Peat Policy and Its Implications on Value Chains of Indonesian Palm Oil

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Abstract

Palm oil and its derivative products are strategic commodities that play important role in the economic development in Indonesia which along with Malaysia are the main exporters to the global markets. Global well as national demands on crude palm oil are increasing not only as food but also as raw material for biodiesel. To increase production, the extensification of oil palm plantation in Indonesia is still preferable choice. Since there are limited fertile mineral soils, the marginal lands such as peatlands have become targeted areas to open new plantations. Due to reoccurring fire and haze problems while attempting to restore degraded peatlands, the government has issued By Law No 57 in 2016 to protect and manage Peat Ecosystem (Peat Policy). This peat policy which mainly aims at preventing environmental degradation would to some extent reduce planting areas and give implications to the production stretching to the supply and value chain of palm oil and its derivative products. This study assessed how the peat policy affected the planting areas, production, economic value, growers especially the farmers including to the export quantity and value. Herewith, we applied numerical approaches followed with simulation subjected to set-up scenarios. Compared to 2015 figures, the peat policy would reduce palm oil plantation area 10–18% and production 12–15% with the potential implications to the reduction of: 1) economic values 12–15%, 2) number of farmers 12–15%, 3) exported palm oil 21–24%, 4 export value 22–24% and 4) cost of fresh fruit bunch 6–8%. These reductions are so severe to the economic development of the countries and threatening the welfare of the farmers. Accordingly, the government and practitioners should settle on policy choices conducive toward the sustainable development of oil palm plantation in the peatlands, i.e., on how to improve integrated spatial planning, environmentally sound peatland management, intensification program to increase productivity and environment monitoring system.

Keywords: Peatland, peat policy, palm oil, value chain

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Introduction

Oil palm and its derivative products are strategic commodities that take important roles on Indonesia economic development. Palm oil plantation (Figure 11) are steadily extending with an average rate of 420 thousand hectares every year since 1990s and has reached more than 11.4 million hectares in 2015.

Palm oil planters can be distinguished into 3 big categories, which are Smallholders (Farmer), State Owned Companies (State) and Private Companies (Private). In average, Private extends its planted area with a rate of 215 thousand per year followed by Farmer with 185 thousand hectares per year while State is only 15 thousand hectares per year. In composition, from the total planted areas (2015), Private, Farmer and State hold 52%, 41% and 7%, respectively. Plantation extension can be divided into 3 periods, which are before 2004 where most of the oil palm were planted in mineral soil lands, around 2004–2006 as a transition periods with very slow extension rate because of the limited mineral soil lands, and after 2006 where the extension has moved to marginal peat lands.

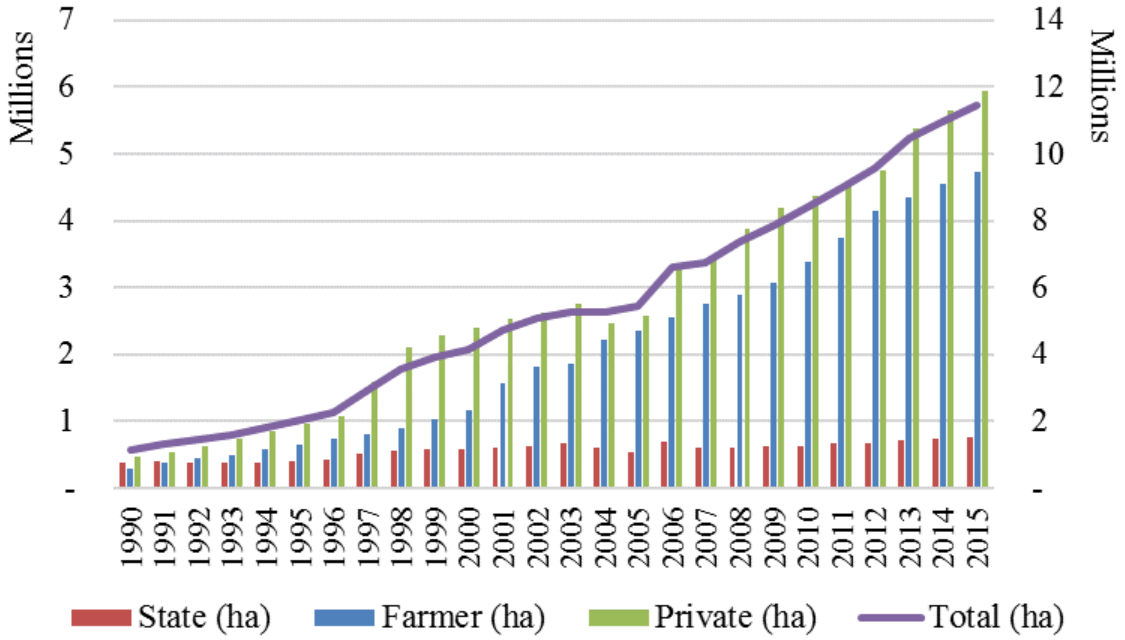


Figure 11Plantation Area (1990-2015)
Source: Dirjenbun, 2015

In national scale, land productivity varied between 1.65–2.72-ton crude palm oil per hectare with its average 2.32 ton per hectare (Figure 12). Based on the planters, Farmer produces 1.07–5.2 ton/ha with its average 1.87 ton/ha, State produces 2.48–4.07 ton/ha with its average 3.13 ton/ha and Private produces 1.46–3.09 ton/ha with its average 2.14 ton/ha. State is more productive than the two others because most of its plantations are in mineral soil lands which are more fertile than those the lands cultivated by the two others which are mostly in peat lands and other marginal lands such as wetlands, abandoned lands.

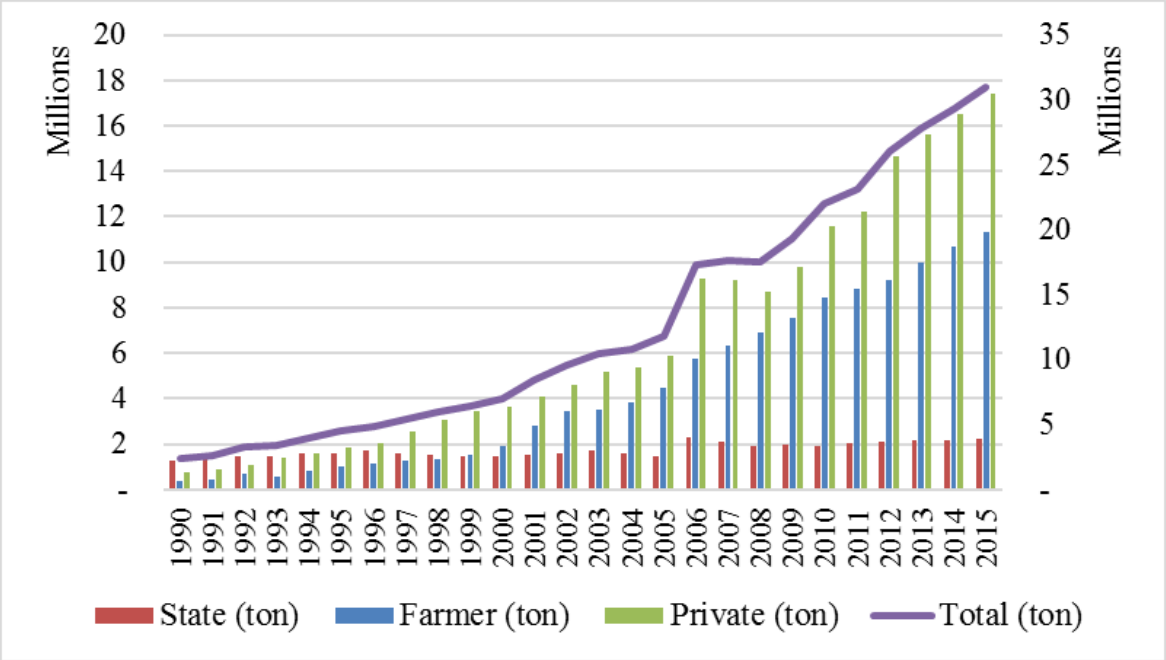


Figure 12. National CPO Production (1990-2015)
Source: Dirjenbun, 2015

Crude palm oil (CPO) production in the country (2015) has reached 31 million ton in which Farmer holds 37%, State 7% and Private 56%. Total asset value of CPO is equivalent to 13.5 Billion USD distributed among Farmer 55%, State 7% and Private 44%. Production development of COP (**Error! Reference source not found.**) can be distinguished into 3 periods, which are before 2005, between 2005–2006 and from 2006. Using two linear equations each having 3 variable inputs, which are Farmer's Land Area (A_P), State's Land Area (A_B) And Private's Land Area (A_S), the national CPO production (P_{CPO}) can be represented by the following Composite Model.

$$P_{CPO}=\alpha_i A_P + \beta_i A_B + \gamma_i A_S \quad (1)$$

Where,

α_1=2.19; β_1=2.48; γ_1=1.65; R^2=0.96; RMSE=148.777 for the periods of 1990≤t≤2005;

α_2=2.50; β_2=2.61; γ_3=2.72; R^2=0.98; RMSE=275.754 for the periods of 2006≤t≤2015.

Based on this model, optimal productivities for Farmer is about 2.50 ton/ha, State 2.61 ton/ha and Private 2.72 ton/ha. Private's productivity is commonly higher compared to the others which is not surprising because it is more intensive in cultivation and proactive in applying national and international standards such as ISPO[1] and RSPO[2]. Based on business as usual or without any limitation of land extension, in 2020, CPO production will reach 37

[1] http://ispo.or.id/. Diaskes 18/11/2016
[2] http://www.rspo.org/about. Diaskes 18/11/2016

million tons with total plantation area 14 million hectares, where additional lands of 2.8 million hectares are peatlands. This land addition is not from newly opened peatlands ands but from the existing degraded peatlands which is in total amounted to 4 million hectares (Agus et al, 2015). While the total area of peatlands in the country amounted to 15 million hectares (BBSDLP, 2011).

In the wake of environmental degradation especially concerning annual peatland and forest fires and followed by the presidential instruction (INPRES) No 8 in 2015 to halt new permits and to gain better management on pristine forests and peatland, those projections would not easily be materialized and even it would give negative implications to the growth of CPO industries in the country. This INPRES that proposedly would be end in 2017 seemingly be extended for another 5 years except for the developments of geothermal, oil and gas, electrical energy, rice and sugar cane fields. In a previous study, Falatehan and Setiawan (2016) have analyzed and simulated the implications of INPRES to the value chains of CPO. Based on 3 scenarios, which are: 1) no expansion (0 ha/year); 2) under INPRES with possibly less extension (100 thousand ha/year); and 3) under normal condition (500 thousand ha/year), in a period of 2011–2015, there would be no significant changes (<0,01%) for all value chains except for one variable which is there would be increase of CPO production 1.52% and 0.30% each without halting and under INPRES. These changes are very small and accordingly, the INPRES is not effective and gives no significant implications.

Recently, another Governmental Regulation No 57 in 2016 (PP 57/2016) was issued to strengthen a previously most controversial regulation (PP 71/2014) concerning Protection and Management of Peat Ecosystem. Many parties agree that PP 57/2016 will ease further trends and even can restore peatland degradation but other parties who cultivate peatlands become unsecured because this harsher instruction on peatland managements would jeopardize production. This study aims to elaborate how far PP 57/2016 would give impacts to the plantation area and CPO production, and its implications to value chains, planters especially Farmer and Indonesian CPO Export.

Peat Policy

With the issuing of PP 57/2016 (herewith named Peat Policy), about 30% or more of Peat Hydrological Unit (PHU[1]) should be conserved meaning that a company operating in peatland is obliged to set aside its area for conservation (Chapter 9, Verse 3). In addition, the company is also obliged to set aside its area having a peat depth more than 3 m for conservation gain (Chapter 9, Verse 4(a)). These two restrictions would potentially reduce plantation areas and accordingly CPO productions. Furthermore, the company should manage water table in the peatland in order not to exceed a depth of 0.4 m (a criterion to judge destructed peat) from the peat surface (Chapter 23, Verse 3(a)). This restriction would decrease or even cease productivity because in many cases, setting the water table lower than 0.4 m will reduce

[1] Peatland bordered by two adjacent rivers, and/or a sea line.

productivity (Kalsim et al, 2016) in reasons that the root zone becomes limited, two wet and lack of oxygen or bad aeration. To implement PP 57/2016 however planters in peatlands need to provide accurate maps which per the regulation should be based on a basic map with at least scaled 1:50,000, and if necessary to reshape its plots to suit the biophysical condition of the peatlands to improve water management.

Plantation Area

Out of the total plantation area which is 11.4 million hectares in 2015, about 80% lays in mineral soil land and the rest of 20% (2.3 million hectares) are distributed and managed by Farmer 41%, State 7% and Private 52%. If at least 30% out of 2.3 million hectares to be conserved, then the total area would become 10.8 hectares. From our empirical data, in a certain PHU, peat depth is distributed unevenly with space and elevation (Setiawan and Rudiyanto, 2015). In general, peatland area having peat depth 3 m or more distributes between 20–80% meaning that rest of plantation area would be in the range of 9.4–10.3 million hectares. If compared to the previous area of 11.4 million hectares then the area reduction would be 10–18% over which managed by Farmer 3.8–4.3 million hectares, State 0.63–0.69 million hectares and Private 4.9–5.3 million hectares.

CPO Production

Setting up water table at least 0.4 m below peatland surface is potentially reducing land productivity in a range of 50–70% dependent on peat type (Kalsim et al, 2015; Valentina et al, 2014). With the decreasing plantation areas mentioned before and land productivity, the national CPO production from 28.5 million tons would reduce to 27.1 million after 30% of the lands allocated for conservation, and would further reduce to 24.5–26.1 million ton after 20–80% of parts of the land having peat depth 3 m or more allocated for conservation, and would further reduce to 24.2–25.1 million ton after setting water table about 0.4 m from the peatland surface. Thus, in total, there would be reduction of CPO production between 12–15%. Farmer would share CPO production in between 9.6–9.9 million ton, State 1.6–1.7 million ton and Private 13.0–13.5 million ton.

Economic Value

As shown in **Error! Reference source not found.**, CPO price in global market and its export price fluctuate with time. Though they are in the same patterns of price that have a proportional correlation which can be expressed with the following equation.

$$H_E = 0{,}99\ H_D \quad \text{..... (2)}$$

With $R^2 = 0{,}96$.

Where, H_E is export price and H_D is global price.

The maximum price was above 1000 USD/ton attained in 2011 but then decreasing sharply with time toward 2015. If followed with this trend, then in 5 years it will reach the lowest value that has been attained previously in 2001 which was about 200 USD/ton.

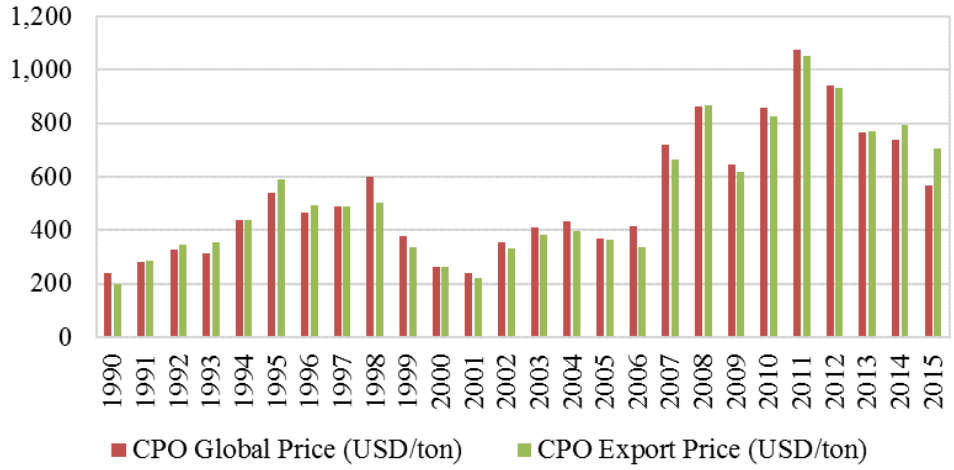


Figure 3 Fluctuation of CPO Price
Source: Dirjenbun, 2015

The price of fresh fruit bunch (FFB) that was received by Farmer (**Error! Reference source not found.**) was also fluctuates with time but its trend increasing especially from 1999 then became steadier from 2011 toward 2015. In general, FFB price was relatively stable compared to the export and global prices. Though, FFB price to same extent is seemingly influenced by the global price. By using Cobb Douglas[1] model with variable inputs of global price (H_D) and national CPO production (P_{CPO}), FFB price (H_{FFB}) can be estimated by the following equation:

$$H_{FFB}=\alpha\ (H_D^{\beta}P_{CPO}^{\gamma}) \quad \text{..... (3)}$$

Where, $\alpha=5.1\ 10^{-5}$; $\beta=0.467$; $\gamma=0.824$; $R^2=0.957$ dan RMSE=22.23.

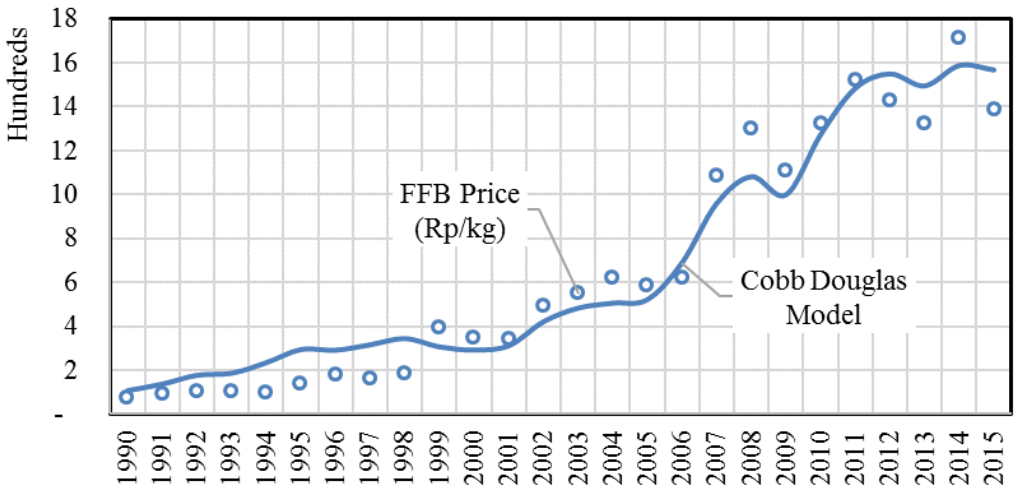
From 2011, the model shows FFB price becomes stable around 1.600 IDR per kilogram. Referred to the price in 2015, under the implementation of PP 57/2016, the economic values held by Farmer would reduce from 15.6 billion IDR to around 13.3–13.7 billion IDR, State from 1,1 billion USD to 0.92–0.95 billion USD and Private from 10.8 billion USD to 9.2–9.5 billion USD with the reduction rate is 12–15%.

Work Forces

In 2015, there were about 4.95 million farmers involved in oil palm plantation. In proportion with the reduction rate of economic value due to lesser production, it is estimated that many farmers would lose jobs around 590–740 thousand persons and the remaining farmers that could maintain to work in the plantation would become 4.2–4.4 million persons.

1 http://economicpoint.com/production-function/cobb-douglas. Diaskes 18/11/2016

More massive layoff would be experienced by work force in Private and would create domino effects along the industrial lines from the upstream to the downstream up to the exporters. It

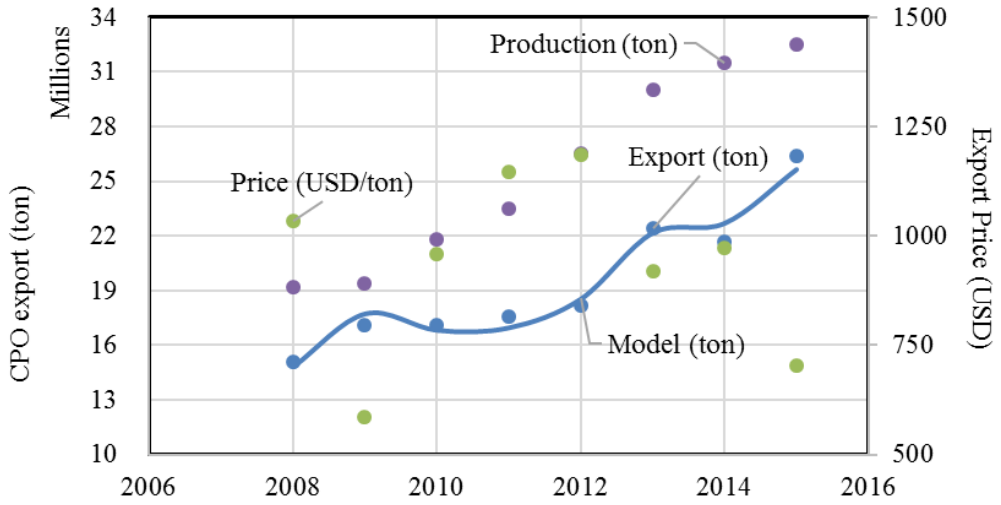


is estimated about 12% of direct workers would lose their jobs.

Figure 4 Farmer FFB Price
Source: Dirjenbun, 2015

CPO Export

Indonesian CPO export[1] is climbing along with production increase (**Error! Reference source not found.**). About 60–88% out of the total production, CPO was exported and reached 26.4 million ton valued to 18.6 billion USD. The export price fluctuated with time and reached the highest value above 1100 USD/ton around 2011–2012 then decreased continually reaching below 700 USD/ton in 2015 and it is predicted to reach 600 USD/ton in 2016 or 2017. Many observers consider that CPO price is highly influenced by the petroleum price.



[1] http://www.indonesia-investments.com/id/bisnis/komoditas/minyak-sawit/item166. Diakses 12/11/2

Figure 5 CPO Production Export
Source: Dirjenbun, 2015

Error! Reference source not found. also shows a model (line) for CPO export (E_{CPO}) based on 2 variable inputs which are national CPO production (P_{CPO}) and export price (H_E) using another Cobb Jacob model as follows:

$$E_{CPO}=\alpha(P_{CPO})^{\beta}(1/H_E)^{\gamma} \quad (4)$$

Where, α=118.668, β=0.824 and γ=0.300 with R^2=0.972 and RMSE=272.537.

If under PP 57/2016, the national CPO production decreases to 24.2–25.0 million ton and with the assumption that the export price is 700 USD/ton then the exported CPO would be around 20.1–20.7 million ton or equivalent to 14.1–14.5 billion USD. In this case, there would be reduction about 19–21% from compared to that in 2015. By using Equation 3 (**Error! Reference source not found.**), FFB price TBS would be around 1.275–1.310 IDR/kg or cheaper around 6–9% from its price in 2015 which means that there would be less income earned by Farmer.

Concluding Remarks

The implementation of Peat Regulation (PP 57/2016) would potentially decrease: 1) plantation areas from 11.4 million hectares in 2015 to around 9.4 (82%)–10.3 (90%) million hectares; and 2) Indonesian CPO production from 28.5 million ton to around 24.2 (85%)–25.1 (88%) million ton. This contraction of CPO production would give implications on the reductions of (Table 33): 1) economic value from 27.5 billion USD in 2015 to around 23.4 (85%)–24.2 (88%) billion USD; 2) CPO export from 26.4 million ton to around 20.2 (76%)–20.7 (78%) million ton; 3) Export value from 18.6 billion USD to around 14.1(76%)–14.5 (78%) billion USD; 4) FFB price from 1,388 IDR/kg to around 1,272(92%)–1,310(94%) IDR/kg; and 5) Farmers from 5 million person to around 4.2(85%)–4.4(88%).

Further implications could be expected to appear such as soaring prices of CPO derivative products, and impacting on the government bio-solar program in attempting to increase CPO mixed percentage and other CPO based industries. The worst cases would be experienced by many farmers who could not cultivate their owned lands anymore and by the direct and indirect workers that previously involved on CPO based industries.

Table 33Changes of Value Chains

Variables	In 2015	Implementation of PP 56/2016			
		Min	Max	Min	Max
Economic Value (B-USD)	27.5	23.4	24.2	85%	88%
CPO Export (M-ton)	26.4	20.2	20.7	76%	79%
Export Value (B-USD)	18.6	14.1	14.5	76%	78%
FFB Price (Rp/kg)	1,388	1,275	1,310	92%	94%
Farmers (M-Person)	5.0	4.2	4.4	85%	88%

Policy Implications

To anticipate the economic contraction due to the implementation of PP 57/2015, the government should take immediate actions, in examples, on how to ease tensions from farmers and workers who would lose their jobs, to promote tax incentive/reduction to maintain reasonable incomes gained by the planters and CPO industries, to absorb more CPO for bio-solar program especially when FBB and CPO export price are declining, to disseminate methods and technologies for the farmers to process CPO into products having higher added values.

The government should be able to convince the planters and the societies that the policy would support to achieve a sustainable development of oil palm plantation in the longer terms with no more threatening from peatland fires and forest encroachments. Immediate steps to be taken among others are improving the spatial land arrangement, promoting proper peatland management, introducing intensification program to elevate land productivity, and developing reliable environmental monitoring system specially to detect extreme condition of the peatlands.

The government needs to get immediate solution on how to manage degraded peatlands that evidently have become the source of annual fires. As recommended by Agus et al (2015), it would be worthwhile: 1) in a short term to accelerate steps on rehabilitating unmanaged peatlands to be allocated for other purposes rather than forest alone; and 2) in the longer term to allocate other unmanaged peatlands outside those allocated for other purposes in example through land swap mechanism whether to be protected or developed areas. These mechanisms however would need throughout assessments to result in right policies equipped with supporting regulations.

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