SUMBANGAN PERLADANGAN KELAPA SAWIT INDONESIA KEPADA PEMBANGUNAN MAMPAN

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Abstrak

Penyelidikan ini akan menerangkan bagaimana sumbangan industri kelapa sawit Indonesia kepada pembangunan mampan sama ada dari segi ekonomi, sosial dan alam sekitar. Kelapa sawit merupakan komoditi perladangan utama di Indonesia, dan kini merupakan salah satu sumber utama minyak sayuran dunia. Keluasan ladang kelapa sawit di Indonesia terus meningkat dengan pesat, sehingga tahun 2021 mencecah 15 juta ha, persaingan sengit antara minyak sayuran telah menyebabkan banyak kempen hitam dan tuduhan sebagai pemacu penebangan hutan di Indonesia. Kaedah kajian yang digunakan adalah kajian deskriptif empirikal, dengan menganalisis sejarah perladangan kelapa sawit di Indonesia dan hubungan antara pembangunan ladang kelapa sawit Indonesia dengan ekonomi, sosial dan alam sekitar. Berdasarkan data satelit yang dikaji oleh Gunarso, didapati bahawa asal usul ladang kelapa sawit Indonesia kebanyakannya daripada tanah terdegradasi, dan hanya 3.4 peratus ditukar daripada hutan primer. Ini membuktikan bahawa ladang kelapa sawit sebagai pemacu utama penebangan hutan di Indonesia adalah tidak benar. Dalam aspek ekonomi, industri sawit menyumbang dalam menjana pertukaran asing, pembangunan wilayah dan berjaya mewujudkan petani berpendapatan sederhana. Dalam aspek sosial, industri minyak memainkan peranan dalam pembangunan luar bandar dan pembasmian kemiskinan dan pengagihan pembangunan ekonomi yang saksama, serta meningkatkan ketidaksamaan pendapatan dan pembangunan. Dalam aspek alam sekitar, ladang kelapa sawit menyumbang kepada pembangunan mampan melalui peranannya dalam menyerap CO2 dan menghasilkan O2, serta meningkatkan biojisim tanah.

Kata kunci: Alam Sekitar, Ekonomi, Ladang Kelapa Sawit, Lestari, Sosial

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CONTRIBUTION OF INDONESIAN OIL PALM PLANTATIONS TO SUSTAINABLE DEVELOPMENT

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Abstrak

This research will describe how the contribution of the Indonesian palm oil industry to sustainable development both economically, socially and environmentally. Oil palm is the main plantation commodity in Indonesia and is now one of the world's main sources of vegetable oil. The area of oil palm plantations in Indonesia continues to increase rapidly, until 2021 it reaches 15 million ha, the intense competition between vegetable oils has led to many black campaigns and accusations of being a driver of deforestation in Indonesia. The research method used is descriptive empirical research, by analyzing the history of oil palm plantations in Indonesia and the relationship between the development of Indonesian oil palm plantations with the economy, social and environment. Based on satellite data studied by Gunarso, it was revealed that the origin of Indonesia's oil palm plantations was mostly from degraded land, and only 3.4 percent was converted from primary forest. This proves that oil palm plantations as the main driver of deforestation in Indonesia are not true. In the economic aspect, the palm oil industry contributes in generating foreign exchange, regional development and has succeeded in creating middle-income farmers. In the social aspect, the oil industry plays a role in rural development and poverty alleviation and equitable distribution of economic development, as well as increasing income inequality and development. In the environmental aspect, oil palm plantations contribute to sustainable development through their role in absorbing CO2 and producing O2, as well as increasing land biomass.

Keywords: *Oil Palm Plantation, Sustainable, Economic, Social, Environmental*

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1.0 Preliminary

Indonesian forests are forests that are often referred to as one of the world's lungs that donate oxygen for the survival of living things that can absorb carbon dioxide which is harmful carbon and produce oxygen gas needed by humans.(Syafitri, LD, Prasetyo, Y., & Haniah, 2018). Forests are natural resources that play an important role in the order of life, both from economic, social, cultural and environmental aspects(Widodo, P., & Sidik, 2020)

In Indonesia's macroeconomic economy, the palm oil industry has a strategic role, among others, as the largest foreign exchange earner, locomotive for the national economy, energy sovereignty, driving the people's economic sector, and employment. Indonesian oil palm plantations are growing rapidly and reflect the oil palm revolution. Indonesian oil palm plantations grow in 26 of Indonesia's 34 provinces. About 90% of oil palm plantations in Indonesia are located in Sumatra and Kalimantan.

The rapid development of the Indonesian palm oil industry has attracted the attention of the world community, especially the world's major vegetable oil producers. Indonesia has become the world's largest palm oil producer since 2006. In 2016, Indonesia managed to outperform Malaysia. Indonesia's CPO production share has reached 53.4% of the world's total CPO, while Malaysia has a 32% share. Similarly, in the world vegetable oil market, palm oil has outperformed soybean oil since 2004. In 2004, total CPO production reached 33.6 million tons, while soybean oil was 32.4 million tons. In 2016, the share of world CPO production reached 40% of the total world's main vegetables, while soybean oil had a share of 33.18%.(Agriculture, 2016)The rapid increase in the share of palm oil in the world vegetable oil market has affected the dynamics of competition between vegetable oils, including forms of negative/black campaigns against palm oil. In addition, the aspect of sustainability of oil palm plantations is in the spotlight. The development of oil palm plantations in Indonesia is considered unsustainable and is accused of being the main cause of deforestation and loss of wildlife habitat.(Shi & Tsang, 2008).

Palm oil has high economic value because palm fruit can be made into several semi-finished materials such as Crude Palm Oil (CPO) and Palm Kernell Oil (PKO). On the other hand, environmental problems are closely related to oil palm plantations. At least half of the eight million hectares of currently productive plantations have been developed through prior deforestation.(Fuadah, 2018)

To reduce the negative impact of the palm oil industry on the environment, there are several efforts that can be made to mitigate or reduce carbon emissions. Among them is evaluating land suitability, namely by identifying the characteristics of peatlands prior to deforestation for plantation land clearing.To maintain quality and quantity and to maintain the competitiveness of palm oil in the international market, the government has created a certification standard called ISPO.(SY., 2015). ISPO is regulated in Minister of Agriculture No.11/Permentan/OT.140/3/2015 concerning the Indonesian Sustainable Palm Oil Certification System (ISPO). ISPO has seven principles, namely plantation business legality, plantation management, protection of primary natural forest and peatland utilization, environmental management and monitoring, responsibility towards workers, social responsibility and community economic empowerment, and improvement of sustainable business. Based on(Dewi A., 2014)Overall sustainability is achieved if there is integration between the three main pillars of development, namely sustainability in economic, social and environmental aspects, as well as institutional aspects which include the institutional framework and capabilities of existing institutions/institutions.

The issue of deforestation is used to suppress the growth of Indonesian oil palm plantations. In

addition, the development of oil palm plantations in Indonesia is considered unsustainable and the expansion of oil palm plantations is considered the main driver of deforestation and forest destruction in Indonesia. Then the author will explain how sustainable oil palm plantations are viewed from environmental (ecological), social and economic aspects.

2.0 Sustainability in Plantations

The sustainability perspective above is based on the multifunctional theory of agriculture which includes four functions, namely green functions, blue services, yellow services, and white functions.(Huylenbroeck et al., 2007). Green functions consist of managing and maintaining landscape facilities, managing wildlife, creating wildlife habitats, and animal welfare, maintaining biodiversity, increasing nutrient recycling, and limiting carbon sinks. Other public benefits created by agriculture are blue services and include water management, water quality improvement, flood control, water harvesting, and energy (wind) creation. The third type is called yellow service, which looks at rural cohesion and vitality, making use of cultural and historical heritage, creating regional identity, and agro-tourism. The last is the white function of agriculture, namely in terms of food safety and security.

Sustainable development has three pillars, namely economic, social and ecological aspects which are often called 3P (profit, people, planet). From a 3P perspective, four agricultural/plantation functions can be synergized, namely profit (white function), people (yellow function), and planet (green function and blue service).(Cato, 2009)

Multi-functional plantations in Indonesia are also covered in Article 4 of Law no. 18 of 2004 (amended to Law No. 39/2014) that plantations have three functions, namely (1) economic functions (increasing people's prosperity and welfare as well as strengthening regional and national economic structures); (2) ecological functions (increasing soil and water conservation, carbon sequestration, oxygen supply, and buffering of protected areas; and (3) socio-cultural functions (as glue and unifier of the nation).

Thus oil palm plantations (downstream industry) are a form and method of utilization as well as multifunctional preservation inherent in oil palm plantations for generations. Through the cultivation of oil palm plantations, these economic, social and ecological functions are not only enjoyed by the present generation, but also by future generations. In fact, the preservation of biodiversity through cultivation is an effective and efficient way.

Various studies have also proven that the ecological functions of oil palm plantations include preserving the carbon dioxide and oxygen cycle (a photosynthetic process that absorbs carbon dioxide from the earth's atmosphere and produces oxygen into the earth's atmosphere), restoration of degraded land, soil and water conservation, increasing biomass and carbon stocks. land.(Perrini, F. and Vurro, 2006),(Chan, 2002)In fact, reducing greenhouse gas emissions/restoration of peatlands(Achdian et al., 2018).

The explanation above shows that the palm oil industry produces commodities/products (private goods) and non-commodities (public goods) simultaneously. The commodity in question is crude palm oil (CPO) and its derivative products (oleochemicals, oleofood, biodiesel). While the non-commodities produced are in the form of environmental services, such as the preservation of the oxygen cycle, the preservation of the hydrological cycle, and the preservation of the carbon dioxide cycle which are an important part of the functioning of global ecosystems. ecosystem. The wider

and wider the area of oil palm plantations, the wider the absorption of carbon dioxide, biomass production, and oxygen production from oil palm plantations.

In Indonesia, according to Law Number 32 of 2009 concerning the Protection and Management of the Environment, sustainable development is defined as follows: "Sustainable development is a conscious and planned effort that integrates environmental, social and economic aspects into development strategies to ensure the integrity and security of environment, capabilities, welfare, and quality of life of present and future generations. Meanwhile, Regulation of the Minister of Agriculture No. 19/Permentan/OT.140/3/2011 defines sustainable development as “a business system in the field of oil palm plantations that is economically viable, socially feasible, and environmentally friendly based on the laws and regulations in force in Indonesia”.

3.0 Discussion results

3.1 Analysis of the development of oil palm plantations in Indonesia

Civilization and development processes on the planet evolved from a hunting economy to a shifting cultivation economy, then to a steady agricultural economy and agricultural modernization. In the period 1911-2021, before Indonesia's independence, oil palm plantations were planted on the island of Sumatra by the Dutch in 1911 with an area of 5,123 ha. The first export of palm oil occurred in 1919 from plantations on the East Coast of Sumatra. However, entering the First World War, oil palm production slowed down and it was not until after the Great Depression of 1921 that oil palm cultivation was revived. In 1924, the area of oil palm plantations increased to 18,801 hectares. In Java, there are also small-scale palm oil factories that produce soap and butter. in 1925,(Simangunsong & S, 2019)

Throughout the period 1945 to 1950, the Indonesian government did not focus too much on economic development. Large plantations and other companies were still controlled by Dutch East Indies companies. In addition, the Indonesian government is still preoccupied with small-scale rebellions in various regions and the West Irian conflict. On December 13, 1957, Army Chief of Staff Maj. Gen. AH Nasutio as the center of war authority (Peperpu) issued an order that the process of taking over foreign companies was under military control. A year later, Government Regulation (PP) No. 28 of 1958 concerning the Nationalization of Dutch Companies in Indonesia was issued and this regulation has been retroactive since 1957. All nationalized companies were then managed by the Dutch Company Nationalization Agency (BANAS) which was formed in 1959, accompanied by payment of compensation to the owner of the company that was taken over. The era after Indonesia's independence began to develop, in 1969 around 119 thousand ha, increased to 292 thousand ha in 1980, then increased to 1.1 million ha in 1990 and continued to increase to 4.1 million ha in 2000, and became 8.3 million ha in 2010. and in 2021 it will be 15 million ha.(Simangunsong & S, 2019)

The government developed four types of People's Nuclear Plantation programs, namely first, special and local PIR spread over 12 provinces in 1980. As a result, 231,535 hectares of new oil palm plantations were created, consisting of 67,754 hectares of nucleus plantations and 163,781 hectares of nucleus plantations. plasma plantations. The second is the Transmigration PIR program which began in 1986 in 11 provinces. This program resulted in new oil palm plantations covering 566 thousand hectares consisting of 70% plasma plantations and 30% plasma plantations. Third, the PIR Program for Primary Cooperative Credit for Members (PIR-KKPA) which involves 74 Village Unit Cooperatives. Fourth, PIR Plantation Revitalization which was initiated in 2016 through PMK No. 117/PKM.

Analysis of the origin of Indonesian oil palm plantations shows that the largest source of land from the expansion of oil palm plantations in Indonesia during the 1990-2018 period came from degraded land of 61.6 percent. This degraded land includes upland scrub & grassland, swamp scrub & grassland, disturbed swamp forest, disturbed upland forest, bare land and others. The second source is from agricultural/plantation land by 37 percent which includes intensive agriculture, plantations, and agroforestry. While the remaining 1.4 percent comes from undisturbed upland forest, undisturbed swamp forest, and undisturbed mangroves. So overall, 98.6 percent of Indonesian oil palm plantations originate not from forest conversion (not deforestation).

With the results of the analysis of the origin of oil palm plantations above, it succeeded in refuting the results of research by Wilcove and Koh (2008) which stated that the conversion of primary and secondary forests into oil palm plantations in Indonesia reached 56 percent. or 1.7 million hectares. The study also successfully countered the study(Louder, 2004)which states that deforestation due to forest conversion to oil palm is estimated at 16 percent, and studies(Wicke et al., 2020)which states that of the 9.7 million deforestation that occurred during 1997-2003, about 27 percent (2.6 million hectares) became oil palm plantations. The three studies which state that the origin of oil palm plantations is the result of deforestation are studies that are not supported by valid data.

Various other studies have also shown that deforestation in Indonesia does not have a direct positive correlation with the expansion of oil palm plantations.(PASPI, 2016)The causes of deforestation and forest degradation in Indonesia are not due to the expansion of oil palm plantations, but due to the following three factors, namely:(Gunarso et al., 2013). First, the transmigration policy since the Dutch colonial period (1905-1940) which was then continued in the 1969-2000 period, where this policy succeeded in converting 8.94 million hectares of forest into agricultural areas and settlements for 3.05 million transmigrant households. Second, the Forest Concession Rights (HPH) policy which began in the early 1970s and had implications for forest degradation in Sumatra reached 6.7 million hectares and in Kalimantan 8.5 million hectares during the 1985-1997 period. And third, forest fires that occurred in East Kalimantan in 1982-1983 reached 3.6 million hectares and in 2011 covered 2.6 million hectares.

3.2 Sustainability Analysis From Economic, Social and Environmental Sides

Sustainable development is a more inclusive and quality development process. This development paradigm has been adopted by the United Nations(Statistics, 2014)as a global development platform for 2015-2030, known as the 2030 Sustainable Development Goals (SDGs 2030). As a global development platform, every country, sector, region, industry is expected to adopt and contribute to sustainable development.

As previously mentioned, the number of oil palm growers is quite large, with the second largest land area after large private companies. In terms of employment, small farmers also involve more than 4.4 million people or 2.5 million households. This data shows the important role of smallholder oil palm farmers in alleviating poverty and increasing food security, as mandated in the SDGs. The importance of small farmers where these planters are the backbone of food security in developing countries. Based on that they contribute up to 70% of national food production and 30-34% of total world food production.(Hidayat, NK; Glasbergen, 2016)

Regarding plantations, including smallholder oil palm plantations, Law Number 39 of 2014 concerning Plantations states the multifunctionality of plantations. Based on this law,(Bentivoglio, D.; Bucci, 2018)states that there are three functions of plantations namely

economic, ecological and socio-cultural functions. Thus, the role of smallholder oil palm plantations in sustainable development becomes clear. This role can also be seen from the objectives of plantation management, which include increasing the welfare and prosperity of the people, providing employment, developing responsible and sustainable plantation resources, providing sources of raw materials for downstream industries, and maintaining local wisdom and wisdom. environmental resistance. The discussion above shows the importance of smallholder oil palm plantations in achieving the SDGs.

However, it is difficult to find studies that focus on the contribution of independent oil palm smallholders and plasma smallholders to achieving the SDGs. The main reason is allegedly because it is not clear which SDGs of oil palm plantations, especially small-scale oil palm plantations, contribute. Many studies discuss the importance of oil palm plantations in achieving the SDGs, but only focus on one or two SDGs, including(Ismail, SR; Maarof, SK; Ali, 2018). During study(philanthropist, 2018)shows that there are many SDG goals that are played by small farmers. However, according(Nurliza, N.; Dolorosa, E.; Suryadi, 2019), sustainable development is relative and site or country specific for each sector and industry.

The Sustainable Development Goals (SDGs) are a global development platform initiated by the United Nations (UN) in 2015 with a target of achieving them during the 2016-2030 period. As a mutually agreed global development platform, the SDGs have 17 main goals and 169 targets which can be grouped into three main economic, social and environmental aspects. For Indonesia, the SDGs actually started to be implemented before the SDGs were adopted internationally. For example, in the Indonesian palm oil industry, the Government has introduced and implemented the development of sustainable oil palm plantations or known as ISPO since 2011. The Indonesian Government has also reissued Presidential Regulation No. 44/2020 concerning the Indonesian Sustainable Palm Oil Plantation Certification System (ISPO). This Presidential Decree was made with the aim of complementing and perfecting existing regulations as well as accommodating global market dynamics and increasing the adoption of SDGs values (PASPI, 2020d). The adoption of the SDGs into the ISPO Presidential Regulation actually shows that ISPO is on the right track with this platform.

Sustainable development is not only sufficient or exclusive to generate economic benefits, but also provides social and ecological benefits across generations. Sustainable development is a matter that is relative and country specific, both sector and industry(Month, 2012). In relation to the dimension of sustainable development, the development of Indonesian oil palm plantations includes three important pillars, namely sustainability in the economic, social and ecological dimensions.

a. Economic Aspect

In the economic aspect, the palm oil industry contributes to sustainable development in the form of a source of foreign exchange and national income, regional economic development, and increasing farmers' income.(PASPI, 2016). The development of the palm oil industry is also inclusive, namely attracting the development of other sectors.

The increase in palm oil production in the central areas of oil palm plantations has led to a significant increase in the Gross Regional Domestic Product (GRDP) of the central districts of oil palm(PASPI, 2017), which then has an impact on the economic development of the area concerned. Economic growth resulting from increased oil palm production is not only enjoyed by those involved in oil palm plantations, but also by communities that are not directly involved in the production process of oil palm plantations. The increase in the income

of oil palm farmers is higher than that of other commodity farmers(PASPI, 2014). In fact, the economic benefits of palm oil are enjoyed by the people of the European Union, imports of CPO that are carried out provide major benefits for GDP, government revenues, or EU employment opportunities.(Economics, 2014).

b. social aspect

In the social aspect, the palm oil industry has also been proven empirically, including its role in rural development and poverty alleviation.(PASPI, 2014)and equitable economic development. In Riau Province which is the main center of Indonesian oil palm plantations, oil palm plantations have played a role in improving income and development inequality.

In the social aspect, the establishment of oil palm plantations can be regarded as a pioneer sector that opens access to remote areas. In addition, oil palm plantations increase the availability of rural infrastructure and increase the availability of education and health facilities(PASPI, 2014). In aggregate, increasing national palm oil production has reduced rural poverty in oil palm plantation centers, such as North Sumatra, Riau, South Sumatra and Central Kalimantan, significantly reducing poverty.(Susila, 2008). Subsequent developments show that oil palm plantations have created new areas of economic growth in rural areas. In 2013, the Ministry of Transmigration and Manpower (2014) inaugurated 50 new growth areas in villages based on the oil palm economy, including Sungai Bahar (Jambi), Pematang Panggang and Peinjauan (South Sumatra), Arga Makmur (Bengkulu), Sungai Pasar and Folded Cloth (Riau), and Paranggean (Central Kalimantan). On the other hand, a number of non-governmental organizations (NGOs) have criticized the expansive development of oil palm plantations because it has an impact on biodiversity, especially the disturbance of the habitat of animals that are currently protected and endangered. Among other issues that have emerged very sharply are elephants in Sumatra and Sumatra. orangutans in Borneo.

c. Environmental Aspect

In terms of the environment, oil palm plantations contribute to sustainable development through their role in absorbing carbon dioxide and producing oxygen(Louder, 2004). In addition, oil palm plantations with a root system that forms natural biopores are an important part of soil and water conservation. Oil palm plantations also increase land biomass. In fact, oil palm plantations on peatlands reduce greenhouse gas/carbon dioxide emissions(Tan et al., 2015). The use of palm biodiesel (FAME) as a substitute for fossil fuels can reduce diesel engine carbon emissions by 62%.(Commission, 2013)

The ecological role of oil palm plantations includes conserving the carbon dioxide and oxygen cycles, restoring degraded land, conserving soil and water, increasing land biomass and carbon stocks, and reducing greenhouse gas emissions/peatland restoration. Every hectare of oil palm plantations absorbs 161 tons of carbon dioxide from the earth's atmosphere and produces 18.7 tons of oxygen/ha(Louder, 2004). Oil palm plantations also increase soil biomass (organic matter) which increases as the plants age(Chan, 2002). Oil palm plantations on peatlands also reduce greenhouse gas emissions(Sabiham, 2013). In the role of water management, various hydrological indicators such as evapotranspiration, groundwater reserves, transmission of rainfall to the soil surface, infiltration rate of the solum layer, and humidity between oil palm plantations and forests are relatively the same.

The environmental services produced by oil palm plantations, such as maintenance of the

oxygen cycle, maintenance of the hydrologic cycle, and maintenance of the carbon dioxide cycle, are an important part of the functioning of global ecosystems. Carbon dioxide released by the world community and its activities that consume fossil fuels, such as industry, transportation and housing, is absorbed by oil palm plantations and then stored in the form of biomass and oxygen is produced for human life on planet Earth. The wider and more spread of oil palm plantations, the greater and more widespread the absorption of carbon dioxide, biomass production, and oxygen production from oil palm plantations.

Thus, the palm oil industry has contributed to the achievement of Indonesia's 2030 SDGs which include economic, social and environmental aspects. Indonesian oil palm plantations which are currently developing in 190 districts throughout Indonesia will make a significant contribution to the achievement of the 2030 SDGs, especially the districts/provinces of oil palm centers in Indonesia.

4.0 Conclusion

The Sustainable Development Goals (SDGs) are a global development platform initiated by the United Nations (UN) in 2015 with a target of achieving them during the 2016-2030 period. As a mutually agreed global development platform, the SDGs have 17 main goals and 169 targets which can be grouped into three main economic, social and environmental aspects. For Indonesia, the SDGs actually started to be implemented before the SDGs were adopted internationally. For example, in the Indonesian palm oil industry, the government has introduced and implemented the development of sustainable oil palm plantations or known as ISPO since 2011. The Indonesian government has also reissued Presidential Regulation no. 44/2020 concerning the Indonesian Sustainable Palm Oil Plantation Certification System (ISPO). This Presidential Decree was made with the aim of complementing and perfecting existing regulations as well as accommodating global market dynamics and increasing the adoption of SDGs values (PASPI, 2020d). The adoption of the SDGs into the ISPO Presidential Regulation actually shows that ISPO is on the right track with this platform. With this multifunctionality, oil palm plantations contribute both economically, socially and environmentally to the achievement of the SDGs. Empirically, the contribution of the palm oil industry to the economy includes encouraging economic growth (national and regional), sources of foreign exchange, and state income, while in the social aspect it includes rural development and poverty alleviation. The ecological role of oil palm plantations includes the conservation of carbon dioxide and oxygen cycles, restoration of degraded land, soil and water conservation, increasing land biomass and carbon stocks, and reducing greenhouse gas emissions/restoration of peatlands. With this comprehensive paradigm, the Indonesian palm oil industry continues to grow in a sustainable perspective. Indonesia's palm oil industry continues to grow in a sustainable perspective. While on the social aspect, among others, in rural development and poverty alleviation. The ecological roles of oil palm plantations include conserving the carbon dioxide and oxygen cycles, restoring degraded land, conserving soil and water, increasing land biomass and carbon stocks, and reducing greenhouse gas emissions/peatland restoration. With this comprehensive paradigm, the Indonesian palm oil industry continues to grow in a sustainable perspective. Indonesia's palm oil industry continues to grow in a sustainable perspective. While on the social aspect, among others, in rural development and poverty alleviation. The ecological roles of oil palm plantations include conserving the carbon dioxide and oxygen cycles, restoring degraded land, conserving soil and water, increasing land biomass and carbon stocks, and reducing greenhouse gas emissions/peatland restoration. With this comprehensive paradigm, the Indonesian palm oil industry continues to grow in a sustainable perspective. Indonesia's palm oil industry continues to grow in a sustainable perspective. While on the social aspect, among others, in rural development and poverty alleviation. The ecological roles of oil palm plantations include conserving the carbon dioxide and oxygen cycles, restoring degraded land, conserving soil and water, increasing land biomass and carbon stocks, and reducing greenhouse gas emissions/peatland restoration.

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