The Effect of Sustainable Pillars (Economic, Social, Environmental) and Security Factors on Sustainable Palm Oil in Nagan Raya District – Aceh

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ABSTRACT

Palm oil is a god-given plant that provides various benefits and advantages for humans. But in a natural context the oil palm industry is also under great pressure through various weaknesses from the palm oil industry itself. This research raises the influence of sustainable pillar factors economic, social, environmental and security factors for sustainable palm oil in Nagan Raya District - Aceh. The results showed that economic, social, environmental and safety factors had a positive influence on sustainable palm oil where environmental factors have the biggest influence. The relationship follows the formulation $Y = 0.153+0.241X1+0.221\ X2+0.254\ X3+0.231\ X4+e$. Simultaneously and partially economic, social, environmental and security factors have a strong relationship with sustainable palm oil, where the influence or relationship is 60.90%. Palm oil potential the big one in supporting the community's economy and regional development in Nagan Raya Regency requires the role and attention of stakeholders in maintaining the sustainability of oil palm by giving attention to sustainable factors of palm oil itself.

Keywords: Sustainable palm oil, sustainable pillars, security.

INTRODUCTION

A country that wants sustainable development in principle must start from the agricultural sector with commodities with market orientation, highly competitive, has real growth, is environmentally friendly and is integrated with other sectors (Todaro, 2011). Palm oil and its derivatives have these criteria (Pirker et al., 2016) and economically able to guarantee the availability of vegetable oil and cheap renewable energy sources (Chin et al., 2013; Bicalho et al., 2016).

Plants that have been known since the time of the Pharaohs in Egypt or about 5,000 years BC (Kumar et al, 2018) are a food source of vegetable oil, and currently has become one of the excellent plantations. World vegetable oil needs of 195 million tons in 2017 as much as 37.6% came from palm oil, and the remaining 30% from soybeans, 32.4% of combined canola oil, sunflower, peanuts and cottonseed (USDA, 2017). In Indonesia as the world's largest palm oil producing country, palm oil fills the export value of Rp. 265 trillion providing 16.3 million jobs in the form of 4.3 million direct jobs and 12 million indirect jobs, in energy security replaces the use of 2.3 million kilo liters of diesel as a fossil fuel through the Mandatory Biodiesel program August 2015 - April 2018 which provides foreign exchange savings of 2.26 billion US $ or Rp. 30 trillion (Indonesian Ministry of Agriculture, 2019).

On the other hand palm oil development also has an impact on human life and environmental balance (Kospa, 2016; Khatun et al., 2017), so it is necessary to get proper management in the concept of sustainable palm oil. Sustainable palm oil which is part of the concept of sustainable development is basically development carried out with reference to the supply of current needs without compromising the needs of future generations (Hasna, 2007; Dehen et al., 2013; Pirker et al., 2016). This condition will be obtained if there is integration and balance of the three pillars of sustainability, namely economic, social and environmental which mutually reinforce one another (Munusinghe, 1993 in Suaedi, 2007; Adiatmojo, 2008; Hasna, 2007; Dehen et al., 2013, Fauzi and Octavian, 2014; Pirker et al., 2016; Khatun et al., 2017).

Some researchers develop the dimensions of sustainability are more situational according to the sustainability goals to be carried out. For example the addition of institutional dimensions by CIFOR to forestry development (Suaedi, 2017) and fisheries development (Charles, 2001; CSD, 2001), technological institutions and security defense in coastal area development (FAO, 1995, in Adiatmojo, 2008), technology and institutions (Ruslan et al., 2013), infrastructure and law (Suwondo et al., 2011), transparency and innovation development (Daud and Panuntun, 2013), capital, technical and labor (Karim et al., 2016).

Besides the various dimensions that have been offered, the security factor cannot be ignored in sustainable development. For example, ethnic conflict in India has disrupted community activities, the economic system and development (Varsney, 2002). Likewise conflicts that occurred in Indonesia from the late 1990s to early 2000 such as in Maluku, Papua and Poso (Buchanan et al., 2011); West and Central Kalimantan (Dharmawan, 2006; Cahyono, 2008) and the Aceh conflict that ended August 15, 2005 (Martono, 2009; Saifuddin et al., 2015; Zainal, 2016). At present the context of palm oil sustainability is receiving very serious attention from palm oil stakeholders (Basiron, 2007; Ivancic and Koh, 2016). Global palm oil stakeholders formed a Roundtable Sustainable Palm Oil (RSPO) organization, Indonesia formed the Indonesian Palm Oil (ISPO) (Cattau et al., 2015; Penaranda et al., 2015; Hidayat et al., 2018).

Like several other provinces in Indonesia, palm oil plants in Aceh have become a mainstay of the people's economy. From

14.03 million hectares of Indonesian palm oil plantations, Aceh filled 537 thousand hectares or ranked 9th in 2017 (BPS Indonesia, 2018). Nagan Raya District as a research area is an area that has the largest palm oil plantations in Aceh (Aceh Agriculture and Plantation Office, 2018). In Nagan Raya District during the Dutch Colonial period, in 1926 the Belgian company Sociate Des Cautthautc Medan SA, which is now called PT. Socfin Indonesia first established palm oil plantations in the Seumayam and Seunagan areas (Gustina, 2011; Suprianto et al., 2015). Since then, oil palm has been known and developed in the Aceh West Coast region.

This development is supported by climatic conditions that are very suitable for palm oil plants, including sufficient solar radiation during the day and the amount of rain that generally falls at night (Nasution, 2015). Gradually the development of smallholder palm oil plantations in Nagan Raya District began in the 1980s, which is the development of the transmigration area in this region, and rapid development occurred after the signing of a peace agreement between the Free Aceh Movement (GAM) and the Republic of Indonesia (NKRI) on August 15, 2005. Security conditions conducive to supporting economic activities including the development of palm oil plantations by farmers.

At present the potential of palm oil plantations in Nagan Raya Distrct according to 2018 data is recorded to have an area of 100,547 hectares, consisting of 47,756 hectares of palm oil smallholder and 52,791 hectares of company plantations. This area occupies 28.37% of the Nagan Raya District area. An area of 47,756 hectares of palm oil smallholders is owned by 21,245 head of household (HH) farmers or 51.88% of 40,950 HH in Nagan Raya District. Specifically the community's palm oil plantations were built with community self-help and government assistance without plasma plantation companies. Contribution to community income, smallholder palm oil plants produce 1,046,365 tons of FFB per year with a value of Rp. 1,046,365,000,000. This amount was allocated to farmers by Rp. 42,252,299, - per HH per year or Rp. 4,104,248, - per family per month (Dishutbun Nagan Raya, 2018; BPS Nagan Raya, 2018). This value has met the farmers' income standards of Rp. 4.16 million / month (Kementan, 2014).

The big potential of palm oil in Nagan Raya Regency and the importance of the condition of palm oil sustainability need attention to be researched. So it is known the effect of sustainable pillars economic, social and environmental and the security factor for sustainable palm oil in Nagan Raya District.It is hoped that the results of this study can become guidelines and be used to minimize failures dan bad impact from the development of palm oil in Nagan Raya District.

RESEARCH METHODS

Research Time and Location
This research was do it in May-October 2019 in Nagan Raya Regency, Aceh Province. The selection of the research area was based on the consideration that in Nagan Raya District palm oil plantations had an important role in the community economy and is the largest palm oil plantation in Aceh Province.

Research Data
The study was conducted descriptively using primary and secondary data. Primary data obtained through questions raised by respondents using research questionnaires with answers compiled based on a Likert scale namely : Very Appropriate score of 5; Appropriate score 4; Neutral score of 3; Not appropriate score 2; Very Not appropriate Score 1. Secondary data obtained from literature and institutions or organizations related to research needs.

Population and Sample
The population of this research is the stakeholders of sustainable palm oil in Nagan Raya District, including palm oil farmers, oil palm plantation employees, former combatants of the Free Aceh Movement (GAM), civil servants (PNS), academics/NGOs, plantation entrepreneurs, Indonesian Sodier (TNI)/Indonesian Police (Polri) who all also double as palm oil farmers. Sampling was done purposively, are people who worked on and understood oil palm plantations, the number of respondents in each group and the sampling technique according to Table 1.

Table 1. Research Respondents.

No	Description	Amount Taking Sample (Persons)	Sample
1	Palm oil farmers	110	Purposive Sampling
2	Employees of plantation companies	68	Snow Ball Sampling
3	Former GAM combatant	27	Purposive Sampling
4	Government officials / employees (PNS)	27	Purposive Sampling
5	Academics / NGOs	14	Purposive Sampling
6	Oil palm plantation entrepreneur	27	Purposive Sampling
7	Soldiers / Police	27	Purposive Sampling
	Total	300	

Source: Research Data (2019).

Research Variables and Indicators
Research variables are attributes, traits, values or activities that have certain variations, determined by researchers to be

studied and drawn conclusions (Sugiyono, 2013). The dependent variable (Y) of this research is sustainable palm oil while the independent variables are Economy (X1), Social (X2), Environment (X3) and Safety (X4). Research indicators are basic guidelines or standards of reference in measuring research variables, this research indicator was adopted from the RSPO, ISPO and expert opinions according to Table 2.

Table 2. Research Variables and Indicators.

Code	Indicators
Y_1	Improving the community's economy
Y_2	Company income
Y_3	Economic growth outside the plantation sector and regional economy growth
Y_4	Concern of plantation companies towards the community around the company
Y_5	Increased social status of the community.
Y_6	Plantation company compliance with laws and regulations.
Y_7	Understanding of Indonesian sustainable palm oil (ISPO).
Y_8	The commitment of plantation companies and farmers does not damage the environment
Y_9	Land fires and floods caused by oil palm plantations
Y_{10}	Conflict between humans and human conflicts with wildlife due to the development of oil palm plantations.
Y_{11}	Driving the reintegration of former GAM combatants
Y_{12}	The role of oil palm plantations in suppressing crime

Independent Variable Economics (X₁)

Code	Indicators
X1.1	Financial plan for the sustainability of the plantation business
X1.2	Increased income of employees and farmers
X1.3	Increased of the people's economy.
X1.4	Palm oil plantation business income so it is feasible to be developed..
X1.5	Business partnership of plantation companies with communities around the company
X1.6	Economic business growth in the community in the presence of oil palm plantations

Independent Variable Social (X₂)

Code	Indicators
X2.1	Transparency in data information in the implementation of palm oil plantations
X2.2	Compliance with plantation business regulations
X2.3.	Compliance with land ownership status regulations
X2.4	Improved social status of the community due to palm oil plantations
X2.5	The concern of plantation companies in helping palm oil farmers
X2.6	The level of racial and gender discrimination, not employing children, implementing the company's Occupational Safety and Health (K3) program in managing the workforce.
X2.7	Development of employee cooperatives, labor organizations, religious groups and farmer organizations by companies
X2.8	The existence of an active organization or association of oil palm farmers..

Independeni Variable Environment (X₃)

Code	Indicators
X3.1	Environmental damage due to oil palm plantations.
X3.2	Destruction of rare plants and killing of protected animals.
X3.3	Use of fire in land clearing or other operations, maintaining land / forest fires.
X3.4	Understanding that damaging the environment will harm themselves.
X3.5	Planting in restricted areas such as forest / protected forests or other restricted areas.

Independent Variable Security (X₄)

Code	Indicators
X4.1	Land conflicts between companies and communities, between communities and communities, and communities with wildlife.
X4.2	Company conflicts with workers or the community around the plantation.
X4.3	Support for the reintegration of former GAM combatants.
X4.4	Security in carrying out regional development.
X4.5	Relationship with the level of crime in the community.

Sources : RSPO; ISPO; Fauzi andn Oktavianus (2014); Permentan No.26-2007; Inbushi et al (2003); Hooijer et al. (2006); Cotula et al. (2008); Saputri and Bantasyam (2018); Aprianto (2009); Saifuddin et al. (2015); Carius (2007).

Data Analysis Method.
Descriptive analysis was conducted as a review of the existing condition of palm oil plants in Nagan Raya District. Validity analysis is used to measure the extent of the accuracy of an instrument or measuring instrument in measuring what is measured. Validity analysis used is Bivariate Pearson correlation (Product Moment Pearson). Reliability analysis is used to see the extent to which the results of a measurement can be trusted, relied upon and remain consistent if the measurements are made repeatedly on the same group at different times or opportunities. The reliability analysis used is the Cronbach's Alpha method.
Multiple linear regression analysis is used to see the effect of sustainable pillars economic, social, environmental and

security factors towards sustainable palm oil in Nagan Raya District with the following regression formulation:

(1)

Y   = Dependent Variable Palm Oil Sustainable.
a= Constanta Value
b1 ... b4 = Variable Coefficient

X1   = Independent Variable Economics
X2   = Independent Variable Social
X3   = Independent Variable Environment
X4   = Independent Variable Security
e   = Disturbing factors or variables not included in the study

Multiple correlation analysis (R) is used to determine the relationship between two or more independent variables (X) to the dependent variable (Y) simultaneously. Analysis of determination (R^2) is used to determine the percentage of contribution, influence, the ability of the model to explain the effect of the independent variable (X) simultaneously on the dependent variable (Y).

Simultaneous Influence Analysis or the F test is used to determine whether all independent variables in the regression model simultaneously affect to dependent variable. Partial influence analysis or t test is used to determine whether in the regression model the independent variable partially or itself influences to dependent variable.

RESULTS AND DISCUSSION.

Validity and Reliability Analysis.

Validity analysis is done by Bivariate Person or Pearson Product Moment Correlation comparing r count with r table, where this test correlates each item score with the total score. The Pearson Correlation total score results for each variable according to Table 3.

Table 3. Validity Analysis of Dependent and Independent Variable

Pearson Correlation (Y)			Pearson Correlation (X₁)			Pearson Correlation (X₂)		
Question	Total Score	Information	Question	Total Score	Information	Question	Total Score	Information
Y_1	0,322	Valid	$X_{1.1}$	0,712	Valid	$X_{2.1}$	0,627	Valid
Y_2	0,647	Valid	$X_{1.2}$	0,760	Valid	$X_{2.2}$	0,648	Valid
Y_3	0,584	Valid	$X_{1.3}$	0,595	Valid	$X_{2.3}$	0,556	Valid
Y_4	0,727	Valid	$X_{1.4}$	0,474	Valid	$X_{2.4}$	0,373	Valid
Y_5	0,548	Valid	$X_{1.5}$	0,547	Valid	$X_{2.5}$	0,681	Valid
Y_6	0,596	Valid	$X_{1.6}$	0,492	Valid	$X_{2.6}$	0,525	Valid
Y_7	0,745	Valid	X_{1Tot}	1,00	-	$X_{2.7}$	0,506	Valid
Y_8	0,550	Valid	N	300	-	$X_{2.8}$	0,501	Valid

Pearson Correlation (X₃)			Pearson Correlation (X₄)			Reliability Statistics			
Question	Total Score	Information	Question	Total Score	Information	Variable	N of Item	Croncbach's Alpha	nformation
$X_{3.1}$	0,433	Valid	$X_{4.1}$	0,720	Valid	Y	13	0,745	Reliable
$X_{3.2}$	0,396	Valid	$X_{4.2}$	0,664	Valid	X_1	7	0,670	Reliable
$X_{3.3}$	0,582	Valid	$X_{4.3}$	0,689	Valid	X_2	9	0,707	Reliable
$X_{3.4}$	0,133	Valid	$X_{4.4}$	0,709	Valid	X_3	6	0,771	Reliable
$X_{3.5}$	0,713	Valid	$X_{4.5}$	0,723	Valid	X_4	6	0,777	Reliable
X_{Tot}	1,000	-	X_{1Tot}	1,000	-				
N	300	-	N	300	-				

Source: Research Data (2019).

Table 3 shows that the validity test of the independent variable question of Sustainable Palm Oil (Y), the independent variables Economic (X1), Social (X2), Environment (X3), and Security (X4) each have a Total Pearson Correlation Score bigger than r Pearson Product Moment table 0.113. This condition shows that all questions used as indicators of research are valid and suitable for use in research. Furthermore, the reliability test shows that the Croncbach's Alpha value of the dependent variable is Sustainable Palm Oil (Y), the independent variables Economic (X1), Social (X2), Environment (X3), and Security (X4) above 0.6 which indicates that all questions which is used as an indicator of research is declared reliable or consistent (Priyatno, 2010; Sujarweni, 2014). This means that the research variable questions that are used show stability or consistency if used on different respondents will give results that are not much different.

Table 4. Multiple Linear Regression Analysis.

Model	Unstandda rdized B		Standardize d Model Coefficients	Model Summery		Anova
		t	Sign R	0,78 1	F	115,10 8
Constanta	0,153	0,858	0,392 R^2	0,60 9	Sig n	0,000
X 1 (Ekonomi)	0,241	4,690	0,000	Adjuste d R^2 0,60 4		
X_2 (Social)	0,221	5,350	0,000			
X 3 (Environmen t)	0,254	4,992	0,000	= t tabel $_\alpha$1,96 $_{0,05}$ 8		
X 4 (Security)	0,232	4,597	0,000	F Tabel $_{\alpha\ 0,05}$ = 2,402		

Source: Research Data (2019).

Correlation and Determination Analysis

Correlation Analysis (R) in the Summary Model is a value used to determine the relationship between two or more independent variables (X) to the dependent variable (Y) simultaneously, if the value is approaching to one it means the relationship is getting stronger otherwise if the value is approaching to zero the relationship is getting weaker. Guidelines that can be used to provide correlation coefficient (R) interpretations are: 0.00 - 0.199 very low; 200-0.399 low; 0,400-0,599 moderate; 0,600-0,799 strong; and 0,800-1,00 very strong (Priyatno, 2010). Correlation value (R) of 0.781 indicates that the relationship between the independent variables Economic (X1), Social (X2), Environment (X3) and Safety (X4) to the dependent variable Sustainable Palm Oil (Y) is strong because it lies between 0.600-0.799.

Furthermore Determination analysis (R²) explains that if the value is approaching to one, the stronger the regression model in explaining the relationship of the independent variable to the dependent variable in contrast, if the value is approaching to zero, the regression model is weak in explaining the relationship between the two variables (Priyatno, 2010; Sujarweni, 2014). Determination coefficient (R ²) value of 0.609, this value implies that the independent variables Economic (X1), Social (X2), Environment (X3) and Safety (X4) affect 60.90% of the dependent variable Sustainable Palm Oil (Y) while the remaining 39.10% is explained or influenced by other variables not included in the research model.

Multiple Linear Regression Analysis

Based on the Undestandarized B data in Table 4 the results of the analysis of research data, the linear regression equation of research can be arranged as follows:

$$Y = 0,153 + 0,241X1 + 0,221\ X2 + 0,254\ X3 + 0,231\ X4 + e \quad (2)$$

This equation explains that without the dependent variables Economy (X1), Social (X2), Environment (X3) and Security (X4), Sustainable Palm Oil (Y) continues in Nagan Raya District by 0.153 units. Four independent variables have a positive regression coefficient (+), this means that each increase in the independent variable will be followed by an increase in the dependent variable of sustainable palm oil. Each increase of 1 unit of the variable Economy (X1) will increase 0.241 unit of the dependent variable, increase of 1 unit of the Social (X2) will increase 0.221 unit of the dependent variable, an increase of 1 unit of the Environment (X3) will increase 0.254 unit of the dependent variable, and an increase of 1 unit Security (X4) will increase 0.231 units of the dependent variable. From the independent variables studied the Environmental variable (X3) has the highest coefficient of 0.254, its meaning that the environmental variable has the biggest influence on sustainable palm oil in Nagan Raya District.

Simultaneous Influence Test (F Test)

The test of simultaneous or joint influence (Test F) is used to determine whether the independent variables simultaneously or jointly affect the dependent variable. Variant Analysis test results (Anava) Table 4 obtained the calculated F value of 105.108. This value is bigger than the F value of table 2.402. This means that simultaneously the independent variables Economy (X1), Social (X2), Environment (X3) and Security (X4) take affect to the dependent variable Sustainable Palm Oil (Y).

Partial Influence Test (t test)

Partial influence test or one to one influence test (t test) is used to determine whether the independent variable partially or separately affects the independent variable. The t-test partial test values of each independent variable in Table 4 include Economic (X1) 4,690, Social (X2) 5,350, Environment (X3) 4,992 and Security (X 4) 4,597 which are bigger than t-Table 1,968. This condition shows that each independent variable partially or one to one influences the dependent variable Sustainable Palm Oil (Y) in Nagan Raya District.

Based on the analysis conducted shows that sustainable pillars consisting of economic, social, environmental and security factors are related and have an influence on sustainable palm oil in Nagan Raya District. Therefore, to get the condition of sustainable palm oil, stakeholders in Nagan Raya District need to maintain these four factors. This is in accordance with the concept of sustainability itself, which is an activity that refers to the fulfillment of current needs without compromising the needs of future humanity. In totality sustainability will be achieved if there is integration of sustainable pillars namely economic, social and environmental (Dehen et al., 2013; Pirker et al., 2016) which are mutually integrated and

strengthen among one another (Hasna, 2007), and with support conducive security conditions.

Economically, sustainability in the agriculture sector can provide good income for farmers. Likewise, farmers who earn good income from their farming systems will maintain the condition of their sustainable farming systems (Karim et al., 2016), through efforts to maintain or increase the productivity, stability, sustainability and equilibrium of their agricultural systems (Kospa, 2016). This condition is proven in oil palm plants where this plant has provided prosperity for humans, is a source of food, renewable energy and is able to be a tool for poverty alleviation in developing countries including Indonesia (Chin et al., 2013; Bicalho et al., 2016; Rist et al., 2010; Pirker et al., 2016; Carrere, 2010; Feintrenie, 2014; Gutiérrez-Vélez and DeFries, 2013). Where Indonesia becomes the main producer of world palm oil with CPO production of 37.813 million tons (Pirker et al., 2016; Pusdatin, 2017; BPS Indonesia, 2018), with various economic benefits that have been obtained by Indonesia (Indonesian Ministry of Agriculture, 2019).

In addition, the economic function of palm oil plantations has been proven by experts, among others; (1) vegetable oil sources, (2) providing employment, (3) sources of foreign exchange, taxes and state income, (4) improving the regional economy, (5) increasing farmers' income and solve the problem of poverty (Winrock, 2009; Sipayung and Purba, 2015; Rofiq, 2013), (6) providing environmental services by increasing the economy of the community around the plantation from the multipliere of the oil palm plantations (Daud and Panuntun, 2015; Rist et al., 2010), (7) has lower production costs and production is 10 times higher than other vegetable plants , (8) renewable energy sources and potential biodiesel raw materials (Pirker et al, 2016; Khatun, 2017), (9) infrastructure development by plantation companies, (10) company compensation from Corporate Social Resposibilitry (CSR) can develop the area around the plantation (Syahza, 2007), (11) company mandatory to facilitate the development of plasma 20% of the company's plantation area (RI Law No. 39/2014).

However, economically palm oil plants have also been criticized for causing disruption to the stability of regional economic growth and reducing the income of local communities from existing sources (Dehen, 2013). Including heavy criticism from the European Union (EU) even though the European Union itself gets large economic "cake" benefits in the form of employment opportunities for 117 thousand people, in 16 EU member countries creating GDP of 5.8 billion euros annually, tax revenues of 2.6 billion euros through their downstream palm oil industry (Europe Economics , 2014).

From the social side, oil palm development is related to the social functions that occur by the community. Various research results to show that the social functions of palm oil plantations include: (1) provide income that has an impact on increasing the social status of oil palm farmers who generally live in rural areas, (2) more fulfillment of financial and social needs compared to other agricultural activities, (3) increasing

the education of community members (Rist et al., 2010), (4) Corporate Social Responsibility or CSR programs can encourage community economic empowerment so that they socially shape the lives of more prosperous and independent people (Syahza, 2007); (5) the development of rural-based palm oil plantations has an impact on the running of social activities of farmers and communities in the plantation environment with the construction of social facilities such as prayer rooms, pesantren, health facilities, educational facilities and others; (6) in terms of plantation management companies there is an optimization of the utilization of human resources, harmonious social interaction and socialization of plantation management programs through social activities of farmer groups, farmers' social gatherings, routine recitation and others (Wigena, 2009).

On the other hand the development of oil palm plantations also has a social impact on the communities around the plantations, namely; (1) social conflicts between companies and communities relating to land tenure, (2) not paying attention to land rights and the relocation of local residents (Cattau et al, 2015), (3) labor relations conflicts between employees and companies, (4) changes in social cultural values in the community and loss of local wisdom, (5) social jealousy between local residents and migrant workers, (6) changes in the livelihoods of local residents, (7) the poor empowerment of local communities which caused social upheaval (Wigena, 2009), (8) the use of underage workers, (9) the neglect of the conditions of indigenous peoples or local communities around plantations (Kospa, 2016).

In addition to its relationship with economic and social factors, the experts also explained the relationship of environmental factors to sustainable palm oil through environmental functions including:

(1) maintaining the hydrological cycle and reducing the high fluctuation of river water discharge in the rainy season and the dry season,

(2) through the carbon cycle the oil palm is able to absorb carbon beyond the capacity of the forest, adult palm oil plants aged 8-18 years are able to absorb carbon into the soil between 1,198-2014 C/m2 /year, higher than the wet tropical forests in the Hawai Islands

519   C/m2/year or Merapi Mountains forests in Indonesia 844 C/m2/year (Wigena, 2009),

(3) reducing greenhouse gas emissions if planted replacing barren grasslands (Germer and Sauerborn, 2008) and major carbon sinks on critical lands (Koh et al., 2011; Teoh, 2010),

(4)   reducing and absorb CO2 greenhouse gases and produce O2, (5) provide environmental services such as biodiversity, conservation efforts, ecotourism and is a place for certain animals (Daud and Panuntun, 2015), (6) biofuel sourced from palm oil provide better environmental health compared to fossil fuel diesel (Mat Yasin et al., 2017), (7) return carbon much higher than other oil producing plants such as soybean, sunflower and rapeseed, (8) solid waste biomass oil palm, especially the longitudinal empty FFB can be

fermented into bio-oil, bio-ethanol, (9) bio-power that is directly produced by gas through anaerobic process, (10) empty longitudinal solid waste, mesocrap fiber, through burning using produce heat and steam to produce electricity, (11) processing POME of palm oil mill wastewater can produce 28 m3 of biogas from 1 m3 POME (Khatun et al., 2017).

In addition to providing the environmental function of palm oil plants it also has an environmental impact which is debated by experts and oil palm stakeholders;

(1) deforestation and forest loss due to the development of oil palm plantations pose a threat to biodiversity

(2) clearing of forest land causes an increase in greenhouse gas emissions,

(3)   very high carbon loss from plantation opening on peatlands (Wilcove and Koh 2010),

(4)   the use of biofuels as an effort to save carbon substitutes for fossil fuels does not exceed the carbon ecosystems from land clearing on peatlands (Danielsen, 2009),

(5)   resulting in flooding, sedimentation, erosion and changes in soil structure (Hooijer et al, 2006; Hamilton et al, 2016),

(6) resulting in forest fires which also have an impact on the destruction of the water and air environment (Cattau, 2016),

(7) food chain disorders,

(8)   changes in soil structure,

(9) loss of animal habitat and human-animal conflict;

(10)   factory effluents in the form of eitrofying, acidifying and toxic POME into compounds that pollute the waters, and

(11) Quality decrease of waters around plantations due to the relatively high use of fertilizers and pesticides (Abrams et al., 2016; Khatun et al., 2017).

Experts also argue that the safety factor cannot be ignored in sustainable development. For example conflicts between ethnic groups in India have disrupted community activities, economic and development systems (Varsney, 2002). Likewise conflicts that occurred in Indonesia from the late 1990s to early 2000 such as in Maluku, Papua and Poso (Buchanan et al., 2011); West and Central Kalimantan (Dharmawan, 2006; Cahyono, 2008) and the Aceh conflict which ended August 15, 2005 (Martono, 2009; Saifuddin et al., 2015; Zainal, 2016). Directly or indirectly security will affect the community in its activities and the government in carrying out development, insecurity can be said to be a threat that affects the course of development (Rani, 2012), including the development of sustainable palm oil.

Several conditions of insecurity or conflict related to oil palm that have been recorded include:

(1) theft of FFB of plantation companies and farmers (Wigena, 2009);

(2)   land conflicts and plantation labor conflicts (Cattau, 2016);

(3) according to NGO records Sawit Watch until November 2011 recorded 663 land conflicts between oil palm plantation companies and communities in Indonesia (Kospa, 2016);

(4) according to the Agrarian Reform Consortium (KPA) records, 659 land conflicts occurred during 2017 or an average of 2 conflicts per day (Sutari, 2017);

(5) at the research location in Nagan Raya District there was also a land conflict between the oil palm plantation company and the community of Cot Mee and Cot Rambong villages, which until now has not been resolved (Saputri and Bantasyam, 2018).

Another case in East Aceh District is that there is a positive side to the oil palm development program in terms of security for former GAM members and conflict victims, conducted through the assistance of the Aceh Plantation Agency, the Asian Development Bank (ADB) and the Aceh Rehabilitation and Reconstruction Agency (BRR). This program has an impact on improving the economy of aid recipient communities and surrounding communities, increased environmental security by decreasing crime due to decreased poverty levels, eliminating the attitude of separatism in the people of Aceh especially former GAM members (Saifuddin et al., 2015). Conditions like this also occur in the Nagan Raya Regency research area.

CONCLUSION

1.   Sustainable pillar factors namely economic, social, environmental and security have a positive influence on sustainable palm oil in Nagan Raya District, where environmental factors have the biggest influence.

2.   The relationship between sustainable palm oil and economic, social, environmental and safety factors follows the formulation $Y = 0.153 + 0.241X1 + 0.221X2 + 0.254X3 + 0.231 X4 + e$.

3.   Simultaneously and partially economic, social, environmental and security factors have a strong relationship to sustainable palm oil, where 60.90% of the factors of sustainable palm oil are influenced by economic, social, environmental and security factors.

4.   Considering the large potential of oil palm in supporting the community and regional economy in Nagan Raya District , the role and attention of stakeholders is needed in maintaining the sustainability of palm oil by taking into account the sustainable factors of oil palm itself.

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