ensure that oil palm management is not only oriented towards short-term profits, but also pays attention to ecological sustainability and intergenerational welfare ([Dharmawan, 2021]; [Obidzinski et al., 2014]).

Based on the interview results, a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis was conducted to identify internal and external factors influencing oil palm plantation management. This analysis aims to ensure that the formulated strategy is more aligned with current conditions, more targeted, and has a higher chance of success. The results of the SWOT analysis are presented below as a basis for further strategic considerations.

Table 1 SWOT Analysis

Internal Factors

No	Excess	Weakness
1.	Increasing community income	Water sources are decreasing and quality is declining
2.	Improving the regional economy	Soil fertility decreases
3.	Open up job and business opportunities	The loss of some animals and biodiversity
4.	Improving road access	Monoculture without diversification
5.	Improving school buildings so that educational opportunities are better	Lack of local community involvement, supervision and farmer institutions
6	Improving the electricity network	Floods and droughts
7	Palm oil commodities are superior regional commodities that are exported.	Best management practices have not been fully implemented and management practices do not meet standards.
8	The quality of life of the community is improving	Dust from palm oil truck transportation

	External Factors	
No	**Opportunity**	**Threat**
1.	Infrastructure development	Palm oil price fluctuations
2.	Cooperation between palm oil mills	Environmental pollution
3.	Intercropping with annual crops to meet local food needs	Dependence on palm oil
4.	Strengthening farmer institutions	Fertilizer prices are expensive
5.	Product diversification	Business competition with other entrepreneurs
6.	Building new businesses such as food stalls and transportation services	Palm oil theft
7.	Corporate CSR for community education scholarships	Social conflict due to land disputes
8.	People's welfare through social debt	Climate Change
9.	Empowering farmers through cooperatives	Tough export rules and CFO export bans
10.	The development of the downstream cooking oil industry	Global Environmental Issues and Sustainability

Source: Data processed from the results of interviews with informants, 2025

Next, the weights, ratings, and weight scores are determined in the IFAS and EFAS matrices. This process uses *expert judgment* to assess the significance level of each internal and external factor. The weights are determined by dividing the significance value of each factor by the total significance, so that the total weights equal 1 (David & David, 2016; Satrianto et al., 2023). Once the weights are obtained, positive factors (Strengths and Opportunities) are rated 6–10, while negative factors (Weaknesses and Threats) are rated 1–5. The weight scores are then calculated by multiplying the weights by the ratings, resulting in an IFAS score of 6.123 and an EFAS score of 5.101. These values indicate that the company's internal strengths are relatively dominant and its external opportunities are also quite substantial (Wakerkwa & Munandar, 2022; Hidayat & Jatnika, 2024). Based on these results, the organization's position is mapped to Quadrant I of the SWOT matrix, which is an *aggressive* or *growth-oriented position.* This condition reflects the company's strong internal foundations and significant external opportunities. Strategies that can be adopted in this position include aggressive growth strategies, such as market expansion, product diversification, the implementation of sustainable plantation practices, and green certification to strengthen competitiveness in the global market (David & David, 2016; Pacheco et al., 2017).

Table 2 IFAS Matrix

No	Question	Significant	Weight	Rating	Weighted Score
	Excess				
1.	Increasing community income	3	0.092	9	0.831
2.	Improving the regional economy	3	0.092	9	0.831
3.	Open up job and business opportunities	3	0.092	9	0.831
4.	Improving road access	2	0.062	7	0.431
5.	Improving school buildings so that educational opportunities are better	2.5	0.077	8	0.615
6.	Improving the electricity network	2	0.062	7	0.431
7.	Palm oil commodities are superior regional commodities that are exported.	2	0.062	7	0.431
8.	The quality of life of the community is improving	3	0.092	9	0.831
	Weakness				
1.	Water sources are decreasing and quality is declining	1	0.031	1	0.031
2.	Soil fertility decreases	1	0.031	1	0.031
3.	The loss of some animals and biodiversity	1	0.031	1	0.031
4.	Monoculture without diversification	1	0.031	1	0.031
5.	Lack of local community involvement, supervision and farmer institutions	2	0.062	3	0.185
6.	Floods and droughts	2	0.062	3	0.185
7.	Best management practices have not been fully implemented and management practices do not meet standards.	2.5	0.077	4	0.308
8.	Dust from palm oil truck transportation	1.5	0.046	2	0.092
		32.5	**1**		**6.123**

Source: Data processed from the results of interviews with informants, 2025

Table 2 shows that internal factors consist of eight strengths and eight weaknesses. The total weighted score is 6.123. This indicates that the organization's internal strengths are relatively more dominant than its weaknesses, providing the company with strong capital to optimize its sustainability strategy (Wakerkwa & Munandar, 2022). The External Factor Analysis Summary (EFAS) matrix is used to identify opportunities and threats from the external environment that can impact an organization. Similar to the IFAS, each external factor is weighted based on its significance, then multiplied by its

rating to obtain a weighted score. Opportunities are scored on a scale of 6–10, while threats are scored on a scale of 1–5 (David & David, 2016; Hidayat & Jatnika, 2024). The results of this analysis are presented in Table 4.3.

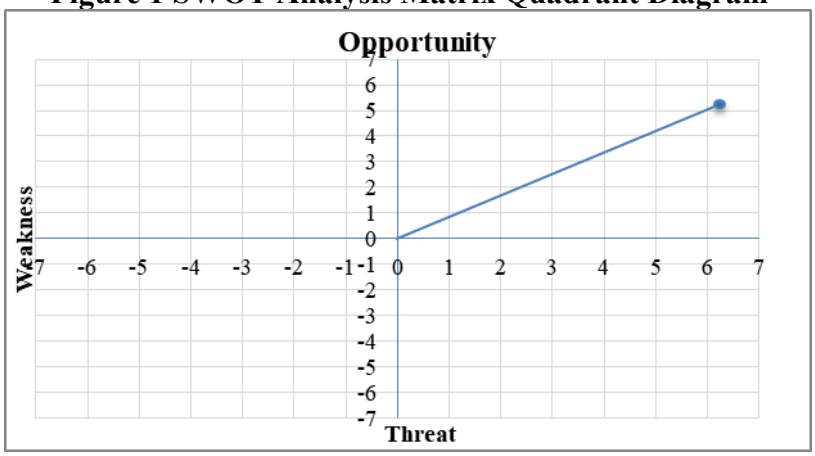
Table 3 EFAS Matrix

No	Question	Significant	Weight	Rating	Weighted Score
Opportunity					
1.	Construction of roads and other public facilities can be better	2.5	0.072	8	0.580
2.	Cooperation between palm oil mills and integration with other sectors	2	0.058	7	0.406
3.	Intercropping with annual crops to meet local food needs	1.5	0.043	6	0.261
4.	Strengthening farmer institutions	2	0.058	7	0.406
5.	Product diversification	2	0.058	7	0.406
6.	Building new businesses such as food stalls and transportation services and support for MSMEs	2.5	0.072	8	0.580
7.	Corporate CSR for community education scholarships	1.5	0.043	6	0.261
8.	People's welfare through social debt	2	0.058	7	0.406
9.	Empowering farmers through cooperatives	2.5	0.072	8	0.580
10.	The development of the downstream cooking oil industry and the management of palm oil plantations with the principle of sustainability	1.5	0.043	6	0.261
WEAKNESS					
1.	Palm oil price fluctuations	1	0.029	1	0.029
2.	Environmental pollution	1	0.029	1	0.029
3.	Dependence on palm oil	1	0.029	1	0.029
4.	Fertilizer prices are expensive	1	0.029	1	0.029
5.	Business competition with other entrepreneurs	2	0.058	3	0.174
6.	Palm oil theft	1	0.029	1	0.029
7.	Social conflict due to land disputes	2.5	0.072	4	0.290
8.	Climate Change	2	0.058	3	0.174
9.	Tough export rules and CFO export bans	1.5	0.043	2	0.087
10.	Global Environmental Issues and Sustainability	1.5	0.043	2	0.087
		34.5	**1**		**5.101**

Source: Data processed from the results of interviews with informants, 2025

Table 4.3 shows that external factors consist of ten opportunities and ten threats, with a total weighted score of 5.101. This value indicates that external opportunities are large enough to be exploited, although there are a number of threats that need to be anticipated.

Figure 1 SWOT Analysis Matrix Quadrant Diagram



The analysis results indicate that the organization is in **Quadrant I (*Aggressive/Growth-Oriented*),** where solid internal strengths are combined with broad external opportunities. This condition allows for the implementation of aggressive strategies such as business expansion, product development, continuous innovation, and global market penetration. Through the TOWS matrix, the resulting strategy includes utilizing strengths to seize opportunities (SO), improving weaknesses with opportunities (WO), using strengths to face threats (ST), and defensive steps to minimize weaknesses and threats (WT). This approach emphasizes the direction of palm oil plantation development that is not only oriented towards economic profit, but also based on environmental sustainability and community welfare. Based on interviews and analysis of internal and external factors, a TOWS matrix was developed to formulate a strategy for sustainable palm oil plantation management. This matrix combines strengths, weaknesses, opportunities, and threats to produce strategic alternatives that are more focused, easy to understand, and relevant to actual field conditions.

Table 4 TOWS Matrix

Factor	Strategy
SO (Strength–Opportunities)	Leveraging internal strengths to seize external opportunities: improving regional economies to support infrastructure, developing downstream palm oil industries, diversifying products, and strengthening farmer institutions.
WO (Weakness–Opportunities)	Reducing weaknesses with external opportunities: restoring soil fertility with environmentally friendly technology, intercropping to reduce monoculture, supporting CSR education, and empowering cooperatives and MSMEs.
ST (Strength–Threats)	Using strengths to face threats: expanding non-palm oil businesses to reduce the risk of price fluctuations, utilizing infrastructure to reduce logistics costs, improving education to reduce social conflict, and sustainable certification to address global issues.
WT (Weakness–	Defensive strategies to minimize weaknesses and threats: water

Threats)	conservation and organic fertilization, area restoration and biodiversity protection, application of environmentally friendly technologies, and diversification of non-palm oil businesses.

Source : Data processed from interview results, 2025

The TOWS matrix analysis reveals a comprehensive combination of strategies. The SO strategy emphasizes leveraging internal potential to strengthen regional development and downstream industries, while the WO strategy focuses more on addressing weaknesses through opportunities such as diversification and strengthening farmer institutions. The ST strategy is aimed at addressing external threats with economic and infrastructure support, while the WT strategy is defensive in nature, maintaining environmental sustainability and mitigating social risks. Overall, this combination of strategies provides a direction for oil palm plantation development that balances economic, ecological, and community welfare aspects.

Factors Driving the Conversion of Forest Land into Oil Palm Plantations in Kuantan Singingi Regency, The change in land use from forest to oil palm plantations in Kuantan Singingi Regency has been going on since the 1990s and has become more massive in the early 2000s. Initially, the transmigration program encouraged local communities and immigrants to manage land for new sources of livelihood, and oil palm was chosen because it was considered to have high economic value and was more stable than other agricultural commodities. Development accelerated as regional autonomy policies provided greater leeway for communities, governments, and companies to manage natural resources. Large corporations and investors began acquiring community land, resulting in the transformation of forests into oil palm plantations through various schemes, including smallholder plantations, plasma schemes, and company-owned enterprises. Economic factors are the primary driver of land conversion, as oil palm offers relatively stable prices, a large market, and guaranteed long-term income. The presence of companies also provides market certainty through partnerships, while creating new jobs in the plantation sector and supporting industries.

Furthermore, government policy support and high global demand for crude palm oil (CPO) have further strengthened the attractiveness of palm oil as a leading commodity. A combination of economic, social, policy, and global market factors has led to rapid forest conversion to oil palm plantations in Kuantan Singingi, particularly since the early 2000s.

The Impact of Forest Land Conversion to Oil Palm Plantations : The conversion of forest land to oil palm plantations in Kuantan Singingi Regency has had complex impacts. On the positive side, communities have seen increased incomes thanks to relatively stable fresh fruit bunch (FFB) prices, easily accessible markets, and ample employment opportunities in the plantation sector and supporting businesses. The presence of companies has also encouraged the development of infrastructure and social facilities, enabling oil palm to develop into a leading regional commodity that contributes significantly to the local economy and national foreign exchange. However, these economic benefits are accompanied by serious negative impacts, particularly on the environment. Forest conversion leads to decreased soil and water quality, loss of biodiversity, increased risk of flooding and drought, and pollution from palm oil mill waste and environmentally unfriendly land-clearing practices. This situation

demonstrates that palm oil expansion has not fully implemented sustainability principles. From a social perspective, oil palm expansion does create jobs and improve the welfare of some communities, but it also triggers land conflicts, weakens customary institutions, and creates economic dependence on a single commodity. When the price of fresh fruit bunches (FFB) falls on the global market, communities become vulnerable due to the lack of alternative income sources. Therefore, future oil palm management needs to be directed towards a sustainable strategy that balances economic, social, and environmental aspects in an integrated manner.

Sustainable Palm Oil Plantation Management Strategy The conversion of forests to oil palm plantations in Kuantan Singingi Regency brings economic benefits but also serious environmental and social impacts. Therefore, oil palm management strategies need to be guided by a sustainable approach that balances economic, social, and ecological interests. Key strategies include implementing clear spatial planning and permitting, recognizing customary rights, and aligning customary rules with state regulations to ensure that plantation practices are not solely profit-oriented but also maintain the sustainability of the local environment and culture. From a technical perspective, sustainable palm oil plantation development can be achieved through the implementation of ISPO/RSPO standards, environmentally friendly practices (zero burning, water conservation, intercropping), and the protection of remaining forest areas. Economic diversification is also crucial to reduce sole dependence on palm oil, for example through downstreaming value-added derivative products (bioenergy, oleochemicals, organic fertilizers) and the development of horticulture and small village businesses. On the institutional side, strengthening cooperatives and farmer organizations is key to improving bargaining power, strengthening village economic solidarity, and encouraging community participation in land management. Companies, through their CSR programs, can also support farmer capacity building, education, and access to environmentally friendly agricultural technology. Thus, sustainability strategies not only ensure productivity and economic stability but also safeguard ecosystems, strengthen local institutions, and sustainably improve the quality of life for communities.

CONCLUSION

This study confirms that forest conversion to oil palm plantations is an unavoidable phenomenon, primarily driven by economic incentives and government policies. However, the resulting social and environmental impacts demand a more comprehensive management strategy. The SWOT analysis and TOWS matrix indicate that the palm oil sector is positioned in the aggressive quadrant, indicating significant opportunities if managed by leveraging internal strengths. This provides room to develop sustainability-based management strategies that emphasize not only profitability but also a balance between ecology, economics, and social aspects. Thus, this research is expected to provide practical and academic contributions to local governments, companies, and communities in formulating more sustainable oil palm plantation management policies and practices. The research findings can also serve as a basis for further, more in-depth studies, particularly regarding efforts to strengthen governance, expand access to environmentally friendly global markets, and ensure the sustainable well-being of communities surrounding plantation areas.

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