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## **Sustainability of Malaysian oil palm: a critical review**

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**Abstract:** Despite some industrial disruption, palm oil is still among the strongest industry of Malaysia. This journey of excellence towards becoming the global leader is getting momentum by support from MPOB, a leader in palm oil research across the globe. This study is to assess the oil palm smallholder activities in Malaysia in order to ensure the sustainability to face the global challenges and competitions of the international markets. Thus, the industry is emerging not only as a dependable source of economic empowerment of the country, but also posing a serious threat towards ecological and social balance due to unawareness of the sustainability issues. With their outstanding share, the industry has potential to lead the market in the near future, but in the way of expansion it must focus on the sustainability issues especially related to environment, economy and society, which can adversely or constructively influence the industry and its production.

**Keywords:** environmental; economic; social; sustainability; oil palm; palm oil industry; fresh fruit bunch; smallholders; sustainable practices; Malaysia.

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## **1 Introduction**

Currently, palm oil is the world's leader in the vegetable oil industry with yearly production and consumption of about 45.3 million tons, which almost cover 60% of global trade of vegetable oils in the international market and it is expected that by 2020, the global demand for palm oil will be doubled (World Bank, 2010; USDA, 2009). The palm oil industry is expected to contribute significantly towards society over the next four decades. Recently, approximately 15 million ha oil palm has been cultivated globally (FAO, 2009; Fitzherbert et al., 2008; Koh and Ghazoul, 2008; Koh and Wilcove, 2008). Numerous consumer items like sweets, baked goods, cosmetics, detergents, margarine are produced using the oils extracted from these palm oils. Since 1990s, around 74% of global production of palm oil has been used for producing food products and the remaining 26% has been used at industries in response to growing demands from the European Union, China and India. As a result, the global land area occupied for producing oil has increased by about 43% (UNEP and UNESCO, 2007; USDA, 2010; RSPO, 2011).

Oil palm cultivation is mainly centralised in some countries in Southeast Asia, South America, Africa and Oceania. Major countries which are producing oil palms are Malaysia, Indonesia, Thailand, Ecuador, Colombia, Nigeria and Papua New Guinea (FAO, 2009) and the existing land areas are expanding because of cultivation of palm oil in some other countries (WWF Malaysia, 2011). As a result, total land used for cultivation of palm oil has gone up to 6.3 million hectares from 2.9 million with active

participations of smallholders. Moreover, this expansion has also created approximately 1.3 million jobs in addition to existing 1.7 million jobs in this industry (Deininger, 2011). This development in palm oil production is not only strengthening the economy but also participating in poverty alleviation as well as rural and social development (Begum et al., 2018; Feintrenie et al., 2010; Basiron, 2007; Zen et al., 2005; Alam et al., 2016; Abazue et al., 2015).

Oil palm is one of the leading driving forces of agricultural sector of Malaysia. The palm oil industry is the fourth largest industry which is contributing to the Malaysian national economy and plantations make up 77% of agricultural land or about 15% of total land area (EP Unit, 2017; Basiron, 2007; MPOB, 2012). The industry started to grow almost 100 years ago and, at present, almost 71% of cultivable lands of Malaysia are used to grow palm. The industry is being regulated by the MPOB. The main responsibilities of the board are to prepare guidelines, make policies and practices of the industry. With its supervision, the industry was able to cultivate 4.7 million hectares of land for oil palms during 2009 with fresh fruit bunches (FFB) yielding 21 tonnes ha – per year. This production is the highest in the history of palm oil production. In recent years, Malaysia got enormous attention from different parts of the world and has been recognised globally for its success stories including alleviation of poverty and equal wealth distribution, etc. To illustrate the success stories, the example of Federal Land Development Authority (FELDA) can be mentioned. The initiative taken for rural development under the name FELDA was highly appreciated and acclaimed across the globe. The core concept was to find out how the smallholders deal with and when they encounter various policy arrangements. As a member of Roundtable on Sustainable Palm Oil (RSPO), FELDA has maintained significant contribution in maintaining higher outputs (Begum et al., 2018, 2016, 2015a, 2015b, 2015c, 2014a, 2014b, 2014c). Besides, according to Dompok (2010); RSPO successfully integrated FELDA for the organised smallholders of oil palm, specifically the supported and schemed smallholders of Malaysia. In 2007, the area of cultivation raised to 4.24 million compared to 1980s 1.02 million. This also accelerates the number of workers at 405,000 in 2007 compared to 92,352 in 1980.

However, the trend of production of world key palm oil producer from 2013 to January 2018 has been presented in Table 1 (USDA, 2018; Oil World, 2018; MPOB, 2018). However, the sources revealed that the Malaysia is the second largest producer after Indonesia (Table 1). Table 1 also demonstrated that oil palm industry of Malaysia produced 20,500 tons during 2017/18 statistics. However, the largest share of total palm oil production in 2005 was for Malaysia (MPOB, 2006). After 2005, Malaysia lost its position to Indonesia in palm oil production. Currently, Indonesia has the largest share in the world palm oil production which is notably increasing gradually over the years. The reason behind this great expansion of oil production is that the government of Indonesia is highly ambitious about palm oil production and they targeted to plant oil palm at about an area of 9 million hectares by 2025.

According to Table 1, due to diversified problems in the smallholders' farms, deforestation, hazing, and community problem, etc., create economic insecurity. In environmentally flimsy and remote areas, the dwellings of majority of these small-scale farmers are situated and they become the part of disenfranchised and marginalised populations. For local community, one of the destructive elements is the oil palm. Due to oil palm expansion in those areas, the rural people have to (be) evacuate (d) from their own areas'. Conversely, the economy and rural employment are vastly assisted by the oil

palm in Malaysia through small holder program and plantation. The migrations of foreign labours in Malaysia have taken place due to trained and qualified professionals' involvement in other employments rather than oil palm. More consciousness for sustainability can be generated among the settlers through Malaysian oil palm smallholders' action which will be assessed in this study. Hence, to follow and extend the previous works, the main purpose of this paper is to review studies on sustainability of oil palm smallholders from 1987 to 2018. However, there are numerous journals critically reviewed in this study. There were papers found through electronic databases (Inderscience, Sustainability, Emerald, MPOB Publications, JSTOR, Sage Journals, Science Direct, Maklumat Asas Felda, CIFOR, UNDP, WB, etc.) using the keywords 'sustainability, oil palm, palm oil industry, smallholders, Malaysia'.

**Table 1** Major palm oil world production (thousand metric tons)

| <i>Production</i> | <i>2013/14</i> | <i>2014/15</i> | <i>2015/16</i> | <i>2016/17</i> | <i>2017/18 Jan</i> |
|-------------------|----------------|----------------|----------------|----------------|--------------------|
| Indonesia         | 30,500         | 33,000         | 32,000         | 36,000         | 38,500             |
| Malaysia          | 20,161         | 19,879         | 17,700         | 18,860         | 20,500             |
| Thailand          | 2,000          | 2,068          | 1,804          | 2,500          | 2,700              |
| Colombia          | 1,041          | 1,110          | 1,275          | 1,147          | 1,269              |
| Nigeria           | 970            | 970            | 970            | 970            | 970                |
| Other             | 4,690          | 4,845          | 5,153          | 5,397          | 5,393              |

*Source:* USDA (2018), Oil World (2018) and MPOB (2018)

## 2 Critical review (1998–2018)

### 2.1 Concept of oil palm sustainability

Along with professionalism, integrity and respect; another vital industry value is sustainability. The areas for sustainable development contribution are environmental, social and economic developments. Sustainability of supply chain is so much essential for adjustment with the risks associated with the resource scarcity and change of global environment. There are diversified sustainability challenges that are currently being faced by organisations. These challenges need to be overcome effectively. In terms of long terms sustainability of business, one of the key options can be the sustainable resource management.

According to the United Nations (UN), one of the basic principles for social, environmental and economic development is the sustainable development (Hansmann et al., 2012). In early 90s, the business society developed linkage among three areas from where the 'triple bottom line' concept was initiated and the achievement of economic development benefits and sharing of the cost of environment are the aims of these three areas (Hansmann et al., 2012; Scoones, 2007; Elkington, 2004). This denotes that all economic, human and natural aspects which include profit, people and planet (the 3Ps), need to be associated with the consideration of the sustainable development.

The sustainability is somehow a future success condition not a sole option. It denotes that it is very essential to integrate the day to day business with the issues of sustainability since the perception of customers and the society depends on the negative

and positive impacts of those issues (Hansmann et al., 2012). Conversely, since these three dimensions are not enough for their own, priority towards one dimension will not bring the desired result for the industry and firms (Henriques and Richardson, 2004, Hansmann et al., 2012). The making of sustainable decision is a very critical task which creates positive correlation and synergies. The balancing and integrating of these three pillars have a vital part in the name of conflict resolution.

The United Nations Conference on Trade and Development (UNCTAD's) report until 1960s denotes that few initiatives were taken by the government for industrial expansion along with the diversification of agriculture beyond tin and rubber which is underway the crude oil palm refining and paves Malaysia's industrial development. The introduction of land settlement program at that time by the government for palm oil plantation has also created opportunities for earning income and providing employment to people of the rural areas, more specifically poor, smallholders and landless farmers. The attributes are liable for creating sustainable RSPO of oil palm is not identified accurately but the palm oil production that does not have any negative impact on the environment and the society is popularly known as sustainable oil palm (Rietberg, 2011). There are 39 principles and eight criteria of the sustainability and the core position is being placed to the palm oil firm by these criteria where different complex issues are failed to be addressed in the local region which is entangled by the company and state's political power. The industry sector organises the RSPO self-consciously and on the basis of voting and consensus, organisations take entire decisions which bring industrial success.

The absence of the group of civil society and governmental representation narrowly influence the society-state relations with palm oil agrarian and other crosscutting matters in the context of palm oil (Dauvergne and Neville, 2010). According to the law of Indonesia, legal security can be assured by the RSPO standards' new plantation initiatives such as HCV (Colchester, 2011). However, the right of indigenous peoples' needs to be respected by the RSPO standard, FPIC initiatives which currently are not much strong due to the absence of proper law in Malaysia. This is asserted with 'the customary rights of the local people are not being protected currently by the Indonesian law where its main purpose is to assure local people and communities' right protection'. However, it is very essential to sort out the future of palm oil sustainability whether it is (Colchester and Jiwan, 2006) positive or not. According to the researchers, several windows of chances will be opened by the regulation of the palm oil business through RSPO which expand the managerial scope of palm oil including worldwide intervention. Towards the initiatives of RSPO, positive response is delivered by both Indonesia and Malaysia that strengthen the palm oil sustainability standards of the nation called Indonesia Sustainable Palm Oil (ISPO) and Malaysia Sustainable Palm Oil (MSPO). Suswono, the agricultural ministry of Indonesia designed the ISPO to create sustainable production of palm oil with the compliance of the regulations and laws of Indonesia in accordance with the international environmental non-governmental organisations to eradicate weak governance by which the deforestation incurred by different major producers of oil palm will be handled very strictly (The Jakarta post, 2010). From that viewpoint, for completing the voluntary standards of RSPO certification through laws and regulations, the national policy will be shaped directly by the RSPO voluntary standards.

Therefore, the firms which generally market their palm oil outside the European market have to face limited 'unsustainable' practice restrictions. The palm oil's

sustainability standard and compliance of P&C can be called by the major RSPO business players. According to the local people's perspective, the environment and the economic life of these people are not changed significantly by the oil palm sustainability as RSPO. The independent farmers of this area are being excluded from the oil palm sustainability framework which creates new formation of classes. Through analysing, it is found that full certification on segregated supply chain was taken by the company which drive the company to exclude the independent farmers from the FFB purchase. That is why, the FFB of independent farmers are being sold to the intermediaries below the current market price of FFB. Cautionary notes are added by the further analysis of the palm oil industry that a new agenda regarding palm oil sustainability is being taken based on political consideration. It is evident with delivering focus on solely national or local behavioural changes without proper international linkage, it is quite hard to achieve sustainability (Keil et al., 1998). Primarily, the development of palm oil industry is being challenged by the certification of RSPO. The national level palm oil production is being reinforced continuously by the rising global market demands of the palm oil through which people's vulnerability, ecosystem exacerbation and deforestation will be accelerated. It denotes that the commodity chain along with the patterns of consumers and producers' behaviours can be reinforced mutually to the sustainability (Jakarta post, 2010). It is added that the customers of those countries cannot miss out the sustainability program of RSPO as the suppliers of those countries lack certification for palm oil. The major concern of the palm business should be the environmental and social impact of the business. Therefore, without proper informed consent and prior procedure of negotiation among government and firms, it is not possible to protect human rights, economic profitability and ensure environment. The RSPO implementation and different perspectives of oil palm sustainability like investigation of NGOs, local people and companies' perceptions are being evaluated in this paper. The study assesses the smallholder activities in Malaysia in order to ensure the sustainability.

## *2.2 Concept of oil palm smallholders*

Oil palm smallholders' definition is (the definition used by the RSPO), a smallholder is to mean family-based enterprises producing palm oil from less than 50 ha of land. This is added with previous researcher, Vermeulen and Goad (2006), the productions of smallholders have much to offer the future of the palm oil industry in terms of sustainability and credibility in Indonesia and Malaysia. Both countries are responsible for over 80% of world oil palm production and smallholders account for 35–40% of the total area of planted oil palm and as much as 33% of the output and West African countries that produce mainly for domestic and regional markets, smallholders produce up to 90% of the annual harvest. However, smallholders form a vital part of the global agricultural community, yet they are often neglected (UNEP, 2013).

In terms of oil palm smallholder cultivation, the existence of recent literature on this matter is available (McCarthy and Cramb, 2009; Jelsma et al., 2009; Feintrenie et al., 2010; McCarthy et al., 2012; Rist et al., 2010; Cramb, 2011) and the livelihood of smallholder farmers is significantly increasing with their increase of incomes (Feintrenie et al., 2010). Additionally, within 2020, the cultivation of palm oil is expected to be expanded in both Indonesia and Malaysia with a range of 3%–8% (Wicke et al., 2011). New options of production expansion are forced to be implemented due to land scarcity in Malaysia and Indonesia. Different firms like UK's Equatorial Palm Oil, Malaysia's

Sime Darby, Indonesia's Golden Veroleum, USA's Herakles Farms, FELDA state plantation agency in Malaysia, and Singapore's OLAM are establishing or negotiating to establish oil palm farms with a range of 60,000–100,000 ha (Garcia-Ulloa et al., 2012). Poor indigenous people's degraded livelihood support of lands known as 'imperatary lindrica grassland' is the most challenging problem for this industry (Wicke et al., 2011). Experienced migrant labours will be brought in the oil palm production farms if the security of these people's employment will be in stake.

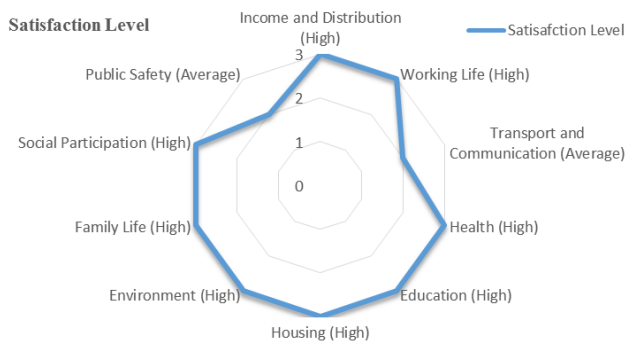
Further, through smallholder innovations' incentives, improving production and yields, etc., degraded lands can be developed (Feintrenie et al., 2010). Conversely, there are several hindrances behind the further expansion of palm oil cultivation in this area which are uncertain tenure lands, ineffective planning, weak local government, etc. In front of the unbiased social achievement and environmental value protection, the main trouble is these institutional malfunctions which disturb the expansion of oil palm production in these areas (Feintrenie et al., 2010). In the timeframe of 1997 to 2007, a dramatic growth has been experienced by the oil palm development with creation of almost 3 million new jobs in 2007 compared to 1.7 million in 1997 and this brings development of rural livelihood, opportunities of jobs, export market entrance, generation of bio fuel and national income by which the rural development promotion becomes possible in all extents (Clancy, 2008; Deininger, 2011). Moreover, the food price will be increased with the growth of oil palm and anti-palm group will be created due to the conflict of indigenous people and farmers' lands (Pye, 2010; Dauvergne and Neville, 2010; Clancy, 2008).

Ample research was conducted on the cultivation process of the palm smallholders (Jelsma et al., 2009; Feintrenie et al., 2010; McCarthy et al., 2012). As a plantation agency of Malaysia, FELDA is also contributing in the plan of the companies through negotiation in the palm plantation of the companies (Garcia-Ulloa et al., 2012). There is a controversy about this plan that those typical degraded land were the living places for the poor locals (Wicke et al., 2011). It is true that employment will be created, but the locals may fail to get the facility because of the plan of companies to recruit skilled workers from outsides. In case of reducing poverty and labour force's migration from countryside to cities and towns, this plays a very vital role through social stability contribution, infrastructural development and job creation. It becomes world's one of the biggest farm conglomerates compared to 51 years ago through resettling the landless and developing land. 112,635 numbers of families have been resettled and an amount of land of 853,313 ha has been developed (Ahmad, 2008). It is clear from the findings of Table 1 that a satisfactory quality of life is enjoyed by them. Moreover, according to the report of Feintrenie et al. (2010), the income level of the smallholders is increasing rapidly which improved their standard of living significantly. It is interesting according to the report of Wicke et al. (2011) that the countries like Malaysia, Indonesia, etc., are expanding their scope of cultivating palm oil because of the continuous success of the existing firms. It is evident with below spider diagram as the spider diagram (Figure 1) shows that all components are high according to smallholders' quality of life analysis.

Practically, the RSPO models' implementation has been scrutinised by different studies. The private governments partners' efficiency RSPO members' compliance are suggested to give emphasis on smallholders (Schouten and Glasbergen, 2011; Nikoluyuk et al., 2010). On the other hand, a significant impact may be contributed through the field implementation of the RSPO models achievement for oil palm industry reform but there

is no clear description regarding the necessary changes and standards of oil palm sustainability in the result of these studies (Schouten and Glasbergen, 2011). According to Feintrenie et al. (2010) those degraded lands can be effective to arouse the smallholders in innovating, expanding business, etc. Though the businesses are expanding in the areas; poor governance of the authorities like inefficient planning, land handover uncertainty, etc., will develop hindrance for the business in future. The environmental issues may be overlooked because of those inefficiencies which will impede sustainability of the area.

**Figure 1** FELDA, Malaysia settler's quality of life findings, 2008 (see online version for colours)



Source: Ahmad (2008)

Besides, according to Deininger (2011) palm oil business has seen extraordinary growth in the period of 1997 to 2007 and that growth of the palm business was very important for the country as the palm business created employment for almost 1.7 million to 3 million people. But Clancy (2008) argued that the rapid growth of the palm industry resulted in an inflation of food price. The local peoples were also marginalised because of losing their land which developed voice against palm oil cultivation (Dauvergne and Neville, 2010).

Several researches are conducted to evaluate the effectiveness of the strategies of RSPO for smallholders. Some of the studies were focusing on the activities of the members whether their activities are identical with the prescript or not. It is observed that the implementation of RSPO model can be effective in reforming the industry. Though the certification of sustainability was made, but how effective and what kind of change can take place after the certification was not defined clearly (Schouten and Glasbergen, 2011; Nikoluyuk et al., 2010). However, smallholder and especially independent smallholder palm oil production has the potential to contribute to socioeconomic and possibly also environmental sustainability, but this must go hand in hand with improvements in the mono-crop plantation production practices. Substitution of mono crop plantations with smallholder is unrealistic and unfeasible if the current production levels are to be kept up and palm oil production is to contribute, not only to the wellbeing of the smallholders themselves, but also to the national economy (Twiggs Den and Bertule, 2009). An attempt to dissect the activities of the smallholder of the industry is made through the study.



### **3 Materials and methods**

This study is designed as an analytical paper and has used secondary data regarding the palm oil industry production and other related subject matters from various sources based on 80 published articles from year 1987 to 2018. The findings of the paper are based on previous and secondary data sources. The following part will focus on the selection of studies, location used in previous literature on sustainability of oil palm smallholders. The paper followed the qualitative approach in analysing the prospects and hurdles of developing smallholders in Malaysia. Additionally, some descriptive statistical secondary data were used to analyse growth performance and comparative performance analysis.

#### *3.1 Selection of studies*

This paper review only focuses on qualitative and quantitative findings of sustainability to examine the relationship between sustainability variables such as environment, economic and social with oil palm smallholders.

#### *3.2 Location and respondents*

This paper is mainly focuses on activities of smallholders of Malaysia to measure the sustainability. Besides, based on the reviews, all studies were also scrutinised from various countries such as Indonesia, Nigeria, Thailand, Africa, Colombo, Europe, UK, Ghana, Australia, etc. The respondents were from secondary sources as oil palm smallholders.

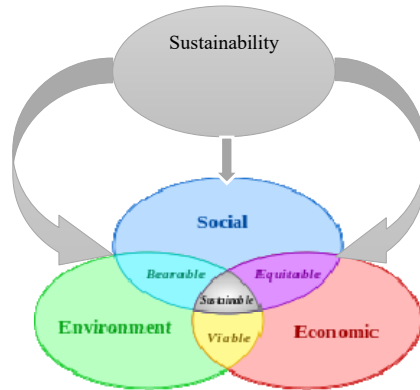
#### *3.3 Variables of sustainability*

Sustainability has therefore been a hot topic in relation to the palm oil industry, where Tan et al. (2009) mention that it needs to be cultivated with an appropriate method to guarantee sustainable development in terms of environmental, social and economic benefits. However, the variables of the study are to examine the relationship between sustainability and oil palm smallholders. There are mainly three dimensions of sustainability such as environment, economic and social mentions in the study mentioned in the study with their studied variables. Figure 2 shows the relationship between the role of sustainability according to three aspects such as environment, economic and socio aspects.

Van Dijk (2012) defines that sustainability is a partnership working with the same aims but different abilities, in which each has subsidised resources and risk sharing investment. Besides, accessing environment, societal and economic dimensions are the measurement of sustainability practices (Burritt and Schaltegger, 2012) as well as the accession of sustainable business is a long-term gain for changing progress with the obtainment of three dimensions (Wu et al., 2013). Thus, the following diagram 3.1 indicates the relationship among the three dimensions of sustainability practices in which both the society and economy are guarded by environmental limits. However, the environment sustainability of oil palm smallholders assess through good agricultural practices (GAP), biodiversity, environment impact assessment (EIA),

climate change adaptability or resilience, eco system functioning, carbon foot print analysis, etc. Besides, economic sustainability assess through the quality of fruits, farmer's income and government revenues, employment opportunities, standard of living, additional income of settlers, settlers training, financial stability. However, social sustainability among oil palm settlers measures through infrastructure facilities, corporate social responsibility, basic needs and social need, incentives for children education, neighbourhood, improving outcomes by training, improving quality of life and health status, etc.

**Figure 2** The relationship of sustainability with three variables (see online version for colours)



*Source:* Author's modified from [www.sustainableinsider.org](http://www.sustainableinsider.org) (Adams, 2006; Van Dijk, 2012; Wu et al., 2013; Burritt and Schaltegger, 2012; Abazue et al., 2015; Alam et al., 2016)

## 4 Discussion

### 4.1 Environmental sustainability

Environmental sustainability has to be maintained by controlling the physical inputs and some identified indicators of sustainability are: emission of GHG, biodiversity, resource consumption efficiency, pollution, etc., of the surrounding area to ensure the existence of human being and production. In a research work, it has been found that total CO<sub>2</sub> emission from peat land destruction in South East Asia constitutes world's 6% of the total annual global emission of greenhouse gasses (Schrevel, 2008; Goodland, 1995). Currently, approximately 15 million ha land across the world is used for cultivating oil palm where world demand is likely to be double by 2020 (FAO, 2009; Corley, 2009; Fitzherbert et al., 2008; Koh and Ghazoul, 2008; Koh and Wilcove, 2008). A number of threats such as environmental threats that arise from up surged palm oil production are being studied around the world by the prominent researchers (UNEP, 2011). For example, an oil palm smallholder of Felda, Malaysia creates environment pollution on a continuous basis (Begum et al., 2014a, 2016). Measuring eco-efficiency is more accurate

with footprint analysis rather than typical analysis of resources usage without considering the productivity. Carbon-dioxide is the factor that is directly liable for the greenhouse effect. Interestingly, there were no enterprises before that do not emitting gas. In this study, emission of CO<sub>2</sub> equivalent gas has been considered as the main indicator to measure the changes that are taking place in the climate. Biodiversity of the environment in any level like-species, genes, wild or domesticated species, etc., can be used to the measure the changes in the population of the environment.

Availability of the plants, animals, etc., in the world are affected by the change in the ecosystem through biodiversity, productivity, resilience, etc. For the previously noted reason, it is better in measuring the conditions of the ecosystem. Different types of indicator will be used for the land and soil as the change in land and soil is usually measured by the erosion of soil. Some strategies have been proposed by Casson et al. (2007) to fight with carbon emission of Indonesian palm oil expansion that could be better to overcome the environmental issues of palm oil expansion. Among others, two notable strategies are usage of degraded land than peat land to palm oil plantation and an increase in the productivity of yield than expansion of land area.

Another significant issue is deforestation which has accelerated the effect of greenhouse around the globe. There are several negative impacts of deforestation not limited to following such as watershed degradation and drying land that increase risk of fire, erosion and soil degradation, biodiversity loss, resource limitation, and greenhouse gas emission (World Bank, 2007). In a study taken by Miller et al. (2010) found that the required provision for ecosystem services diminishes, e.g., lack or imbalance of nutrients, lack of water, weed competition, pest damage, and lack of pollination. Therefore, oil palm growers should adopt sustainable practices to reduce deforestation and ensure food security (Bernama, 2013).

While palm oil production in Indonesia has received a lot of negative international attention due to the numerous environmental and social problems that it brings with it, West African small scale oil palm growers are cited as being an example of sustainable palm oil production. UNDP Human Development report 2007/2008 states that: "Oil palm can be grown and harvested in environmentally sustainable and socially responsible ways, especially through small-scale agro forestry. Much of the production in West Africa fits into this category. However, large scale mono-cropping plantations in many countries do not have a good record" (UNDP, 2007). It is not just the sustainable practices of West African growers in particular, but the relatively higher sustainability of smallholders in general, which seems to have become common knowledge in most discussions on oil palm sustainability. UNDP is just one source among several others which believes smallholder production to be a better alternative than the large mono crop plantations.

Moreover, despite the increase in national income, there is a problem of environmental pollution, significant biodiversity (Koh and Wilcove, 2008; Bruhl and Eltz, 2010). There is a major opportunity to improve smallholder agriculture by developing and distributing seeds of more-resilient crops that will thrive under smallholder cultivation conditions (FAO, 2010). Nonetheless, sustainable agriculture is an agricultural system which is able to meet the supply of goods or agricultural materials without the confines of time, while continuing to maintain or improve the environment and conserve natural resources.

#### 4.2 *Economic sustainability*

Economic sustainability may serve as a driver to improve yield efficiency which will lead to profitability, higher productivity (El Tayeb et al., 2011). Several indicators, for example; profits, cost efficiency, productivity, per capita income of the related smallholders, certification of RSPO can be used to assess economic sustainability. The Bruntland Commission's (UN, 1987); defines sustainability as fulfilment of needs of the poor across all nations. Therefore, efforts of sustainability should focus on annihilation of poverty and the oil palm industry of Malaysia is considered highly successful in this respect (Goodland, 1995). Having all these above factors considered, it can be evaluated whether the company has economic sustainability or not. Besides, economic risk flexibility is assessed through indication of loss of income too and the procedure for evaluating biodiversity for ecosystem is similar to this. After consideration of value chain, the difference between verified product and a conventional product is the production ratio. In line with existing situation of the business world, certification provided by RSPO to ensure sustainability standard can be seen as a good attempt. Eventually, the FELDA was established more than a half century ago in order to develop land area and to provide settlement facility for landless people in the country in Malaysia. Table 2 portrayed that, it has so far developed 853,313 ha of land and ensured settlement facilities for 112,635 families in the developed land areas (Ahmad, 2008). To link with that previous studies also revealed that provides a very interesting result that the projects of FELDA have played significant roles to root out poverty of the settlers (Begum et al., 2014b, 2015a; Abazue et al., 2015; Alam et al., 2015). Table 2 shows that FELDA project has kept the income levels of the settlers benefitted by FELDA well above the poverty line of the country. Finding also shows that the difference between level of mean scores of income and the national poverty line level have consistently widened (FELDA, 2009; MPOB, 2011; EP Unit, 2010). It is predicted Wicke et al. (2011) that the countries will be expanding by 3% and 8% respectively. Notably, there are some countries which have problem of land scarcity. However, those countries are opting for new techniques to accelerate the rate of productivity of the existing land areas. The strategy of the production process has already been adopted by some companies (Golden Veroleum and Sime Darby among others) for ensuring sustainable economy.

Palm oil also has the advantage of having the lowest production costs per unit, when compared to other oils, for example soybean oil, which, although cheap, has 20% higher production cost (the labour costs taken into account) per unit than palm oil (Thoenes, 2006). However, industrial dominant capital model is not being challenged through implementation of sustainable development rather the market power of delivering environmental and social goods (Adams, 2009). One of the misleading and powerful concepts regarding oil palm is the sustainability and since the goals and norms of this industry is recognised by international community, it will be quite hard to challenge its development (Dauvergne and Neville, 2010). However, the European market only requires the green palm oil which is comparatively very insignificant compared to the China and India's CPO market. The palm producers should be concerned about the challenges which are arising for increased competition in palm business. Though the palm business across the world is proceeding in a superficial pace, RSPO confined its activities in increasing domestic awareness to ensure sustainable production. As an executive of RSPO, Demon Bangun argued that it less concerning for them tough the

supply of them are just 8 to 10% in the developed countries as the giant countries like – India, China, etc., are the customer of them (RSPO, 2009).

**Table 2** Palm oil as a source of higher income levels and poverty eradication

| <i>Year</i> | <i>FELDA settler<br/>RM (US\$)</i> | <i>Independent smallholder<br/>RM (US\$)</i> | <i>PGK National poverty line<br/>RM (US\$)</i> |
|-------------|------------------------------------|--|--|
| 2006        | 1,338 (429)                        | 476 (153)                                    | 526 (169)                                      |
| 2007        | 2,221 (712)                        | 1,209 (388)                                  | 740 (237)                                      |
| 2008        | 3,278 (1,051)                      | 1,094 (351)                                  | 691 (221)                                      |
| 2009        | 2,457 (788)                        | 944 (303)                                    | 666 (213)                                      |
| 2010        | 3,000 (962)                        | 1,259 (404)                                  | 720 (231)                                      |

Note: \*PGK for Peninsular Malaysia.

Source: FELDA (2009), MPOB (2011) and EPU (2010)

Beside, smallholders are prominent contributor to enhance the economic sustainability (Alam et al., 2016). On the contrary, oil palm smallholders are facing major threats in the decades while higher price of pesticides and the less price of FFB are the major challenges to run their business (Begum et al., 2018).

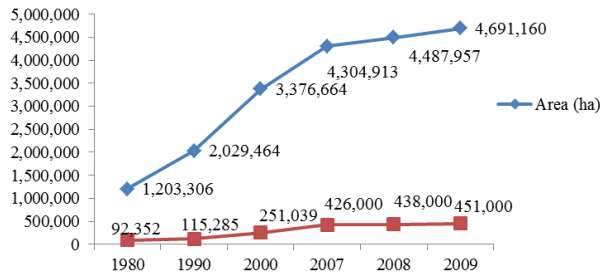
### 4.3 Social sustainability

According to McKenzie (2004), social sustainability is a positive reinforcement of the society or the process of developing positive impact on the society. There are some principles such as access of the mass people to the fundamental services like, education, pure water, health, etc., and these fundamental services are indicators of social sustainability. Food security, education, water, sanitation, community ownership, standard of living, and opportunities of smallholders, etc., are also some other influencing factors of social sustainability (Ziegler, 2004) as well as those factors are influencing also to define oil palm social sustainability among smallholders too (Alam et al., 2016; Begum et al., 2014c, 2015c). Whatever the gender or creed of the person is, they should be facilitated with the opportunity of accessing equally like anyone else of the same society. Services should be available to all with same level of facilities which can ensure a balanced sustainability in the society. The activities of the smallholders, who use the best practices to reduce the negative impact on the environment while producing palm oil, are considered for the study. Their activities increase the development of the society by creating employment for the peoples as well as decreasing the negative impacts on the environment. Three major components were considered in framing the assessment of the sustainability of the smallholders regarding the oil palm schemes. Indicators are the quantitative or qualitative measurement so that the performances of the different entities of any field can be evaluated through comparison with a common standard [Global Reporting Initiative (GRI), 2002]. The GRI (2002) also added that situational analysis impacts the strategy of choosing social performance indicators. Leading indicators let the organisation forecast their future according to the trend in their present activities for sustainability. Social indicators can be helpful to evaluate and control the activities of the organisation in achieving their objectives.

Moreover, the most significant and necessary edible oil is the oil palm in today's world along with this industry's employment creation for millions of people (FAO,

2002). In terms of vegetable oil production, about 131 million tonnes are now being produced through the production of palm oil which is made up with 50.7 million today (USDA, 2012). Adding more, the oil palm industry is a major source of employment (Begum et al., 2014c, 2015b, Alam et al., 2015). Figure 3, the planted area grew from 1.2 million hectares in 1980 to 4.69 million hectares in 2009 as well as the oil palm industry generated employment opportunity of smallholders from 92,352 in 1980 to 451,000 in 2009 (Palm Oil World, <http://www.palmoilworld.org/sustainability.html>). Based on an estimated five persons per household, the total number of people in Malaysia dependent on the oil palm industry could well be around 2.26 million. Hence, the creation of employment among smallholders is one of successive factor for social sustainability (Lim and Biswas, 2015).

**Figure 3** Oil palm plantations in Malaysia: source of employment (see online version for colours)



Source: Palm Oil World (<http://www.palmoilworld.org/sustainability.html>)

On the other hand, there is some sort of conflict in this sector (Wicke et al., 2011). In case of indigenous communities' exploitation, human rights and land conflicts, the social concerns are sometime abandoned by them (Colchester, 2011; Rietberg, 2011). This is why RSPO requires members to adhere to specific principles regarding the development of community infrastructure and the improvement of health and education systems (RSPO, 2014).

In adding, the smallholders create environment pollution because of lack of education and wrong agricultural practices (Begum et al., 2014a, 2018). Hence, they need proper sustainability education to develop their knowledge of agricultural method (Begum et al., 2014c). Overall, over the years, the oil palm industry has consistently contributed towards poverty eradication and narrowing of the income gap between rural and town-folk, created rural townships where workers reside and enjoy good quality of life with adequate social infrastructure, e.g., housing, health, religious facilities (Begum et al., 2018; Abazue et al., 2105); contributed to social security and peace and reduced migration of labour force from the rural to urban areas in Malaysia (Alam et al., 2015).

#### 4.4 Current issue of sustainability of oil palm smallholders

The qualitative study is mainly identified their current sustainability practices and their adopted policies in order to understand the level of sustainability of oil palm smallholders in Malaysia. Many of the existing literature sources reviewed in order to address the current issues of oil palm smallholders. It is observed that oil palm smallholders in

Malaysia are below the sustainability threshold though it is developing the country's economy and creating employment opportunities. The triple drivers such as environment, economic and social factors were unable to successful fully due to environment un-sustainability practices of oil palm smallholders. Undeniably, smallholders are mainly responsible for environmental pollution due to lack of environmental awareness education. Hence, unsustainable practices effect on quality of fruit. The fruit quality is directly responsible for wastages, fewer prices of FFB and less production of CPO. The less production of CPO is unable to fulfil the demand of palm oil in international market. The environment is also polluted as the palm trees are nourished with fertilizers which are detrimental for the environment. Damage of greenhouse gas is severer than carbon-dioxide while the impact of the gas is calculated by converting the gas into CO<sub>2</sub> equivalent unit. Moreover, in this regard, the researcher's priority in this topic is not only to identify the environmental pollution but also studied the economic, and social adopted policies in Malaysia, if any. Although the international focus has mainly been on the negative environmental impacts of palm oil production discussed above, one cannot disregard the social consequences that such large scale mono cropping practices have caused in local communities. The rising demand for land has led to a struggle over sustainability of smallholder palm oil production in Indonesia and Malaysia resource entitlements between many indigenous peoples and the government, who have often been interested in selling or leasing land to commercial use, with palm oil cultivation being one of the major uses of land. The conflicts in many instances have occurred because indigenous peoples have historically not been granted legal land tenure rights.

Sustainable policies for smallholders and industry, slow development and the lower productivity of labour than substitute industries is the most basic long term problem of this industry. However, Malaysia is proud of being well on the way towards fulfilling the sustainable business triple bottom line of people, planet and profits and in pursuing the objectives of sustainability, the Malaysian oil palm industry does not want it to be abused as a trade barrier but welcomes a fair and balanced view on issues related to sustainability of palm oil. The assessment of life cycle was also made for the study. In this assessment, while measuring the performances of the oil palm smallholders, the impact of the different period is also considered as well as other factors. Several activities from plantation to milling of palm which have direct impact on the performance are considered. The stepwise impacts of the activities from milling to drawing out the oil which indirectly impact the performances are also considered.

## **5 Conclusions and policy implications**

This study is reflected in suggestions to improve oil palm sustainability in the future as well as projects carried out by institutions such as RSPO, MPOB, World Bank and FAO. World Bank, particularly, has been investing heavily in the establishment of various smallholder scheme projects in Indonesia, Malaysia and other palm oil producing countries. With the West African smallholders often being cited as a successful example of sustainable oil palm production, what is it that really makes it sustainable. All types of agriculture farming including subsistence farming have extensive social, economic and environmental impact on the firm and neighbouring areas while worsening the impacts through intensity of cultivation. The first foot step that might be required to narrow this

utmost substantial harmful aspect is to recognise them for sustainability. The cultivation of sustainable palm oil cannot be achieved without improving the livelihood of workers and supporting communities that are intertwined with the operations of oil palm estates. Surprisingly, no management solution can be applied in global perspective. The solution is developed according to the developed issues and the problems can differ dramatically from one place to another place. The principles of sustainability may also differ from one region to another. It will be encouraging for the schemed and independent smallholders to follow best agricultural practices in line with the community so that sustainability can be maintained through environmental proper education and management skills. In this regard, the business can follow sustainable policies, acts, environmental restrictions via international, national, state and local regulatory board which may increase the scope of sustainability. Again, the organisations may control air and water quality, maintain healthy workplace for the employees, plantation on degraded land rather than hampering useful land of locals, etc. Economic cycle is the main fact in short term challenge whereas; fundamental issues should be emphasised for long term challenges. As the industry still have impact on the economic cycle of the country. Vegetable oils, bio fuels, etc., are still controlling these. However, the further study recommended that how wide are the adopted policies and are there any modification measures that have been undertaken for sustainability of oil palm smallholders? Are oil palm smallholders really conserving the environment through their GAP via depth survey?

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