

Replanting policy of Indonesian palm oil plantation in strengthening the implementation of sustainable development goals

Jan Horas Veryady Purba¹

¹Sekolah Tinggi Ilmu Ekonomi Kesatuan, Jl. Ranggagading No 1, Bogor, Indonesia, 16143

*E-mail: janhorasvpurba@gmail.com

Abstract. Indonesia's palm oil industry is one of the National strategic commodities. This industry is inclusive and has a very broad impact on Indonesia's economic development, regional development, poverty alleviation, the country's foreign exchange resources and attempted to help overcome Indonesia's balance of payments deficit. Along with the end of the first 25 years of age in most of oil palm plantations in Indonesia, the replanting policy has become an important momentum, because it concerns the future of the Indonesian oil industry, then continued with the second milestone of the 2040s. With replanting, Indonesia also improves productivity and is followed by improvements in technical culture. Indonesian oil palm productivity is directed to reach the 35-26 scenario, which is the production of 35 tons of FFB per ha and 26 percent yield so that Indonesia's palm productivity will shift from productivity levels of 4.4 tons of CPO per hectare to 9 tons of CPO per hectare. With this level of productivity, Indonesia's CPO production will increase from 77.17 million tons in 2050 to 94.64 million tons. The purpose of this study is not merely to look at oil palm plantations from an economic standpoint because in a broader scope, oil palm plantations have four multi-function agriculture, namely green functions, blue functions, yellow functions, and white functions. The replanting policy of Indonesian palm oil also plays a role in strengthening Indonesia's palm oil industry in the achievement of the Sustainable Development Goals, which includes the economic fields (8 SDGs), social fields (6 SDGs) and the environment (3 SDGs).

I. Introduction

The oil palm plantation has played an important role in encouraging Indonesia as the world's largest CPO producer and exporter. This also shows one of the strategic roles of the People's Palm Oil Plantation in the Indonesian economy, both in the acquisition of foreign exchange, regional development. Poverty alleviation, increasing regional GRDP and its important role in "feeding the world" [1].

In 1980, Indonesian palm plantations began to grow increasingly rapidly. In the 1990s, which was driven by smallholder oil palm plantations, both plasma, and independent farmers. This success has driven the acceleration of Indonesia's oil palm plantations to reach 14.3 million ha in 2018, and more than half (53%), are smallholder oil palm plantations [2]. This needs to be underlined, that smallholder oil palm plantations have an important role in the Indonesian palm industry, bringing Indonesia as a major producing country with a 55.7 percent share of world CPO production (Malaysia is in second



place with a 28.9 percent share) in the same year, [3] and a major CPO exporter on the global market where in 2017, Indonesia's palm oil exports reached USD 31.05 billion [4].

The current issue is the moratorium on Indonesian oil palm plantations as stipulated in Presidential Instruction (Inpres) No. 8 of 2018, which covers two main things, namely Evaluation of Licensing for Oil Palm Plantations and Increased Productivity of Oil Palm Plantations. This policy leads to a replanting strategy, which is related to the Indonesian palm oil industry in the future. This policy is also not just a natural development to replace oil palm plants that have reached a 25-year cycle, as happened in a number of provinces in Indonesia but are carried out by design, and no longer practice expansion. In the perspective of vegetable oils in the global market, Indonesia also faces a variety of very strong world pressures in various dimensions. While the world market is in dire need of CPO and even becomes the largest source of vegetable oil in the world.

This shows the point of the problem faced in saving the future of the Indonesian palm oil industry. When viewed in the most extreme conditions replanting failure can potentially reduce 4 million hectares of Indonesian palm oil, and the area of Indonesian palm oil plantations will decline drastically, and will be under the position of Malaysia and no longer as a major CPO producer on the world market.

At present, the productivity of national oil palm plantations has only reached 3.69 tons CPO/ha. State oil productivity (PTPN) of 3.97 tons CPO/ha; Private plantation productivity is 3.37 tons CPO/ha and the productivity of new oil palm plantations reaches an average of 2.82 tons CPO/ha.

Indonesian palm oil commodities not only play an economic role, but these commodities are also seen as Indonesia's strategic industry, and cannot be separated from various aspects of national development. Therefore, in addition to the internal problems facing the Indonesian palm industry, the policy of developing the Indonesian oil industry must also be in line with world development issues, namely sustain development goals (SDGs). With these two aspects, the research question is: how is the replanting policy on oil palm plantations in Indonesia and how is the implementation of SDGs in the development of the palm oil industry in Indonesia?

The goal of this study was (1) to analyze replanting policy of oil palm plantations in Indonesia and (2) to analyze the support for the development of the Indonesian palm oil industry in implementing SDGs.

2. Materials and methods

2.1. Conceptual analysis

The analytical method in this study is a descriptive method, and attempts to answer the research problems above from various aspects comprehensively. There are two important things in this study, namely the replanting and support of the palm oil industry in the implementation of SDGs. Conceptual analysis of replanting can be summarized as follows.

Oil palm plantations have a productive cycle of up to 25 years, or one production cycle. At the age of 3 to 4 years, this plant can already be harvested. High productivity will be achieved at the age of 8 to 20 years, and after that it begins to decline. Thus it is easy to see that the production of oil palm is inverted U shape. Until the age of 25 years, then enter the replanting stage.

From an economic standpoint there are two ways to increase Indonesia's palm productivity, the first way is through increasing the partial productivity productivity of oil palm plantations in harvested area that shift the productivity curve of oil palm plantations currently (P1) to the new productivity curve (P2). In practice, this first method is carried out through the best management practices of existing TM gardens.

The second way is through the use of seeds that are superior when replanting. Until now, some of the seed varieties produced by palm oil companies have a productivity potential of around 35 tons of FFB and 26 percent yield or can produce around 9 tons of oil per hectare. (figure 1)

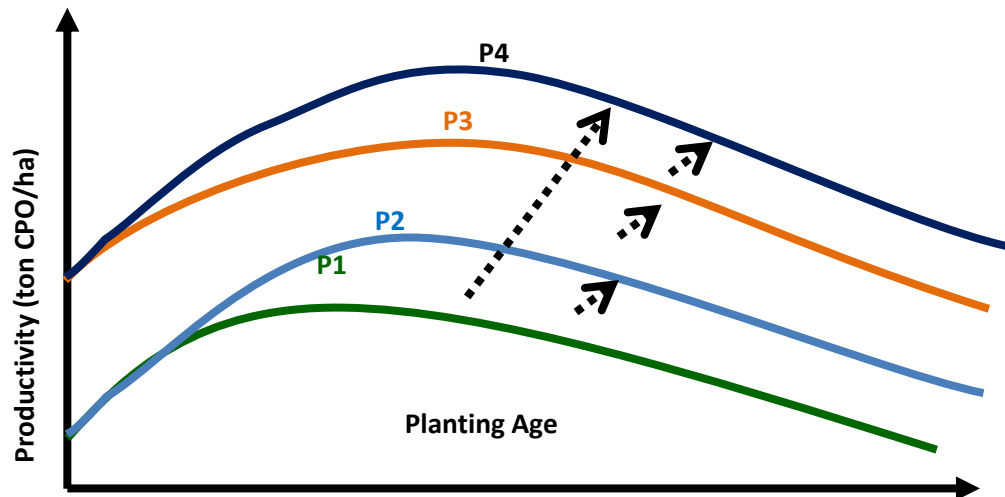


Figure 1. Increased productivity due to improvement of technical culture (P2 and P4) and total productivity factors (P3) Source:[5]

In order for the ideal plant composition, the standard norm of replanting each year is an average of 4 percent of the area of the garden. So that nationally with an area of 10 million hectares, it is expected that there will be around 400 thousand hectares replanting every year. The second way will shift the productivity curve from P1 to P3.

The combination of these two methods, namely the improvement of technical culture in harvested area and replanting using superior seeds, will result in continuous increase in total productivity. This combination will shift the productivity curve from P1 to P4 and so on. Thus, the replanting program is a new milestone in advancing the Indonesian palm industry, and this is very relevant at this time in line with the current moratorium policy so that the replanting program is an implementation of policies that will determine the future of the Indonesian oil industry.

2.2. Data

Type of data used in this study are secondary data on Indonesian palm oil statistics from the Ministry of Agriculture and BPS until 2017/2018, and the method of data analysis used is descriptive analysis by exploring relevant data on government policies and reviewing the results of the results of empirical studies from UNDP , GAPKI, PASPI, and other sources of reference.

3. Result and discussion

3.1. Result

The purpose of this study was to analyze replanting policy of oil palm plantations in Indonesia and to analyze the support for the development of the Indonesian palm oil industry in implementing SDGs.

a. Replanting Policy

The PASPI projection [6] shows that the combination method will increase national oil productivity from 4.4 tons of CPO/ha in 2020 to 7.42 tons of CPO/ha in 2050. Productivity of smallholder oil palm plantations will increase from 3.39 tons CPO/ha (2020) to 6.38 tons CPO/ha (2050). While the productivity of the private oil palm plantation will increase from 4.93 tons CPO/ha (2020) to 8.32 tons CPO/ha (2050). While the productivity of stated owned oil palm plantation will increase from 4.16 tons CPO/ha (2020) to 7.3 tons CPO/ha (2050). (Figure 2). If it is assumed there is no expansion of oil palm plantations, and is only affected by an increase in the level of productivity as the data

above Indonesia's CPO production will reach 45.76 million tons in 2020 and 77.17 million tons in 2050. Malaysia's CPO production projection is expected to reach 21.36 million tons in 2020 and 40.82 million tons in 2050.

The consumption of vegetable oil per capita in the world will be remembered, along with the increase in income (GDP per capita), will affect the demand for world vegetable oil. The world population in 2020 will reach 7.49 billion people and 9.078 billion in 2050. It is estimated that global CPO consumption in 2020 and 2050 will each reach 73.47 million tons and 154.84 million tons.

This shows that world CPO demand continues to grow. The lack of global CPO supply will encourage the development of new CPO producing countries, both in Asia and in Africa and other ROWs. In 2020, the share of CPO in ROW will reach 8% and will grow to 23%.

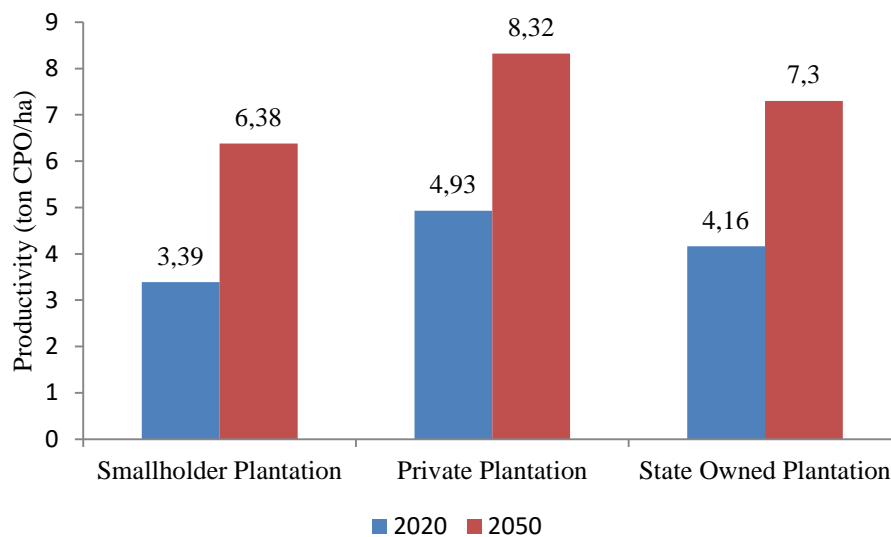


Figure 2. Projected productivity of smallholder, state and private palm oil plantations in 2020 and 2050

With better preparation, then in the 2040s, it is the second milestone in improving the productivity of Indonesian CPO (along with the second replanting, after the 25-year cycle ends). Indonesian palm productivity is directed to reach the 35-26 scenario, which is the production of 35 tons of FFB per ha and 26 percent yield so that Indonesia's palm productivity will reach 9 tons of oil per hectare, and Indonesia's CPO production can be increased from 77.17 million tons in 2050 to 94.64 million tons.

b. The support of the Indonesian palm oil industry in implementing SDGs

The World Bank (World Bank, 2012) proposes a simple concept of Growth, Green, Inclusive. Economic growth must be green but also inclusive (broad impact). Conversely, environmental conservation (green) must guarantee economic growth and be inclusive. Therefore, development management needs to guarantee all three things. The big objectives of SDGs can be classified into the following three fields.

Table 1. SDGs in the perspective of sustainability, economic, social and ecological dimensions

No	Purpose	SDGs
1	Economy	(1) removing poverty in various forms and all places, (2) removing hunger, malnutrition and building inclusive food security, (3) building sustainable energy, (4) inclusive and sustainable economic growth, (5) sustainable industrialization, (6) reduction of inequality, (7) consumption and sustainable production, and (8) global cooperation in sustainable development.
2	Social	(1) health, (2) inclusive quality education, (3) gender equality, (4) availability of clean water that is inclusive, (5) city development that is inclusive and selling and (6) inclusive social peace.
3	Ecology	(1) overcoming global climate change, (2) sustainability of the sea and waters, and (3) forest sustainability and biodiversity (biodiversity)

Source: [13]

Given the important role of the government in realizing sustainable development [14], [15] proposes that the concept of sustainable development is not only 3-P (Profit, Planet, People) but 4-P (Profit, Planet, People, Policy) Government policy variables are considered very important in addition to determining development policies also specific to each country. In the implementation of SDGs, it will certainly vary in each country which in this case is determined by government policies in each country.

3.2. Discussion

a. Replanting is a Milestone to Support Implementation of SDGs

Replanting of Indonesian palm oil plants provides a high opportunity for Indonesia to maintain Indonesia's role as the largest producer and exporter of oil palm to meet the demand for world vegetable oil. This is in line with the policy of intensification through increasing productivity two to three times the current level of productivity.

However, replanting is not limited to replacing new oil palm plants. Replanting has a more strategic role in Indonesia's new economic development. This is supported by the following important things: (1) The national palm oil industry is inclusive and has a very broad impact on Indonesia's economic development, as well as regional development and one of the country's foreign exchange sources; (2) Indonesian palm oil in a wider scope has four functions, namely green function, blue services/function, yellow services/function and white function [7], [8].

“Indonesian Palm Oil: More Sustainable” is a commitment that Indonesia is currently developing, both in the long-term goal of developing the Indonesian Palm Industry, as well as an effort to succeed in Palm Oil Diplomacy to the European Union and at the same time converting negative accusations from anti palm oil NGOs to the development of the oil industry Indonesian palm oil.

In a broader perspective, the development of a sustainable Indonesian palm oil industry is in line with and supports the success of Indonesia in achieving the Sustainable Development Goals (SDGs),

whose scope is wider than the Millennium Development Goals that have been implemented in the previous time period.

Indonesia's palm oil industry is one of Indonesia's strategic commodities, both in economic development, regional development and increased GDP as well as poverty reduction in the center of palm oil producers, and is able to overcome Indonesia's trade balance deficit through export activities.

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

Sustainable development [1], [10] has three pillars namely economic, social and ecological aspects which are often called 3-P (profit, people, planet) (figure 3).

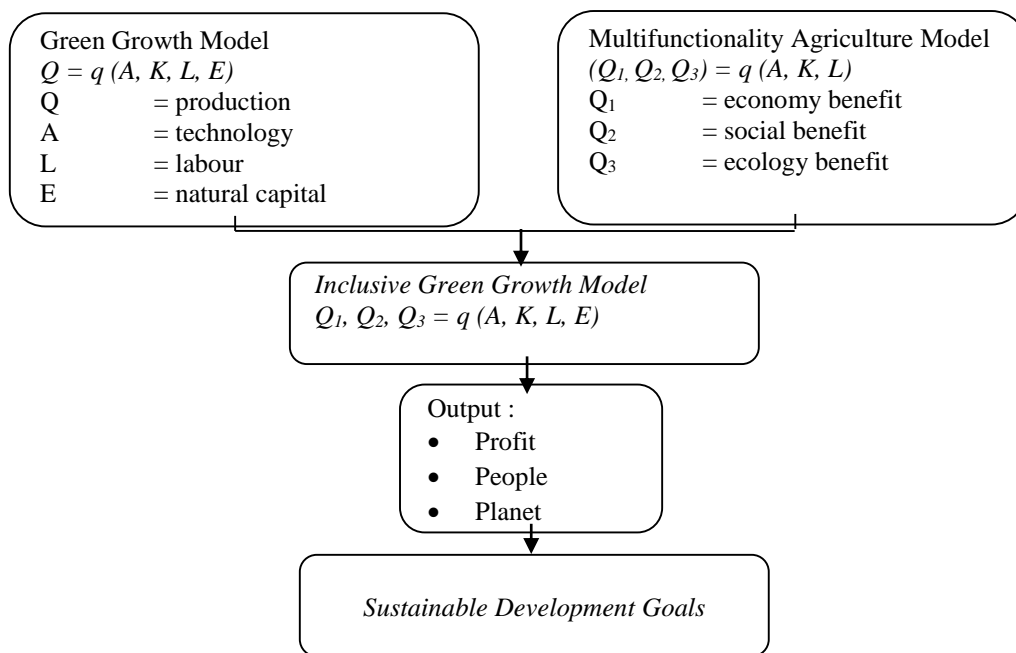


Figure 3. Research Teorotical Concept of Sustainability Development Goals in Oil Palm Industry [10a]

Sustainable development not only enough or exclusive produces economic benefits but also provides social benefits and ecological benefits across generations. Sustainable development is a relative matter and is country, sector and industry specific [11], [12]). Related to the dimension of sustainable development, the development of Indonesian palm oil plantations includes 3 important pillars, namely sustainability in the economic, social and ecological dimensions.

The paradigm of sustainable development is the root of SDGs. The goals of the SDGs are inseparable from each other. Even to achieve these SDGs requires synergy between fields (ICSU/ISSC, 2015). Elimination of poverty for example requires synergy between inclusive food security (SDGs 2), inclusive economic growth (SDGs 8), reduction of inequality (SDGs 10) even with climate change mitigation (SDGs 13).

b. Contribution of palm oil industry

The contribution of the palm oil industry to the achievement of the SDGs is related to the multifunction of the plantation itself. Multifunction in the agricultural sector, including plantations, has long been taking place across generations since the beginning of human civilization on earth. But the issue of multifunctional agriculture began to be discussed at the international level at the Rio Earth Summit in 1992. The Declaration of the Committees of the Ministers of Agriculture The Organization of Economic Coordination Development [16] defines multifunctional agriculture as follows "Beyond its

primary function of producing food and fiber, providing environmental benefits such as land conservation, sustainable management of renewable natural resources and preservation of biodiversity, and contributing to the socio-economic viability of many rural areas. Agriculture is multifunctional when it has one or several functions in addition to its primary role of producing food and fiber. "This means that in addition to the main function of the economic function (producing food and fiber), agriculture also has social functions and ecological functions.

The **green functions** consist, among others, of landscape management and the landscape of landscape amenities, wildlife management, wildlife creation and animal welfare, the maintenance of biodiversity, recycling and limitation of carbon sinks. Other public beneficiaries that can be created by agriculture are the **blue services** and contain water management, improvement of water quality, flood control, water harvesting and creation of (wind) energy. A third kind are **yellow services** and peripheral to the role of farming for rural cohesion and vitality, ambience and development, exploiting cultural and historical heritages, creating a regional identity and offering hunting, agro-tourism and agro-entertainment. Finally, many authors acknowledge the **white function** produced by agriculture, such as food security and safety. The four functions of agriculture/plantations internationally are often called 3-P namely profit (white function), people (yellow service), and planet (green function and blue service). (Figure 3)

Multifunctional plantations in Indonesia are also recognized in Law No. Article 4 of the 18 of 2004 (has been amended to Act No. 39/2014), that plantations have three functions, namely: 1) economic function (increasing prosperity and prosperity of the people and strengthening regional and national economic structures), 2) ecological functions (increasing conservation soil and water, carbon sequestration, oxygen providers and buffer protected areas and 3) socio-cultural functions (as an adhesive and unifying nation).

Empirically the economic contribution of the palm oil industry has been widely proven by various experts, including encouraging economic development, foreign exchange sources and state revenues [17], [11], [18]. Judging from the forward and backward input-output linkages and various multiplier indicators, it shows that oil palm and downstream industries are one of the locomotives of the national economy [19]. As a foreign exchange source, Indonesia's export of palm oil industry products is the largest source of foreign exchange (net exports) in non-oil and gas exports [20].

The increase in palm oil production in the center of oil palm plantations has led to a significant increase in the district's GDP [21], which then has an impact on the economic development of the region concerned. Economic growth driven by increased palm oil production is not only enjoyed by those involved in oil palm plantations but also enjoyed by people who are not directly involved in the production process of oil palm plantations [19]. Increased income of oil palm farmers is higher than other commodity farmers [22]. Even the economic benefits of palm oil are also enjoyed by the European Union community. CPO imports carried out gave great benefits both to GDP, government revenues and the work opportunity of the European Union [23].

The contribution of the palm oil industry in the social aspects has also been empirically proven, among others, its role in rural development (improving quality of life) and poverty reduction [24]. As a pioneer sector in remote areas, oil palm plantations also increase the availability of rural infrastructure and increase the availability of education and health facilities. In aggregate, the increase in national palm oil production decreases rural poverty [25], [26] in the centers of oil palm plantations such as North Sumatra, Riau, South Sumatra and Central Kalimantan, which significantly reduces poverty [27].

Various studies also prove that the ecological role of oil palm plantations includes preserving the cycle of carbon dioxide and oxygen (photosynthesis, which absorbs carbon dioxide from the Earth's atmosphere and produces oxygen to the earth's atmosphere), restoration degraded land soil and water conservation, increased biomass and carbon stock land, reducing greenhouse gas emissions/peatland restoration. Each hectare of oil palm plantations absorbs carbon dioxide from the earth's atmosphere by 161 tons/ha and produces 18.7 tons of oxygen/ha [28], [29], [30]. Oil palm plantations also increase biomass (organic material) land which is increasing with older plants [31]. Oil palm plantations on peatlands also reduce greenhouse gas emissions [32], [33], [34]. In terms of the role of the various

water hydrological indicators such as evapotranspiration, groundwater reserves, forwarding of rainfall to the soil surface, the rate of infiltration of the solum layer and humidity [29] between oil palm plantations and forests are relatively the same.

The environmental services produced by oil palm plantations such as oxygen cycle sustainability, the sustainability of the hydrological cycle and the sustainability of the carbon dioxide cycle are important parts of global ecosystem functions. Carbon dioxide released by the global community and its activities that consume fossil fuels such as industry, transportation, housing and others, by oil palm plantations are absorbed (through photosynthesis) and then stored in the form of biomass and produced oxygen for human life in the earth. The wider and more widespread palm oil plantations are increasingly large and the more widespread the absorption of carbon dioxide, the production of biomass and the production of oxygen from oil palm plantations.

Thus, the contribution of the palm oil industry in achieving Indonesia's SDGs 2030 covers economic, social, and environmental aspects. Indonesian palm oil plantations that are currently developing in 190 districts in the country will contribute significantly to the achievement of the SDGs 2030, especially the districts/provinces of oil centres in Indonesia.

c. Replanting roadmap in Indonesia

Malaysia's success story in replanting was carried out in the period 2000-2005. This success is supported by national policies (MPOB) and requires the replanting problem as an imperative replanting. By consciously, replanting aims to shift the productivity curve upwards or to improve the level of productivity. This commitment is also reflected in replanting scenario with accelerated replanting.[9]

The replanting strategy of oil palm plantations in Indonesia includes two important things, namely (1) strategies to increase productivity, to increase crop productivity by improving technical culture, and (2), replanting strategies with the latest improved varieties (productivity of about 8 tons per hectare) for non-crop productive old age. Increasing palm oil production through improved oil productivity through the improvement of technical culture and sustainable replanting, will bring Indonesia's oil palm plantations to a more quality and sustainable phase, namely in the capital-driven phase as well as the innovation-driven phase.

In 2017, the President of the Republic of Indonesia was directly involved in initiating this replanting movement in several palm oil centers in Indonesia, accompanied by financial support especially for smallholders. However, the realization of replanting has not run as expected, and is not supported by the availability of superior seeds.

Ideally, assuming a 25-year palm oil crop production cycle requires replanting around 4 percent per year, so the ideal composition is immature area 12 percent, and harvested area 88 percent (table 2).

Table 2. Age composition of oil palm plants and ideal composition (%)

	Immature area	Harvested Area		
		4-7 years old	8-15 years old	16-25 years old
Nasional	20	21	38	21
Ideal	12	16	32	40

Sources: PASPI, 2016 (processed)

The current condition of unharvested area reaches 20% and is still far from ideal conditions (12%). A replanting roadmap for Indonesian palm oil plantations is very necessary accompanied by a replanting acceleration program in the next 5 years.

4. Conclusion

In line with the objectives of this study, the conclusions are as follows:

The replanting policy in Indonesia emphasizes 2 important strategies, namely to increase productivity through the improvement of technical culture and improved varieties. This strategy is directed to reach the 35-26 scenario, where the level of productivity of Indonesian palm oil plantations will reach an average of 9 tons of CPO per hectare, and the potential for increasing Indonesia's CPO production can reach 94.64 million tons in 2050.

The development of a sustainable Indonesian palm oil industry is in line with and supports the success of Indonesia in achieving the Sustainable Development Goals (SDGs). The contribution of the palm oil industry in achieving the Indonesia's SDGs 2030 covers economic, social and environmental aspects. Ideally, the replanting area is 440,000 ha per year or 4 percent of the total area of Indonesian oil palm plantations. The lagging area that should be slammed now reaches 20% and is very far compared to the ideal condition of 12%. Therefore, it is necessary to prepare The Indonesia oil palm replanting roadmap and be accompanied by replanting acceleration programs in the next 5 years. With this comprehensive paradigm, the Indonesian palm oil industry continues to grow in a sustainable perspective.

Acknowledgment

I would like to thank Prof. Dr. Moermahadi Soerja Djanegara, Dr. Iriyadi, Mr. Nusa Muktiadji for their valuable support in this research. I also would like to extend many thanks to Dr. Tungkot Sipayung as the Executive Director of PASPI, which has facilitated this research and supported me to attend the International Conference.

References

- [1] PASPI, 2016. Perkebunan Sawit Rakyat dan Peran Strategisnya di Masa Mendatang. *Jurnal PASPI Monitor* Vol. II No. 15 : p 369-374
- [2] Kementerian Pertanian RI, 2018. "Kementerian Pertanian: Lahan Sawit Indonesia Capai 14,03 Juta hektare", Tersedia pada <https://ekonomi.kompas.com/read/2018/02/26/203000426/kementerian-pertanian--lahan-sawit-indonesia-capai-14-03-juta-hektare>
- [3] USDA, 2018. Palm Oil production. Available in <https://www.indexmundi.com/agriculture/?commodity=palm-oil&graph=production>
- [4] GAPKI 2018. Perkembangan mutakhir Industri Minyak Sawit Indonesia. Available in <https://gapki.id/news/3971/perkembangan-mutakhir-industri-minyak-sawit-indonesia>
- [5] PASPI. 2016. Replanting Sawit dan Pembangunan Ekonomi Baru. *Jurnal PASPI Monitor. Analisis isu Strategis Sawit*. Vol. 2 No. 33 : p 487-494
- [6] PASPI, 2014. Industri Minyak Sawit Indonesia Menuju 100 Tahun NKRI. Bogor. PASPI. Bogor
- [7] Aldington, T.J. (1998), "Multifunctional Agriculture: a Brief Review from Developed and Developing Country Perspectives", unknown status. FAO Agriculture Department, Internal Document.2
- [8] Huylenbroeck, G. V.; V. Vandermulen, E. Mette Penningen, A. Verspecht. 2007: Multifunctionality of Agriculture: A Review Definition, Evidence and Instruments. *Living Review in Landscape Research* 1: (2007) : 3
- [9] Idris Omar, Azman Ismail and Chang Lin Chong. Improving Productivity: The Replanting Imperative. *Oil Palm Industry Economic Journal* (Volume 1/2001) : 21-29
- [10] World Bank, 2012. Inclusive Green Growth: The Pathway to Sustainable Development. The World Bank Washington DC
- [11] Sipayung, T, & Purba, J.H.V. (2015). *Ekonomi Agribisnis Minyak Sawit*. Palm Oil Agribusiness Strategic Policy Institute. Bogor
- [12] Sato Y. 1997. *The Palm Oil Industry in Indonesia: Its Structural Changes and Competitiveness*.

- In Waves of Change in Indonesia's Manufacturing Industry (ed: M.E Pangestu and Y. Sato). Institute of Developing Economics. Tokyo
- [13] Moon, W. (2012). *Conceptualizing Multifunctional Agriculture from a Global Perspective*. Departement Agribusiness Economics Southern Illinois University
- [14] PASPI. 2016. Sustainability Ekspor Minyak Sawit Indonesia Sebagai Industri Strategis Nasional. *Jurnal PASPI Monitor. Analisis isu Strategis Sawit*. Vol. 2 No. 32 : p 479-486
- [15] Feher, I and J, Beke. 2013. *The Rational Of Sustainable Agriculture*. Iustum Aequum Salutare IX:2013(3) p 73-87
- [16] Moon, W. (2012). *Conceptualizing Multifunctional Agriculture from a Global Perspective*. Departement Agribusiness Economics Southern Illinois University. Carbondale IL 62901.
- [17] OECD. 2001. Multifunctionality Towards an Analytical Framework. OECD. Paris
- [18] Tomich, T.P dan Mawardi, M. S. 1995: *Evolution of Palm Oil Trade Policy in Indonesia 1978-1991*. *Elaeis* Volume 7 (1): P 87-102
- [19] Susila, W. R. 2004. *Impact of CPO Export Tax on Several Aspects on Indonesia CPO Industry*. *Oil Palm Industry Economic Journal* 4 (2): 1-13
- [20] Amzul, R. 2011: *The Role Palm Oil Industry In Indonesia Economy and Its Export Competitiveness*. PhD Dissertation. University Of Tokyo
- [21] PASPI, 2014 : *Industri Minyak Sawit Indonesia Berkelanjutan*. Peranan Industri Minyak Kelapa Sawit Dalam Pertumbuhan Ekonomi, Pembangunan Pedesaan, Pengurangan Kemiskinan dan Pelestarian Lingkungan. *Palm Oil Agribusiness Strategic Policy Institute*. Bogor
- [22] PASPI, 2015. Prognosa Dampak Pungutan Ekspor Minyak Sawit Terhadap Industri Minyak Sawit Indonesia. *Jurnal PASPI Monitor* Vol. 1 No. 13 : p 91-96
- [23] Greig-Gran, M. 2008: *The Cost Avoiding Deforestation Update of The Report Prepared For Stern Review Economic of Climate Change*. International Institute For Environment And Development
- [24] Europe Economics. 2014. *The Economic Impact of Palm Oil Imports In The EU*. Europe economics, chancery house, 53-64 chancery lane. London WC2A 1QU
- [25] Sumarto, S and A. Suryahadi. 2004: *Trade, Growth and Poverty in Indonesia*. National Conference Of The University Outreach Network. Bogor
- [26] Susila, W. R. 2004. *Impact of CPO Export Tax on Several Aspects on Indonesia CPO Industry*. *Oil Palm Industry Economic Journal* 4 (2): 1-13
- [27] Joni, R. 2012. *Dampak Pengembangan Biodiesel dari Kelapa Sawit Terhadap Kemiskinan, Pengangguran dan Pertumbuhan Ekonomi Indonesia*. Disertasi. IPB. Bogor
- [28] PASPI, 2014. *Industri Minyak Sawit Indonesia Berkelanjutan : Peranan Industri Minyak Sawit dalam Pertumbuhan Ekonomi, Pembangunan Pedesaan, Pengurangan Kemiskinan dan Pelestarian Lingkungan*. PASPI. Bogor
- [29] Henson I. 1999. *Comparative Ecophysiology of Palm Oil and Tropical Rainforest*. Oil Palm and Environment A Malaysian Perspective. Malaysian Oil Palm Brower Council. Kuala Lumpur
- [30] Harahap, I. Y, Y Pangaribuan, H. H Siregar, E Listia. 2005: *Lingkungan Fisik Perkebunan Kelapa Sawit*. PPKS. Medan
- [31] Fairhurst. T. and R. Hardter, 2004: *Oil Palm: Management for Large and Sustainable Yields*. Oxford Graphic Printers, Pte Ltd
- [32] Chan, K. W. 2002: *Oil Palm Carbon Sequestration and Carbon Accounting: Our Global Strength*. MPOA
- [33] Murayama, S. and Baker, Z. A. 1996. *Decomposition of Tropical Peat Soils. Decomposition Kinetic of Organic Matter of Peat Soils*. *Japan Agricultural Research. Quarterly*. **30**: 145-151
- [34] Melling, L. Hatano, R. and Goh, K. J. 2005. *Soil CO₂ Flux From Ecosystem in Tropical Peat Land of Serawak*. *Malaysia. Tell us*. **57**: 1-11
- [35] Sabiham, S. 2013. *Sawit dan Lahan Gambut dalam Pembangunan Kebun Kelapa Sawit di Indonesia*. Himpunan Gambut Indonesia

Reproduced with permission of copyright owner. Further reproduction prohibited without permission.