Social, environmental and economic impacts of oil palm plantation in Aceh, Indonesia

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ABSTRACT

This study aimed to evaluate the impact of oil palm plantations on the social, environmental, and economic aspects of the local communities residing in the PTP Nusantara 1 company area, located in Tanjung Seumantoh, Karang Baru, Aceh Tamiang District, Aceh Province, Indonesia. The study utilized primary data obtained through the distribution of questionnaires. We employed a rudimentary random sample methodology to gather data from 62 respondents. The model used in this study was a quantitative descriptive analysis method, with scoring done using a Likert scale. The research findings indicate that oil palm farms positively impact the social, environmental, and economic aspects of villages. The index values of social, environmental, and economic aspects strongly indicate that oil palm plantations positively impact social and environmental quality and enhance community livelihoods.

1. Introduction

The development of agriculture and plantations holds significant importance in enhancing national economic growth while improving the standard of living for communities. Development in the agricultural and plantation sectors will foster agribusiness (Hidayah et al., 2020). Opportunities created in agribusiness will stimulate investment in the field, leading to the establishment of companies engaged in oil palm plantations. Establishing such companies in a particular region will have macroeconomic implications for the national economy. It will also impact the communities surrounding the newly established companies' social, environmental, and economic conditions.

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In Indonesia, oil palm plantation companies are one of the key sectors in the economic landscape. These plantation companies often hold a dominant position in social, environmental, and economic development. The plantation sector has a significant impact, both positive and negative. On the positive side, the plantation sector can increase regional revenue, create job opportunities for communities, and contribute to economic growth and development. However, negative national, environmental, political, and cultural impacts arise due to the lack of effective government strategies to safeguard the interests of environmental preservation and the local population (Roanuddin, 2016).

The prospect of developing oil palm cultivation has spread to various provinces across Indonesia, including Aceh Province. Aceh Province is one of the regions rich in natural resources that can be optimized, including agricultural and plantation resources. Agriculture remains the primary livelihood for much of Aceh's population, particularly those living in rural areas. The plantation subsector is one of the driving forces of economic growth in Aceh and is expected to increase income and alleviate poverty.

Aceh Tamiang Regency has a total area of 1,956.72 square kilometers, bordered directly by North Sumatra Province and serving as the gateway to Aceh Province from the east, with its excellent potential lying in agriculture, plantations, animal husbandry, and fisheries sectors. Among these sectors, oil palm plantation is the region's flagship. Aceh Tamiang Regency is dominated by palm plantations and oil palm plantation that process fresh fruit bunches (FFB) into crude palm oil (CPO). According to the Central Statistics Agency of Aceh Tamiang, in 2022, the area of oil palm plantations reached 22,794 hectares with a total palm oil production of 275,918.7 tons and a productivity rate of 14.7 tons per hectare, indicating significant potential for establishing cooking oil mills or other derivatives due to the high demand for cooking oil consumption in the community.

There are several issues related to the influence of oil palm companies, particularly the social, environmental, and economic impacts of oil palm plantation development on communities in Karang Baru District, Aceh Tamiang Regency. The government and all stakeholders must collaborate to create sustainable and responsible oil palm plantation development, ensuring that the surrounding communities receive optimal benefits from the development without sacrificing health and the environment. The continued negative impacts of oil palm plantations necessitate attention from both the companies and local government to balance development with community welfare and environmental concerns. It is crucial to

address potential negative impacts of plantation development, such as environmental degradation and land conflicts between communities and plantation companies. Effective and sustainable plantation management is also necessary to minimize negative impacts while benefiting communities and the economy.

With the description above, the establishment of PTPN 1 Tanjung Seumantoh Palm Oil Mill as one of the oil palm processing plantation companies located in Karang Baru District, Aceh Tamiang Regency, certainly has an impact on the social, environmental, and economic aspects of the communities around the location. The changes from establishing oil palm plantations can bring positive or negative outcomes that may adversely affect the local community.

2. Literature review

2.1. Definition of Impact and types of impact

Social impact involves changes in humans and society due to development activities. According to Fardani (2012), social impact is a consequence that arises due to particular circumstances. The influence mentioned refers to the effects on society, whether it affects the community directly or other aspects within the community.

Impact encompasses everything that arises from the existence of something, which has consequences before or after the occurrence of that thing. In this context, it pertains to the impact on the surrounding environment, including the community's natural and social environments. Environmental impact involves the consequences of activities, whether positive or negative. One of the environmental impacts is the health issues resulting from air pollution caused by oil palm plantation (Sari, 2022).

Environmental impact affects the natural environment and influences the life of plants, animals, and humans. If the natural environment is contaminated, the plants growing in that environment will also be affected, as will the animals living there. Eventually, as living beings, humans will also experience the consequences of pollution.

Economic impact refers to the consequences of policies, events, or conditions that result in positive or negative economic changes. Positive economic impacts include job creation and increased income for the community. On the other hand, negative economic impacts may include local community behavior towards plantation communities (Wati et al., 2020). The development of oil palm plantations has accelerated economic development in rural areas. Economic impacts on the

community can be seen in the economy's growth through increased distribution of goods and services. In plantation areas, there is an increase in the number of small shops opened by the community. Traders capitalize on the market provided by the plantation company, and employees of the company become consumers of these businesses.

2.2. The impact of establishing oil palm plantation companies

According to Law No. 39, 2014, plantations are all activities related to managing natural resources, human resources, production facilities, tools, machinery, cultivation, harvesting, processing, and marketing related to plantation crops. The crops planted are not staple food or vegetables to differentiate them from fruit and horticultural vegetable cultivation, although fruit tree planting is still considered a plantation activity. Typically, the crops grown are large-sized and have relatively long planting periods, ranging from less than a year to perennial.

Oil palm plantation is a company that manages oil palm trees from plantation to CPO production. Usually, each palm oil mill has its oil palm plantation area to manage, or they have partnerships with oil palm farmers to supply the commodity to the respective company. The size of the oil palm plantation owned by a company does not necessarily determine the amount of CPO produced. It all depends on the quantity of oil palm produced per plantation area.

The palm oil industry, commonly known as a palm oil mill, is CPO utilized for various processed products, including food and non-food industries. Food industries utilize CPO for cooking oil, margarine, shortening, cocoa butter substitutes, and vegetable ghee. In contrast, non-food industries include oleochemicals (fatty acids, fatty alcohols, glycerin) and biodiesel (Syahza, 2012).

Palm oil processing involves a series of processes to extract palm oil. The main products obtained from this process include palm oil, palm kernel, palm fiber, palm shell, and empty fruit bunches. In the context of the palm oil industry in Indonesia, a Palm Oil Mill is understood as a unit for extracting CPO and palm kernel from fresh fruit bunches (FFB) of oil palm trees. Palm Oil Mill comprises process units that combine mechanical, physical, and chemical treatments. Key production parameters such as extraction efficiency, yield, and product quality play a crucial role in ensuring the competitiveness of the palm oil plantation industry compared to other vegetable oils. It is important to note that the quality of the resulting CPO is significantly influenced by the condition of the FFB processed in the mill. The processing process

in the mill serves to minimize losses; thus, the quality of the CPO produced does not depend solely on the FFB entering the mill.

Impact refers to a change caused by an activity. An investment effort in development activities has the potential to generate impacts (impacts encompass influences that bring about both positive and negative consequences). The concept of impact is understood as human activities' influence on the development of the environment and humans (Kausar, 2019).

Malisawati (2017) stated that sectoral development has continuously increased the exploitation of natural resources, while the need to conserve and protect natural resources cannot be appropriately implemented. As a result, there is an increasing amount of environmental damage, water pollution, and other problems. Industrial development, on the one hand, brings about changes that impact the socio-economy of the community, but on the other hand, it also brings about negative impacts. These negative impacts include damage and pollution to the surrounding settlement environment, such as road conditions, drainage, clean water, wastewater, and waste management.

3. Methods

3.1. Research approach

Data reduction is the simplification, grouping, or discarding of unnecessary data so that the data can produce meaningful information for conclusions. Data presentation is the activity where information is organized, allowing the possibility of drawing conclusions and taking action. Qualitative data presentation can be narrative text in the form of field notes, matrices, graphs, networks, and charts (Rijali, 2019). Through data presentation, the data will be organized and arranged in patterns of relationships, making it easier to understand.

After obtaining all desired data, the next step is to find conclusions as answers to the research questions. Concluding with verification is done by reviewing both the data reduction and the data display so that the conclusions drawn do not deviate from the analyzed data.

In Table 1 of this research, a Likert Scale is used. The Likert Scale is a research scale used to measure attitudes and opinions. With this Likert scale, respondents are asked to complete a questionnaire requiring them to indicate their level of agreement with a series of questions. In creating a scale, research needs to assume the existence of a natural continuum of a specific attribute. For example, in terms of

agreement with something, the continuum is strongly agreed, agree, neutral, disagree, strongly disagree. Unrelated items cannot be included on the same scale because of the necessity of a continuum in creating a Likert scale (Nazir, 2009).

Table 1. Criteria for Interpreting Scores

Likert Scale	Percentage	Score
Strongly Agree (SA)	80% - 100%	5
Agree (A)	60% - 79,99%	4
Neutral (N)	40% - 59,99%	3
Disagree (D)	20% - 39,99%	2
Strongly Disagree (SD)	0% - 19,99%	1

Source: Nazir (2009)

To obtain accurate data in qualitative research, there are steps needed to analyze qualitatively using Likert Scale formula.

$$Formula = T \times P_n \tag{1}$$

where T is the total number of respondents who chose it, and P_n is the Likert score option. Determine the highest score interpretation result (X) and the lowest score (Y) for the assessment item with the following formula.

$$Y = Highest\ Likert\ score \ \times \ number\ of\ respondents \tag{2}$$
$$X = Lowest\ Likert\ score \ \times \ number\ of\ respondents \tag{3}$$

$$Index\ percentage = \frac{Total\ score}{Y} x\ 100 \tag{4}$$

3.2. Population and sample

Sugiyono (2018) states that a population is a subject or object with specific characteristics. The population used in this study is the Tanjung Seumantoh village community affected by the oil palm plantation company, namely the total population of 1488, with the number of families 414 taken as the population. Sampling is a way of taking samples using specific methods. The sample is part of the number and characteristics possessed by the population. In determining the size of the sample mentioned, if the number of research subjects is less than 100, then in sampling, it is better to take the whole. Furthermore, if the number of subjects is large, it can be taken between 10%-15% or 20%-25% or more. Because the research

subjects numbered above 100, namely 414, the subjects studied were 15%, so the number of research subjects taken was 62 samples.

The sampling technique used in this study uses a simple random sampling method with a sample withdrawal of 15% of each population, which is random sampling without regard to strata (levels) in the population members. That is done if the population members are considered similar or homogeneous. In this study, the population was the head of family (as many as 414 heads of family). The sample used in this study is the Tanjung Seumantoh village community affected by oil palm plantation companies.

4. Results and discussion

4.1. Analysis of community perceptions of oil palm plantation

The Likert Scale assesses the public's views on the social, environmental, and economic implications of oil palm plantation activities. The Likert scale measures individuals' opinions or perceptions about a phenomenon. Results are obtained through responses to questions in a questionnaire administered to the community, using a five-scale option where respondents must choose the most appropriate one about the statements or questions presented by the researcher.

Table 2. The community's perception of the social impact due to the presence of oil palm plantation

Aspect	Indicator	Categories				
		SA	A	N	D	SD
Social impact	The presence of a good relationship between the company and the community	14 (22,58%)	45 (72,58%)	3 (43,83%)	0	0
	There is no conflict between the plantation company and the community.	8 (12,9%)	49 (79,03%)	4 (6,45%)	1 (1,61%)	-
	There is no job loss in the community.	6 (9,67%)	45 (72,58%)	8 (12,9%)	3 (4,83%)	-
Total		54 (29,03)	28 (15,05%)	139 (74,73%)	15 (8,06%)	4 (2,15%)

Source: Results of survey data analysis

Based on the results of the research in Table 2, the presence of oil palm plantation in the social aspect indicates that there is a good relationship between the company and the community, with 14 respondents strongly agreeing or equivalent to 22.58%, 45 respondents agreeing or equivalent to 72.58%, three respondents neutral or equivalent to 4.38%, 0 respondents disagreeing. In the indicator of no conflict

between the plantation company and the community, there are eight respondents strongly agreeing or equivalent to 12.9%, 49 respondents agreeing or equivalent to 79.03%, four respondents neutral or equivalent to 6.45%, one respondent disagreeing or equivalent to 1.61%, and 0 respondents strongly disagreeing. In the indicator of no job loss in the community, there are six respondents strongly agreeing or equivalent to 9.67%, 45 respondents agreeing or equivalent to 72.58%, eight respondents neutral or equivalent to 12.9%, three respondents disagreeing or equivalent to 4.83%, and 0 respondents strongly disagreeing.

Table 3. The community's perception of the environmental impact due to the presence of oil palm plantation

Aspect	Indicator	Categories				
		SA	A	N	D	SD
Environmental Impact	There is clean water quality.	7 (11,29%)	52 (83,87%)	3 (4,83%)	0	0
	Not bothered by the smell originating from the palm oil mill waste.	3 (4,83)	5 (8,06)	9 (14,51)	28 (45,16)	17 (27,41)
	Not bothered by the noise originating from the palm oil mill.	3 (4,83)	30 (48,38)	20 (32,25)	6 (9,67)	3
Total		13	87	32	34	20

Source: Results of survey data analysis

Based on the research results in

Table 3, the presence of oil palm plantation in the environmental aspect indicates that in the indicator of clean water quality, there are seven respondents strongly agreeing or equivalent to 11.29%, 52 respondents agreeing or equivalent to 83.87%, three respondents neutral or equivalent to 4.83%, 0 respondents disagreeing, and 0 respondents strongly disagreeing.   In the indicator of not being disturbed by odors from palm oil mill waste, there are three respondents strongly agreeing or equivalent to 4.83%, five respondents agreeing or equivalent to 8.06%, nine respondents neutral or equivalent to 14.51%, 28 respondents disagreeing or equivalent to 45.16%, and 17 respondents strongly disagreeing or equivalent to 27.41%.   In the indicator of not being disturbed by noise from oil palm plantation, there are three respondents strongly agreeing or equivalent to 4.83%, 30 respondents agreeing or equivalent to 48.38%, 20 respondents neutral or equivalent to 32.25%, six respondents disagreeing or equivalent to 9.67%, and three respondents strongly disagreeing or equivalent to 4.83%.   Based on the research,

it is known that in terms of environmental impact, the community's responses are as follows: strongly agree with 13 points, agree with 87 points, neutral with 32 points, disagree with 34 points, and strongly disagree with 20 points.

Table 4. The community's perception of the economic impact due to the presence of oil palm plantation

Aspect	Indicator	Categories				
		SA	A	N	D	SD
Economic impact	Increasing community income due to the presence of the company	27 (43,54%)	27 (43,54%)	5 (8,06%)	3 (4,83%)	0
	Improving the welfare of the community	9 (14,51%)	47 (75,8%)	3 (4,83%)	3 (4,83%)	0
	The availability of increased employment opportunities for the community	18 (29,0%3)	38 (61,29%)	4 (6,45%)	2 (3,22%)	0
Total		54 (29,03)	112 (60,21)	12 (6,45)	8 (4,30)	0

Source: Results of survey data analysis

Based on the research findings in Table 4, the presence of palm oil plantations in the economic aspect indicates an increase in community income due to the company's existence, with 27 respondents strongly agreeing, equivalent to 43.54%, and 27 respondents agreeing to 43.54%. Additionally, five respondents remained neutral, equivalent to 8.06%, while three respondents disagreed and no respondents strongly disagreed. Nine respondents strongly agreed to improve community welfare, equivalent to 14.51%, and 47 agreed to 75.80%. Meanwhile, three respondents were neutral, equivalent to 4.83%, and three respondents disagreed, with no respondents strongly disagreeing. Regarding the indicator of increasing job opportunities for the community, 18 respondents strongly agreed, equivalent to 29.03%, and 38 respondents agreed, equivalent to 61.29%. Additionally, four respondents were neutral, equivalent to 6.45%, and two respondents disagreed, with no respondents strongly disagreeing. Based on the research results, it is known that in terms of economic impact, respondents who strongly agreed totaled 54 points, those who agreed totaled 112 points, those who were neutral totaled 12 points, and those who disagreed totaled 8 points.

4.2. Social, environmental and economic aspects of oil palm plantations

Based on Table 5, the calculations using the Likert scale above, it is known that the impact of oil palm plantations on the social aspect is the establishment of a good

relationship between the company and the community, which is an obligation for every company to fulfil its responsibility regarding the livelihood of the surrounding community. The percentage obtained regarding the improvement of the relationship between the company and the community is 83.5%, which means that the community largely agrees that there is a good relationship with the oil palm plantation company. This is because there is a good relationship between the local community and the surrounding community, which is a requirement for the company, wherever they are located, to avoid prolonged conflicts with the surrounding community.

Table 5. Results of the analysis on the social aspect

Social Aspect	Respondent's Answers		Frequency Score
The existence of a good relationship between the company and the community	SA	14	70
	A	45	180
	N	3	9
	D	0	0
	SD	0	0
	Total		259
Percentage Index = Total score/Y x 100			83,5%
There is no conflict between the plantation company and the community	SA	8	40
	A	49	196
	N	4	12
	D	1	2
	SD	0	0
	Total		250
Percentage Index = Total score/Y x 100			80,6%
There is no job loss in the community	SA	6	30
	A	45	180
	N	8	24
	D	3	6
	SD	0	0
	Total		240
Percentage Index = Total score/Y x 100			77,4%
Total results of the social aspect: 80,53%			

Source: Results of survey data analysis

To indicate no conflict between the plantation company and the community, the efforts to avoid conflict are to provide justice to the surrounding community. The strongly agreed community is 8, with a frequency score of 40. Agree is 49 with a frequency score of 196, neutral is 4 with a frequency score of 12, and disagree is 1 with a frequency score of 2. The percentage obtained for the absence of conflict between the plantation company and the community is 80.6%, which means that

the community largely agrees that there is no conflict between the plantation company and the community because the company has a good relationship and communicates with the surrounding community.

For the indicator of no job loss in the community, the oil palm plantation company plays a vital role in the local community, especially in increasing the workforce for the plantation company. This is because the company can see the quality of local human resources that can be improved through education quality. The strongly agreed community is 6, with a frequency score of 30. Agree is 45 with a frequency score of 180, neutral is 8 with a frequency score of 24, and disagree is 3 with a frequency score of 6. The percentage obtained for the absence of job loss in the community is 77.4%, which means that the community largely agrees that there is no job loss. The oil palm plantation company can see the quality of local human resources that can be improved through education.

From these three social aspect indicators, the index value obtained is 80.53%, which means that the community strongly agrees that the presence of oil palm plantations has a positive impact.

Table 6. Results of environmental aspect analysis

Environmental aspect	Respondent's Answers		Frequency Score
There is clean water quality.	SA	7	35
	A	52	208
	N	3	9
	D	0	0
	SD	0	0
Percentage Index = Total score/Y x 100	Total		252
			81,2%
I was not disturbed by the smell originating from the waste of oil palm plantation.	SA	3	15
	A	5	20
	N	9	27
	D	28	56
	SD	17	17
Percentage Index = Total score/Y x 100	Total		135
			43,5%
I was not disturbed by the noise originating from the palm oil mill.	SA	3	15
	A	30	120
	N	20	60
	D	6	12
	SD	3	3
Percentage Index = Total score/Y x 100	Total		210
			67,7%
Total results of the environmental aspect: 80,53%			
Source: Results of survey data analysis			

From Table 6, the calculations using the Likert scale above show that the impact of palm oil plantations on the environment is the presence of clean water quality. The positive impact of oil palm plantation on the environmental health conditions of settlements can be seen from the condition of the water that meets physical requirements, namely water that is odorless, tasteless, colorless, precise, or transparent. The community members who strongly agree are 7 with a frequency score of 35, 52 with a frequency score of 208, and 3 with a frequency score of 9. The obtained figure from the indicator of not being disturbed by the odor from palm oil mill waste is 81.2%, which means that the community strongly favors clean water quality. Settlements in Tanjung Seumantoh already have water sources from the local water utility (PDAM) or private bore wells in each house. However, some using water from bore wells have a slightly turbid color.

For the indicator of not being disturbed by the odor from palm oil mill waste, the odor is an unpleasant and unwanted aroma that the sense of smell can sense. The community members who strongly agree are 3, with a frequency score of 15. Agree is 5 with a frequency score of 20, neutral is 9 with a frequency score of 27, disagree is 28 with a frequency score of 56, and strongly disagree is 17 with a frequency score of 17. The obtained figure for not being disturbed by the odor from palm oil mill waste is 43.5%, which means that the community is relatively undisturbed by the odor from palm oil mill waste. The odor from palm oil mill waste will be noticeable during the daytime, in the scorching sun, and during the dry season. The odor will decrease or disappear during the evening until nighttime or when it rains.

For the indicator of not being disturbed by the noise from the palm oil mill, the community members who strongly agree are 3, with a frequency score of 15. Agree is 30 with a frequency score of 120, neutral is 20 with a frequency score of 60, disagree is 6 with a frequency score of 6, and strongly disagree is 3 with a frequency score of 3. The obtained figure for not being disturbed by the noise originating from the palm oil mill is 67.7%, which means that the community tends to agree that they are not disturbed by the noise from the palm oil mill.

From the Table above, it is known that for the presence of clean water quality, a frequency score of 252 is obtained, not being disturbed by the odor from the palm oil mill waste is 135, and not being disturbed by the noise originating from the palm oil mill is 210. From these three environmental aspect indicators, an index value of 64.19% is obtained, which means that the community agrees that the presence of oil palm plantation has a positive impact.

Table 7. Results of economic aspect analysis

Economic Aspect	Respondent's Answers		Frequency Score
Increasing the income of the community due to the presence of the company	SA	27	135
	A	27	108
	N	5	15
	D	3	6
	SD	0	0
	Total		264
Percentage Index = Total score/Y x 100			85,1%
Improving the welfare of the community	SA	9	45
	A	47	188
	N	3	9
	D	3	6
	SD	0	0
	Total		248
Percentage Index = Total score/Y x 100			80%
The existence of increased job opportunities for the community.	SA	18	90
	A	38	152
	N	4	12
	D	2	4
	SD	0	0
	Total		258
Percentage Index = Total score/Y x 100			83,2%
Total results of the economic aspect: 82,79			

Source: Results of survey data analysis

The calculation using the Likert scale in Table 7, it is known that the impact caused by the oil palm plantation on the economic aspect is the increase in community income. The community who strongly agrees is 27, with a score frequency of 135, and those who agree are 27, with a score of 108. Neutral is 5 with a score frequency of 15, and disagree is 3 with a score of 6. The obtained figure for the improvement of community welfare is 85.1%, which means that the community strongly agrees that the oil palm plantation has an impact on increasing community income because the company can bring changes or improvements to their income. One indicator of income is employment, where the community's income is not only from working in the industrial sector but also from other jobs, such as opening rice stalls, grocery stores, and other small businesses. Thus, it increases income for the surrounding community.

To improve community welfare, community welfare means fulfilling basic human needs, including food, drink, clothing, shelter, health, education, and community security. The strongly agreed community is 9, with a score frequency of 45. Agree is 47 with a score frequency of 188, neutral is 3 with a score frequency of 9, and

disagree is 3 with a score frequency of 6. The obtained figure for the improvement of community welfare is 80%, which means that the community strongly agrees that the oil palm plantation impacts community welfare. The community can now fulfill their basic needs and even meet their livelihood needs; for example, it now has motorcycles, mobile phones, and other things, so the community feels prosperous.

For the indicator of the increase in job opportunities for the community, the community that strongly agrees is 18, with a score frequency of 90. Agree is 38 with a score frequency of 152, neutral is 4 with a score frequency of 12, and disagree is 2 with a score frequency of 4. The establishment of oil palm plantations has led to more job opportunities for the community to work in the plantation. The obtained figure for the increase in job opportunities for the community is 83.2%, which means that the community strongly agrees that the oil palm plantation has an impact on increasing job opportunities for the community. From the three economic aspect indicators, the obtained index value is 82.79%, which means that the community strongly agrees that the existence of oil palm plantations has a positive impact.

5. Conclusion

The results show that the presence of oil palm plantation positively impacts rural communities' social, environmental, and economic conditions. The social aspect index obtained a high score, indicating substantial agreement that the existence of the palm oil mill has had a positive impact on the community's social conditions. The environmental aspect index obtained a high score, which also shows agreement that the presence of oil palm plantation positively impacts environmental aspects. Likewise, the economic aspect index obtained a high total score, which also shows strong agreement from the community that the existence of the palm oil mill has a positive impact on the economic aspects of the community. It can be concluded that, in general, the presence of oil palm plantations is significant for improving the welfare of the local communities near the oil palm plantation.

Conflict of interest

Acknowledgments

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