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Reducing forest and land fires through good palm oil value chain governance☆

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ABSTRACT

United Nations' Sustainable Development Goals (SDGs) aim to protect the planet and ensure prosperity. In reaching SDGs, Indonesia's palm oil industry represents a solution for the economy but a problem for environment-related goals. Palm oil is a tremendous land-based commodity that supports the subnational and national economies of Indonesia. With 11.4 million ha of plantations, palm oil has contributed USD 20.75 billion in 2015 to Indonesia's export income. However, fire has been involved in the development and replanting of palm oil plantations. Smoke haze from fires harm the economy, the environment, and the health of millions of people. The research took a normative approach to understand whether the current palm oil value chain governance comply with the principle of good governance. The focus was on analyzing options to improve the current governance towards good governance, which is able to reduce fire uses. We reviewed previous investigations, and carried out focus group discussions, field interviews, and value chain analysis. We found that the palm oil economy distributed enormous value added to those participating in the chain. However, the fire uses in land preparation can be altered by using coercion, dis(incentives) and dominant information that held by district and central governments, growers and mil. The potential benefits from green products, a strengthened growers' association, moving up scenarios can be used to compensate the 'benefits' of using fire. Lessons learnt from the palm oil commodity chain in Indonesia, when the economy and the environment are contested, can be used by other countries to reach towards their SDGs.

1. Introduction

Indonesian President Joko Widodo has planned to deliver a moratorium plan restricting the granting of new permits for the expansion of palm oil plantations and mining to minimize the extent of forest and land fires as well as to promote environmental preservation. Fire is often used for land clearing due to its effectiveness and cheapness (Purnomo et al., 2017). The palm oil industry received fresh fruit bunches (FFB) from those who converted protected forest and national park into palm oil plantations (EOF, 2016; WWF, 2013). Forest conversion to palm oil plantations is considered as the source of forest degradation and deforestation (Pearce, 2017; Gaveau et al., 2016). The links between palm oil development and deforestation and involvement actors at different levels have been elaborated (Susanti and Maryudi, 2016; Prabowo et al., 2017).

This growing investment in the palm oil industry has been boosted since the Letter of Intent agreement between the International Monetary Fund (IMF) and Indonesia was finalized in 1998 to tackle the Indonesian economy crisis; it aimed to liberate plantation investment in Indonesia, among other measures. Afterwards, palm oil investment was sourced in part domestically but also more frequently from neighboring countries, especially Malaysia and Singapore (Varkkey, 2016). This shows palm oil in Indonesia involves regional developments. At the same time, forest and land fires, including peatland fire, which caused smoke and toxic haze impacted the economy, the health, and the environment of Southeast Asian countries (Gaveau et al., 2014). Indonesian fire and haze in 2015 contributed to an economic loss of USD 16.1 billion (Glauber and Gunawan, 2016), 24 people death and 100,300 people preliminary death (Koplitz et al., 2016).

In the other hand, export value of palm oil has recently exceeded that of petroleum and gas. Indonesia provides 52% of the world's palm oil supply (MoI, 2015). Indonesia aims to remain the biggest supplier of this commodity. Through its 11.4 million ha of plantations, Indonesia

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produced 33 million tons of palm oil amounting to an export revenue USD 20.75 billion in 2015 (MoI, 2015). The Ministry of Agriculture plans to increase the production to 36.4 million tons annually (MoA, 2016).

Indonesia is mandated by Article 33, Paragraph 4 of the 1945 Constitution to conduct economic development under the principles of sustainability and environmental friendliness. Various government policies have been delivered to ensure sustainability of the palm oil industry in Indonesia (Purnomo et al., 2013). Through the Intended Nationally Determined Contribution (INDC) and the Paris Agreement, however, Indonesia aimed to reduce carbon emissions amounting to 29% without international assistance and 41% with its assistance in 2030 from 2.88 billion ton CO_2 equivalent. Sustainability of agricultural plantations, reducing deforestation and forest degradation, and utilizing renewable energy are keys for the CO_2 emissions reduction (GOI, 2016).

However, they failed to disconnect the palm oil business from the environmental degradation and fires. Indeed, 20% of fire in 2015 was in palm oil plantation areas (Glauber and Gunawan, 2016). Improving the governance of palm oil value chains through fair value added distribution, market transparency and green certification can potentially reduce the use of fires. Good governance require all palm oil practices can be exposed to the public. Smallholders, if they are empowered they can get better value added that can be used for green land preparation International palm oil consumers are going stronger and greener and demanding for tracebility of palm oil souces. Palm oil certification such as RSPO and ISCC demands for not involving fire in its value chains.

This paper aimed to contribute to palm oil sustainability by understanding palm oil value chain governance and its relation to forest and land fires. The paper answers the following questions: a) Who gets what in fire related palm oil value chains? b) What constitutes the governance of the palm oil value chain and who holds the power to influence the chain? c) What are the solutions to the problems of the value chain of palm oil that will reduce fires in the future?

We used Actor-Centered Power (ACP) approach from Krott et al. (2014) in combination with Social Network Analysis (SNA) to improve the governance of palm oil value chains. We specified how element of power i.e. coercion, dis(incentives) and dominant information to be used to influence the value chain governance in order to reduce fire in land preparing for palm oil plantations. In addition, mapping actors, one to one, together with their power elements is new in the uses of ACP approach. This can be useful for further development of ACP approach. In many cases ACP was used for forest and landscape governance (e.g. Susanti and Maryudi, 2016; Prabowo et al., 2017). Yet for comprehensive value chain governance.

The contemporary scientific debate on landscape sustainability contesting forest conservation and palm oil development (Sayer et al., 2016). Although, RSPO principles include zero-burning methods on palm oil plantation, but it is only a part in fighting the haze problem in Southeast Asia (WEF, 2015). Understanding complex sociopolitical actors in palm oil industry is necessary to create a more sustainable palm oil industry (Ivancic and Koh, 2016). Influencing palm oil actors and their value and supply chains can reduce deforestation and environmental destruction (UCS, 2016), for which this research can scientifically contribute.

Governance of value chains must take into account the power contest among actors in the chains as well as how they are related to each other. Social and institutional setting matter for building good governance (Giessen and Buttoud, 2014) As palm oil is a business, scrutinizing the economic power held by each actor is key (Krott et al., 2014) as well as how policy context influences the actors (Brockhaus et al., 2014). Actors who have more economic power can potentially command those who have less. They have better capacity to negotiate and obtain better value added.

This research can advise to the achievement of Sustainable development goals (SDGs) in the current palm oil countries such as Indonesia and Malaysia as well as emerging palm oil countries in Africa and Latin America. On September 25, 2015, countries adopted a set of goals to end poverty, protect the planet, and ensure prosperity for all as part of a new sustainable development agenda. SDGs have become a global orientation of development since 2016. Seventeen SDGs are accepted by many countries, and are being targeted and monitored. Each goal has specific targets to be achieved over the next 15 years. Goal 8 encourages decent work and economic growth. Goal 12 outlines responsible consumption and production, while Goal 15 focuses on the sustainable use of land, of which forests and forestry form a part (UN, 2017). The palm oil industry in Indonesia, in which sustainability of production and consumption are in question, is highly relevant to the implementation of Goal 12. Palm oil provides huge benefits to its players and growth to the nation (as per Goal 8), but at the same time it causes environmental destruction and fires (going against Goal 15) if it is not well governed.

2. Value chains and good governance

Value chain analysis (VCA) describes activities that are required to bring a product or service from design, through various phases of production, to delivery to end consumers and disposal after use. VCA helps explain the distribution of value added to those participating in it. The value chain provides the big picture and system view of a particular product (Kaplinsky and Morris, 2001). The competitiveness of an individual firm depends upon the competitiveness of its value chain (Schmitz, 2005). Herr et al. (2006) propose the use of VCA to upgrade small-scale industry that has a positive impact on social development. Purnomo et al. (2014) provides an example of the use of VCA in Central Java, Indonesia in the context of timber value chain. Globalized trade and value chains influence value-added distribution in producing countries (Keane, 2012).

Value chain research can be used to develop horizontal and vertical scenarios for better and fair value-added distribution (Gereffi et al., 2005; Herr et al., 2006; Purnomo et al., 2011). Scenarios are descriptive narratives of plausible alternative projections of a specific part of the future (Fahey and Randall, 1998). The subnational and national governments are seeking scenarios to deliver inclusive and sustainable palm oil development (Glenday et al., 2015). A landscape approach, which aims to reconcile forest conservation and agricultural development, is the umbrella of future scenarios of development (Sayer et al., 2013).

Lembito et al. (2013) underline three key components of palm oil value chains, i.e. production (plantation and mill), demand and supply (domestic and export market), and revenue and cost (sales revenue, production cost, logistics cost). Mohammadi et al. (2015) reveal the demand of the world for palm oil and biodiesel and show that their prices will reinforce oil palm planting. Environmental degradation in Kalimantan was aligned with palm oil development (Obidzinski et al., 2012).

Governance refers to sustaining coordination and coherence among a wide variety of actors with different purposes and objectives. Such actors include political actors and institutions, interest groups, civil society, and nongovernmental and transnational organizations (Pierre, 2000). The relative power balance among actors is key for achieving good governance. Governance is the most critical aspects for participation by smallholders that involves producing rules for sharing the benefits and costs (Scherr et al., 2004). Without good governance, problems related to free riders and rent seekers can emerge easily. Moreover, the problem of elite capture as described by Platteau and Gaspart (2003) may also arise. Elite capture had frequently appeared in the decision-making process before good value chain governance was sought (Lund and Saito-Jensen, 2013; Marwa et al., 2010; Ribot, 2006). The elites became the winners while grass-root communities were the losers in the palm oil development of Kalimantan (Obidzinski et al., 2012). Indeed, multiple levels of government actors facilitated palm oil

plantation expansion disregarding environmental constraints (Setiawan et al., 2016).

Governance is defined as being how policies and decisions are made and implemented. Giessen and Buttoud (2014) state that forest governance research can be understood as social science inquiry into forest-related decisions, their implementation and resulting effects within a given institutional setting. Brockhaus et al. (2014) investigate how policy context, and the influence of key actors and their discursive practices are affecting national-level governance. Krott et al. (2014) develop an Actor-Centered Power (ACP) approach to show who the politically most powerful actors are in any given governance system. ACP is defined as a social relationship in which actor A alters the behaviour of actor B without recognising B's will. ACP framework has three core elements of power i.e. coercion, (dis-)incentives and dominant information. Maryudi and Sahide (2017) reveal the usefulness the ACP approach as a novel advance to understand power relation. Prabowo et al. (2017) by using ACP approach explain how oil palm companies accumulate power that enables them to control forestland and convert it into oil palm which then leads to forest degradation.

World Resource Institute provides set of indicators to measure forest governance (Davies et al., 2013). Their indicators are organized in six thematic areas i.e. forest tenure, land use, forest management, forest revenue, cross-cutting institutions and cross cutting issues. The principles of good governance are transparency, participation, accountability, coordination and capacity.

Rana and Chhatre (2017) show mixing useful elements from each of the modes of governance, state managed and community managed in India, equity and sustainability in forest governance to a greater extent can be achieved. This is a show-case of hybrid governance in forestry. Tysiachniouk and McDermott (2016) reveal Forest Stewardship Council (FSC) certification process provide 'governance generating network' that enables local, national and international organizations to influence decision making processes related to its standard compliance. In a case in Russia, they reveal strong and stable transnational environmental networks have been relatively successful in protecting "high conservation value forests". However equivalent multi-level networks are lacking for key social standards. While a national social NGO has had some success in promoting procedural equity through community participation, we find no evidence that certification was addressing local community concerns for distributive equity.

Sayer et al. (2016) illustrate landscape metrics to measure the sustainability of landscape given various economic interests, actors' power contestation, and product and service value chains. Rural landscapes commonly have a forest core, forest margin, mosaic agricultural land, and non-vegetated land (Chomitz, 2007). Agricultural land, including land where oil palm is grown, has an economic land value higher than forested land. Threats to forested land from agricultural expansion are great in the absence of good landscape governance (Fig. 1).

Landscape generates products and services. For example, wood and water stem from forests, and palm oil fresh fruit bunches (FFB) from palm oil plantations flow to factories for processing. These products are delivered to final consumers through various channels, including to wholesalers and retailers.

Good value chain governance ensures that interactions between firms along the value chain are efficient and effective (Kaplinsky and Morris, 2001; Schmitz, 2005). Fair value-added distribution for all participants in the value chain is needed to ensure its sustainability (Gereffi et al., 2005). Third-party monitoring and strong stakeholder coordination is highly necessary to ensure fair value-added distribution and its sustainability (Muradian and Pelupessy, 2005). von-Geibler (2013) highlights the strengths and weaknesses of RSPO as a market-based standards-setting process in the light of increasing market demand for palm oil.

Good governance of palm oil value chains could contribute to reducing forest and land fires. Good governance balances the power of palm oil actors particulary between smallholder and large companies in its value chains. Therefore, value added can be distributed fairly to its actors. Having good governance requires public tranparancy in the whole palm oil supply chains. Through which, using fire that causes toxic haze will not be tolerated by palm oil consumers and public. Good governance improves the compliance of all palm oil actors' practices with the existing legal system, which prohibiting fire use.

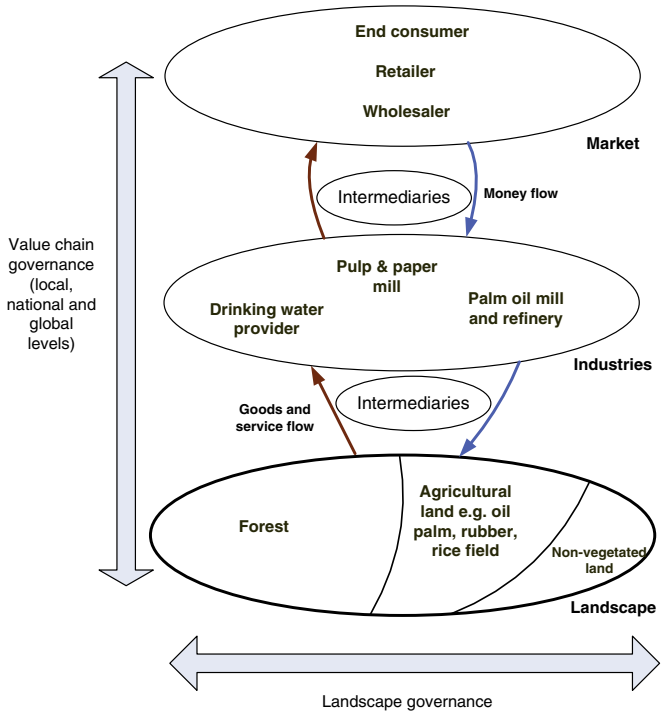

Fig. 1. Landscape and value chain governance approach.

3. Approach and methods

Giessen and Buttoud (2014) reveal there are two broad approaches for governance assessment. First, analytical studies that are concerned with the mere reflection of these phenomena and their explanation and strive for developing value-free methodological frameworks. Second, normative analyses imply value judgements on desirable conditions within their methodological frameworks and often develop recommendations towards selected ends. This research lies on the second approach, which is a normative analysis. The normative analysis was used to understand the current governance of palm oil value chain that involve fires and explore scenarios to improve palm oil value chain governance at landscape level.

The research was located in Indonesia's Riau Province. This province was chosen because it has the largest area of palm oil plantations in Indonesia. Riau Province was also selected for this research because it experiences the most frequent fires in Indonesia (Sizer et al., 2014) and experienced massive forest conversion to palm oil plantations.

The paper comprises the following steps (a) Describing the Indonesian palm oil plantations and fire evidences; (b) Describing palm oil value chain that involves fires; (c) Assessing the governance; (d) Developing scenarios to improve governance and reduce fires. Data from NASA, LAPAN and other publications were used to describe how Indonesian palm oil was connected to fire evidences. The palm oil value chain description was carried out following the Kaplinsky and Morris (2001) i.e. mapping the chain of value added and defining the areas of interest; and calculating the value added for actors participating in the chain and determining their mode of connection. Interactions among those who participate in value chains are categorized into four types i.e. a market-based type, indicating many customers and many suppliers

Table 1
The focus group discussion participants and their knowledge contributions.

No.	Organization	Number of participants	Role and knowledge contribution
1	Forestry unit, Government of Riau	3	Land policy and regulation; land access for palm oil
2	Indonesian Forest Business Association (APHI) and Indonesian Chambers of Commerce and Industry (KADIN)	2	Forest and palm oil value chain business; palm oil market
3	Head of Dompas Village, Bengkalis Regency	2	Palm oil smallholder business; price of FFB; intermediary
4	Community fire-prevention group (MPA) of Sejangat Village, Bengkalis Regency	2	Fire monitoring at local level
5	Cooperation of Riau Forest Rescue Network (JIKALAHARI)	1	Forest rescue and palm oil supply chains; power relation
6	World Wildlife Fund (WWF)	1	Palm oil supply chains
7	Indonesian Forum for the Environment (WALHI)	1	Environmental governance
8	Community Network for Riau Peatland (JMGR)	1	Community-based restoration
9	The Nature Conservancy (TNC)	4	Conservation policy
10	Eyes on the Forest (EOF)	2	Palm oil mills and refinery network
11	Academics, University of Riau	2	Fire prevention and peatland restoration
12	Students, University of Riau	6	Fire prevention action at local level
13	Center for International Forestry Research (CIFOR)	4	Political economy and value chain governance
	Number of participants	31	

with limited information flows; a balanced network type, indicating that a supplier has various customers, and where both sides have the capability to solve problems through negotiation; a directed network type, indicating that the main customer purchases at least 50% of outputs, and that customers define the product and provide technical assistance; and a hierarchy type, indicated by vertical integration and with very limited autonomy to take decisions at a local level (Herr et al., 2006).

Mapping of the value chain was conducted through a focus group discussion (FGD) supported by a literature review. The review was conducted of reports published by WWF (2013), EOF (2016), Ali (2015) and CIFOR (2016) and others. The FGD was held on 9 May 2016, with participation by representatives of governments, NGOs, business persons, village society, academics, and students. Participants were selected using the following criteria: proximity to the area, knowledge of palm oil value chains and forest conservation, policy relevancy, and forest and land dependency. Table 1 shows the FGD participants.

Calculating value added obtained by different actors and its governance was conducted using field study, an FGD and secondary data review. Field study was carried out in May 2016 in Tesso Nilo National Park and Bukit Batabuh Protected Forest (Fig. 2). These areas witnessed illegal and rapid forest conversion to palm oil plantations. Groups of respondents (Table 2) were selected purposively using criteria of their knowledge of palm oil plantations, their knowledge of illegal land transactions, their accessibility, and their understanding of policy at the local level.

Since we did not measure directly on the ground the productivity of plantations, mills, and refineries, we used assumptions in estimating their productivity. At the growers and intermediaries levels, we used a World Agroforestry Center (ICRAF) data set, where profits for farmers are given as ca. USD 70 per ton FFB produced (Sofiyudin, 2016). For estimating value added from a hectare land of oil palm plantation, we run a series of financial simulation from mills to refineries level. In financial simulation we estimate value added from each actor by calculating cost of production and revenue from Crude Palm Oil (CPO) and it derivative products. As efficiency level has significant effect to value add, we incorporate efficiency factor in each CPO processing entities. This numbers were selected based on Ministry of Industry number on production and installed capacity. In mill level, we run simulation with capacity of 45 tons of Fresh Fruit Bunches (FFB) per hour and 75% efficiency level. For cooking oil factory, we simulated using 65% utilization of maximum capacity 540,000 tons CPO per year. In oleochemical refinery, we simulated with 80% utilization of maximum capacity 108,000 tons CPO per year and for biodiesel 45% of total capacity 200,000 ton per year.

We implemented criteria of good governance to assess the existing palm oil governance. The criteria were derived based on the work on World Resource International (WRI) on governance indicator that involve legality, environment, social and economic indicators (Davies et al., 2013). To reduce fires in palm oil plantations we developed the intervention scenarios (Kaplinsky and Morris, 2001). The components of governance include actors, rules and practices (Davies et al., 2013). We assessed who the most powerful actors in the value chains by using ACP approach in combination with Social Network Analysis (SNA). For each scenario we assessed the plausible economic impacts whether it can compensate the reduction cost or benefit for using fire to prepare oil palm plantation. To implement the scenarios we used Krott's elements of power to envision how coercion, (dis)incentives and dominant information can be used.

The study results were then communicated to key stakeholders at provincial and national levels. At the provincial level, this was done during the legal drafting for provincial laws on fire prevention through FGDs. At the national level, this was communicated to strengthen ISPO through seminars and FGDs.

4. Results

4.1. Palm oil plantations and fires

4.1.1. Fires in Indonesian palm oil

Palm oil plantations in Indonesia have an area of 11.4 million ha (MoA, 2015). Smallholders own 41%, corporations 52%, and state-owned enterprises 7%. Palm oil plantations doubled in area from 2005 to 2015. The expansion was carried out by smallholders and the private sector, while the state-owned plantations grew more slowly. Riau Province had the largest palm oil plantations, amounting to 2.4 million ha, which is more than one-fourth of the area of Riau Province. The top 10 importers of Indonesian palm oil were India, China, EU-27, Pakistan, Malaysia, Egypt, Bangladesh, United States, Singapore, and Iran (USDA, 2016).

We overlaid data of Sumatra and Kalimantan from the World Resource Institute (WRI), the National Aeronautics and Space Administration (NASA), and the Ministry of Environment and Forestry (MoEF). The area was categorized into two parts: corporation concessions 34% and outside the concessions 65%. Oil palm plantations are located in two types of areas: non-forested areas (9%) and forested land converted to plantation (3%). As much as 16% of hot spots are located in corporate-managed oil palm plantations. Significant hot spots occurred in non-forested areas including oil palm plantations managed by smallholders (Table 3).

Indonesia's National Agency for Aviation and Space (LAPAN) conducted measurements of burnt areas from satellites and ground

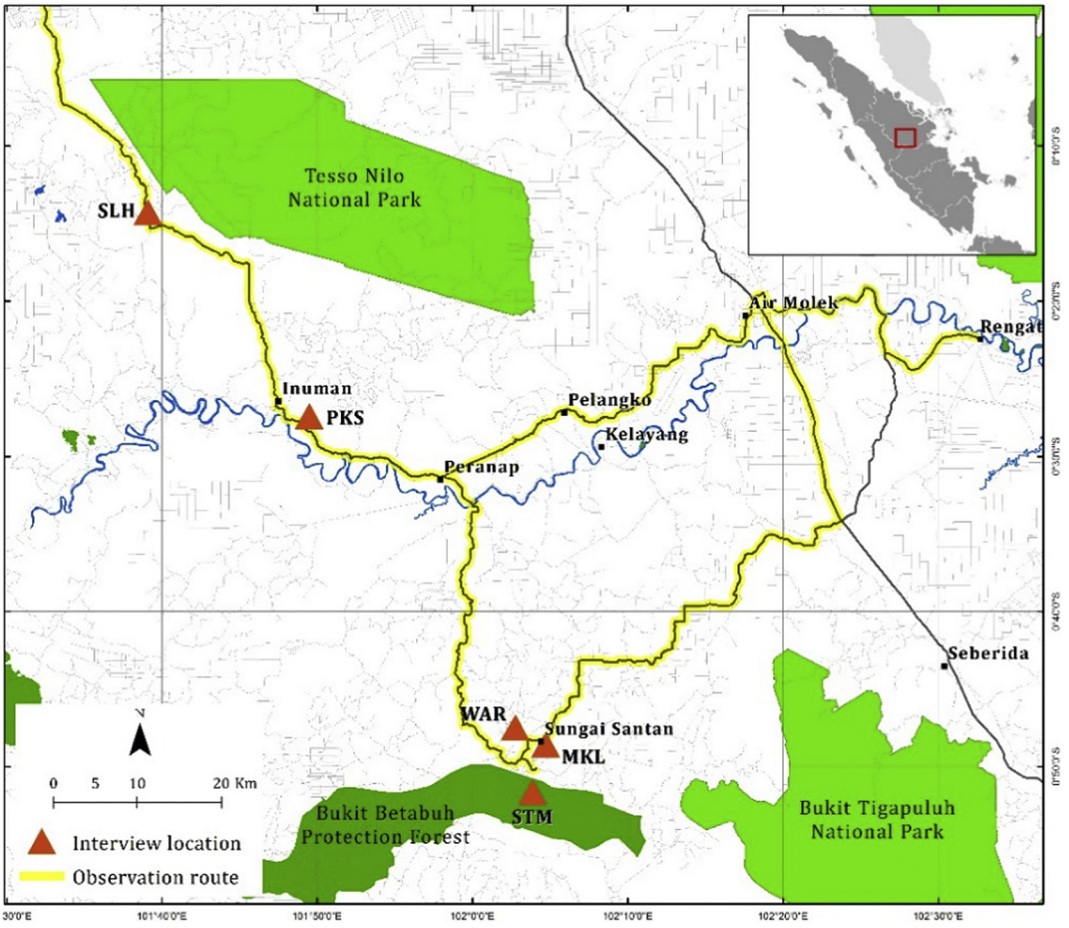

Fig. 2. Situation map research site with locations of interviews.

checking. They found that 2.6 million ha was burnt during June–October 2015, known as the biggest fire disaster in Indonesia (LAPAN, 2015). During that period, 0.51 million ha of palm oil concessions were burnt, making up 20% of the total burnt area (Glauber and Gunawan, 2016). This real fire measurement (20%) is higher than that obtained from the hotspots calculation (16%). The difference stems from many factors, including the fact that not all hotspots were fires. The hotspot calculation is the average for 15 years compared with measurements taken for the highest fire season, 2015. Nevertheless, both calculations provide evidence for the significant occurrence of fires in palm oil areas.

4.1.2. Assessing the current palm oil practices

We adapted the "Governance of Forests Initiative (GFI) Indicator Framework" developed by the World Resource Institute (WRI) to assess the governance of the practice of the first step of palm oil value chain, which is land preparation. We concentrated only on this first step as in practice this is the only phase when the fires is used in the land preparation and our aims is to reduce the fire. First, we develop the indicators to for the palm oil land preparation, and then we do the assessment of current practice of land preparation based on our findings from Riau.

We came up with the following indicators to assess palm oil land preparation. First, legality of practice. Practice in land preparation

Table 2
Field group interviews.

Code	Group interview	Number of interviewees	Knowledge contribution
SLH	Farmers' group. Location: Tesso Nilo forest complex, Pelalawan Regency	3	- Story of illegal land transaction and palm oil development - Smallholder palm oil benefit and cost - Role of intermediary and relation with farmers
STM	Field and illegal palm oil operators, Bukit Batabuh Protected Forest, Kuantan Singingi Regency	4	- Cost of illegal land preparation for palm oil plantation - Palm oil business local network
PKS	Palm oil mill workers, Kuantan Singingi Regency	2	- Palm oil supply chains from growers to mills and refineries - FFB suppliers
MKL	Community leaders, Indragiri Hulu Regency	3	- Land transaction - Prices for different land cover (forest, deforested land, burnt land, and palm oil plantation) - Land availability to buy
WAR	Non-farmer group, Indragiri Hulu Regency	3	- Fire occurrence - Land prices
	Total	15	

Table 3
Land uses and hot spots in Sumatra and Kalimantan (Purnomo et al., 2017).

Land use			Extent		Hot spots, 15-year average	
			ha	%	Number	%
Corporate-managed lands	Logging concessions		12,501,285	12	545	4
	Wood plantations		8,443,633	8	3297	23
	Palm oil plantations	in non-forest zone	8,951,386	9	1589	11
		in forest zone	2,791,974	3	750	5
	Overlapped		2,374,943	2	260	2
State- and smallholder-managed lands	Non-forested areas		29,876,742	29	4963	21
	Forested areas		36,851,699	36	3057	34
Total			101,791,661	100	14,459	100

should be done legally according to central and local laws, such as UU No. 32, 1999 that stipulated that using fires in land preparation is not allowed except for indigenous people with controlled burning and to grow local plants. Second, environmental friendly. The land for oil palm plantation shoule be prepared in a way that do not have adverse impacts on environment and biodiversity. Third, safety. The land for oil palm plantation is prepared in safe ways for human being: both for the actors of land preparation and also other human being in the sourroundings particularly for not having adverse health impact. Fourth, economic benefit. The preparation of land for oil palm plantation provide economic benefit for the actors.

Based on previous findings and the results of our focus group discussions with stakeholders in Riau, there are different ways to prepare land which may involve fires and non-fires. In this assessment, we are focusing only on land preparation that used fires in preparation. The asessment results of land preparation using fires is as follow. For the legality indicator, the current practice is not compliance. The practice of land preparation using the fires by smallholders or other people is illegal as it is not conform wiht the Law 32, 1999. For the environmental friendly indicator, the existing practice is not compliance. The use of fires to burn the land in preparation may have adverse effect to the environment and it is dangerous for the biodiversity. For the safety indicator, the existing practice is not compliance. The land that is prepared using fires may be dangerous for the actors and also may produce haze that have adverse effect to human healths. For the economic benefit indicator, the existing practice is compliance. The land clearing using fires is beneficial to the actors, and in this case, using fires is more beneficial than using non fires.

4.2. Palm oil value chain and fires

The value chain of palm oil was formed from opening up forests and land for plantations and ends with the consumption of palm oil products (Fig. 3). Forests and land were converted into smallholder and corporate plantations through legal and illegal means. Legally, forest is converted through the release of convertible production forested areas. The illegal way is through the encroachment of the forests and land. FFB from the palm oil plantations were brought into palm oil mills and processed into CPO and palm kernels (PK). In palm oil refineries, CPO and PK are processed into cooking oil, oleo-chemicals and biodiesels, which are then processed further or sold to market.

Fires were used illegally to prepare land for palm oil plantations. Forest that is targeted for conversion to plantations is not primary forest, but secondary or logged-over areas. Indeed, this forest had been unsustainably and illegally logged. This forest was cut and slashed and then burnt to prepare the land to establish palm oil plantations. Others

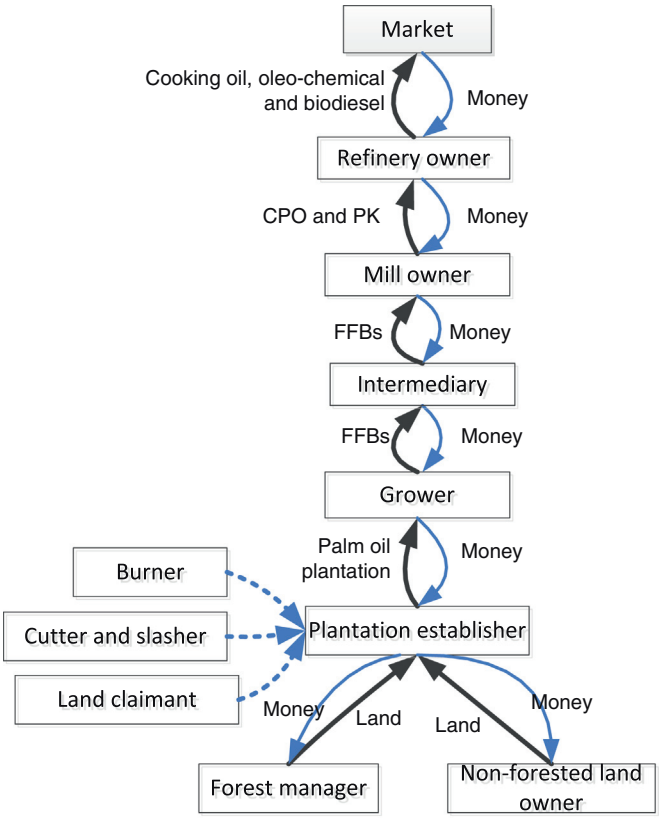

Fig. 3. Map of palm oil value chain (FFB = fresh fruit bunches; CPO = crude palm oil; PK = palm kernels.

use non-forested land, in Indonesian legal terms is called *Areal Penggunaan Lain* or APL, for plantation development. Fire was often used for land preparation.

Based on our interview, forest areas that have been degraded were claimed and 'sold' at a price of USD 113 per hectare. The area was then cleaned and equipped with certificates such as SKT (Certificate of Land) and SKGR (Letter of Indemnity) then sold at a price of USD 655 per hectare. To prepare palm oil land quickly and cheaply, burning was done at a cost of USD 15 per hectare. According to Purnomo et al. (2017), the land was then planted with palm oil, and after 3 years, it was worth USD 3077 per hectare. This illegal value added was mostly obtained by farmer organizers, role that was run by local elites. The growerss bought these palm oil plantations, grew the oil palm, ran the plantation business, and made money every year. Detail value added per actors shown in Table 4.

According to Ministry of Agriculture statistics (MoA, 2015), each hectare of palm oil plantations averagely produced 14.52 tons FFB/year. With this productivity number, we found that each hectare of land will gain revenue USD 1241, costing USD 211 and providing value added 1030 per hectare per year. Table 5 presents the distribution of value added per hectare obtained by different actors along the chains. This FFB were sold to intermediaries, in which the intermediaries obtained value added as much as USD 10.3 per ton FFB or USD 150 per hectare per year of palm oil harvesting. The intermediaries played key roles particularly for small- and middle-scale palm oil plantations, where they did not own transportation, economic of scale and capacity to sell directly to palm oil mills.

The value added at mill for producing CPO and PK was USD 54.8 per ton or equal to USD 203 per hectare of palm oil plantation. In refineries, value added was divided into three forms of CPO-based products: cooking oil, oleo-chemicals (fatty acid, fatty alcohol, methyl ester, and glycerin), and biodiesel. In order to estimate value added

Table 4
Value added per hectare of oil palm plantation.

Measurement	Plantation establishers				Growers	Intermediaries	Mill owner	Refinery		
	Land Claimant	Cutter and slasher	Fire starter	Organizer and other actors				Cooking oil factory owner	Oleo-chemical refinery owner	Biodiesel refinery owner
	ha	ha	ha	ha	ha/year	ha/year	ha/year	ha/year	ha/year	ha/year
Amount	1	1	1	1	14.52 tons FFB	14.52 tons FFB	3.1 tons CPO 0.6 tons PK	Proportion of CPO's derivative product 81% 2.1 tons cooking oil	10% 0.3 tons[a] oleo-chemicals	9% 0.3 tons biodiesel
Conversion factor from raw material to products							21.7% CPO 4.3% PK	85%	100%	90%
Revenue (USD)					1241	1669	2015	2511	2353	2083
Cost (USD)					211	1519	1812	1970	2165	2060
Value added (USD)	113	526	188	2180	1030	150	203	541	188	23
Value added total (USD)	3007				1030	150	203	752		
Source	Purnomo et al. (2017)				Calculated					

[a] 73% fatty acid; 10% fatty alcohol; 7% methyl ester; 10% glycerin.

from a hectare of land, this number was divided based on the proportion of CPO-based derivatives production. The total value added obtained by refinery owners was USD 752 per hectare of palm oil plantations per year. The cooking factory owners obtained USD 541, the oleo-chemical refinery owners received USD 188, and the biodiesel refinery owners obtained USD 23 per hectare per year.

4.3. Governance of palm oil value chains

4.3.1. Actors and their economic scales

Value added received by each actor reflected what would be accepted for each hectare of oil palm in the plantation or upstream. The work scale of every actor was different. Illegal oil palm plantation developerss worked at a scale of 1000 ha, whereas independent and plasma smallholder growerss worked on a scale of 10 ha. Intermediaries worked on a scale of 3000–4000 tons of FFB per year or equivalent from 250 ha. The mill owners worked with a scale of 243,000 tons of FFB per year and the owners of refineries worked with 2 million tons of FFB, equivalent to 0.5 million tons of CPO and PK per year. We defined illegal oil palm plantation developerss as those who use fire in preparing the plantations, and then sell them to the buyers. In most cases the land status is located in forest zone, several are located in concession areas that are not enforce by laws.

If the scale is multiplied by the added value gained we can obtain the economic strength of each actor. When the economic power is then normalized by dividing by the economic strength of the smallest actor, i.e. the burner, the relative economic strength of the actors can be obtained (Table 5). Table 5 shows the rank of economic power as follows: (1) refinery owner; (2) mill owner; (3) oil palm developers; (4) intermediaries; and (5) growers. This economic strength represents the power of the actors in governing the value chains. The most powerful actors (i.e. the refinery owners, the mill owners, and the oil palm developerss) determine the standards and procedures of palm oil trades from upstream to downstream.

4.3.2. Connections of the value chain actors

The palm oil actors were connected with other actors through various relationships. In terms of dependency between actors, the 'hierarchy' relation provides the highest, followed by 'directed network', 'balanced network', and 'market' relationships. In one instance, a forest manager was connected to a plantation establisher through a 'directed network' relation. This relationship was noted because the illegal plantation developers was more powerful and became the source of illegal income as well as providing assistance on how to conduct land grabbing. The plantation establisher manipulated and bribed the forest manager, who is a government official, to not take control over forested areas. Letting of the forested area was claimed illegally by the plantation developers. More generally, for 'non-forested land owners', the plantation developers is connected through 'market' relations. The land is sold legally according to the existing market price. Fig. 4 shows the

Table 5
Economic power per actor.

Actor	Assumption	Productivity per year		Economic value added scale (thousand USD/year)	Economic value added scale (%)
		Unit	Amount		
Oil palm illegal developer	Development of 1000 ha of oil palm plantation per year with value added of USD 3007 per hectare	Ha/year	1000	3007	4.02
Grower	Owns 10 ha, with productivity of 14.52 tons FFB/year	Tons FFB/year	145	10	0.01
Intermediary	Supply of 10 tons FFB/day	Tons FFB/year	3650	38	0.05
Mill	Total capacity of 45 tons FFB/h with 75% efficiency	Tons FFB/year	243,000	3450	4.6
Cooking oil refinery	Total capacity of 540,000 tons CPO/year with 65% efficiency	Tons CPO/year	351,000	62,362	83.3
Oleo-chemical refinery	Total capacity of 108,000 tons CPO/year with 80% efficiency	Tons CPO/year	86,400	5281	7.1
Biodiesel refinery	Total capacity of 200,000 tons CPO/year with 45% efficiency	Tons CPO/year	90,000	690	0.9

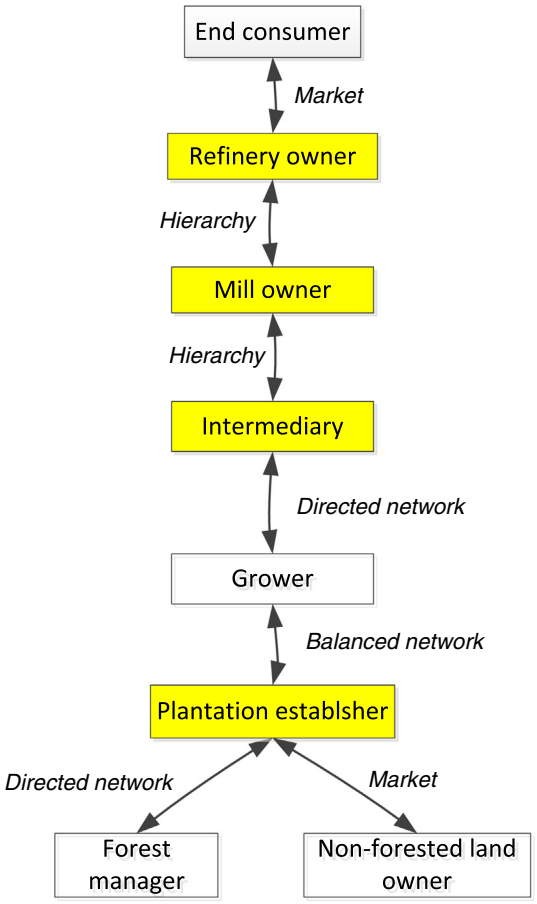

Fig. 4. Governance of the palm oil value chain.

value chain governance, with the strong economic actors marked in yellow or grey.

Plantation establishers are connected to growerss through a 'balanced network' relation. They divided and sold palm oil plantations to individual growerss and groups of growerss. This 'balanced network' was indicated by the fact that the plantation developers (supplier) had a wide range of growerss, two-way exchange of information, and both parties had the capacity to negotiate. The growerss were known as independent smallholders if they were not connected to palm oil corporations or as plasma smallholders if they were connected to such corporations. The growerss sold their FFB through a 'directed network' relation to intermediaries, some of whom sometimes provided money loans, seedlings or fertilizer to them. The intermediaries were connected to mill owners through a 'hierarchy' relation, in which the mill owner provided a delivery order, FFB quality requirements, and the price. The intermediaries had limited opportunities to make their own decisions. Likewise, the mill owner was mostly connected to the refinery owner through a 'hierarchy' relation, which was characterized by vertical integration. Some mills were owned by the refinery. Some mills also exported CPO and PK to overseas countries such as India, China, and Pakistan.

The refinery owners sold their products to end consumers or manufacturers such as Unilever and Procter & Gambler through 'market' relations. The 'market' relation was indicated by having several groups of refineries and many customers, no technical assistance, recurring transactions, and limited exchange of information. The refineries were connected to the groups of Wilmar, Golden Agri Resources (GAR – Sinarmas Group), Cargill, Asian Agri (APRIL group), Musim Mas, and Astra Agro Lestari.

Overall, 'hierarchy' and 'directed network' dominated the relations from refinery and mill corporations to intermediaries. The processing part of palm oil value chains is mostly integrated vertically, whereas chains from intermediaries to forest and land owners are mixed between 'balanced network' and 'market' relations. In other words, they

Table 6
Power of each actor to alter the behavior of another actor (C = coercion; I = (dis)incentive; D = dominant information; based on Krott et al. (2014).

Value chain actor	End consumer	Large retailers	Refinery	Mill	FFB Intermediaries	Growers	Illegal oil palm developers	Village government	District government	Central government	Power to alter
End consumer	0	C	0	0	0	0	0	0	0	I, D	3
Large retailers	I	0	C	0	0	0	0	0	0	I	3
Refinery	0	I	0	C, I	0	0	0	0	I	I	5
Mill	0	0	0	0	C, I	C, I	I	0	I	I	7
FFB intermediaries	0	0	0	0	0	C, I	0	I	0	0	3
Growers	0	0	0	0	0	0	I	0	0	0	1
Illegal oil palm developers	0	0	0	0	0	I	0	C	0	0	2
Village government	0	0	0	0	0	C, I	D	0	0	0	3
District government	0	0	0	C	0	I	C, D	C, I	0	0	6
Central government	I	C	C, I	C	0	I	C	0	C, I	0	9
Impacted by an other actor's power	2	3	3	4	2	**9**	**6**	4	4	5	

are more liberal, market-based, and economically incentive-driven relations. Taking these relations into consideration was important when we designed intervention scenarios to reduce fire.

4.3.3. Power relations among the value chain actors

We implemented Krott's ACP approach to analyst who is the most powerful actors. Krott et al. (2014) and further adapted by Prabowo et al. (2017) provide elements of power, which include coercion, (dis) incentives and dominant information. Actor(s) who have capability and capacity to coerce, dis(incentivise) and inform with unverified information other actors will be more powerful than those who do not have. Table 6 provides actors who involve directly in the palm oil value chains and governments that provide policy and environmental setting to the business of palm oil. We investigated what source of power of actor (row) can be used to alter behaviour of another actor (column).

In the last column of Table 6 we added-up the power elements to understand how the individual actor can influence other actors. The central government is the most powerful actor, followed by mill, district government and refinery. Actors with medium power are end consumers, large retailers, FFB intermediaries and village government. Actors with the least power are growerss, and then followed by illegal palm oil developers. Those with the least power are those who are also the most impacted by the other power.

Central government has coercive power to influence oil palm supply chain through law and policies. Central government also has strong incentive power where they incentivise refineries especially biodiesel industries and smallholder replanting through oil palm fund (BPDP). Other kind of incentives also disbursed through fertilizer subsidies.

Influential role of local government besides regulating oil palm supply chain actors is determining price of FFB for farmers. FFB Pricing Team *(Tim Penetapan Harga TBS)* is periodically updates FFB price based on price formulation in Ministry of Agriculture Decree Number 14/2013 where one of important variables, K Index, is determined by Governor. Local government also actively incentivise farmer with good quality seedling distribution to improve yield productivity.

As upstream industry, mills and refineries play important role in oil palm value chain. Mills and refineries which mostly associated with large-scale oil palm plantation will also associated with farmer and intermediaries for securing FFB supplies. Along with sustainability issue in oil palm, mills and refineries are required to ensure their supply base, including farmer, following sustainability standard. To meet the standard, refineries can coerce their supply base mill and mills will coerce growers to follow the standard. In return, incentive can be given to those who meet the standard.

Fig. 5 shows the power connection among different actors of palm oil value chains. The arrow direction indicates 'power to alter' with degree number. We simply adding up actor power elements (C, I and D) to provide degree of power. As shown, village, district and central government have power to alter the behaviour of 'Oil palm illegal developers' that uses fire. The district government has the biggest power through law and its enforcement as well as dominant information to reduce fire uses in oil palm development. Growers and the oil palm illegal developers depends each other, so the growers unlikely to use his power to alter.

4.4. Scenarios to reduce fire through good governance

The scenarios focus on reducing fire uses in palm oil land preparation. The scenarios were developed based on the understanding of palm oil value chain and its governance including power relation among its actors. The component of good governance include actors, rules and practices. Good governance is characterized by transparency, participation, accountability, coordination and capacity (Davies et al., 2013). In this regards, the scenarios focus on how to alter the use of fire by the illegal developers, and provide alternatives for them to have environmental friendly practices in land preparation. The scenarios basically comprises two categories i.e. coercion and (dis)incentive not to use fire. Coercion comes from actors who hold laws and regulation to support, while (dis)incentives come from palm oil business as well as governments.

The first category, as shown in Table 6, coercion comes from district and central governments but village government. District government, supported by provincial government, can use local regulation or PERDA *(Peraturan Daerah)* such as Jambi Province's PERDA No. 2, 2016[1] on fire prevention to enforce people not to use fire. Involvement of police is a fundamental to guard and monitor people not to use fire. Central government through Ministry of Environment and Forestry (MoEF) and national police can enforce Law 32 year 1999 on environmental management and Law 41 year 1999 on forestry, and Law 18 year 2013 on combatting illegal logging. Village government cannot coerce the illegal palm oil developers since the develpers have a lot of influence at local levels, particularly at village and sub-district levels. They often can force the village government to support them. Depending on whom to support the developerss they may extent their power to sub-district government.

The district government can develop propaganda and provide dominant information to reduce fire. Although technically controlled and safe burning is possible and allowed by Law 31, 1999 but currently all are afraid to use fire for the reason of fire disaster in 2015. Massive information provided by district government supported by local policy and army with threat of putting them in jail for fire uses frightens local communities and farmers to use fire, even in their own backyard.

The second category, as shown in Table 6, (dis)incentive to use fire for illegal palm oil developers come directly from growers and mill. If the demand is high than the plantation price per hectare increases and provides incentive more to use fire in developing land for palm oil plantation. Likewise, the high demand of FFB from mills incentivise growers to buy oil palm plantation and subsequently increase provide incentive to develop illegal new plantation. Similarly, if growers wants only to buy land without fire uses then it will disincentivise to use fire in developing palm oil plantation. Likewise, if mill want only to buy FFB coming from good plantation then it will disincentivise to use fire.

Incentives for not using fire need to be big enough to compensate oil palm developerss. The cost differences on burning and zero burning oil palm planting from 'heavy' forest on mineral soil in Riau is about 44% (Simorangkir, 2007). The cost differences on burning and zero burning oil palm planting from logged over forest in Malaysia is 6% on peat and 13% in mineral soil (Jamaludin et al., 1999). The cost of oil palm plantation development with-fire is about 3007 USD per ha (Purnomo et al., 2017), which means cost of oil palm plantation development without-fire is about USD 180–1323 higher than using fire.

We would discuss below whether green product scenario can compensate this value. Incentives particullary for smallholders not to use fire can also be compensated from potential increased value added from strengthening their association vis-à-vis mills and refineries. The compensation can also be potentially taken if smallholders are able to moveup to higher stages in palm oil value chains. Incetives from other parties for not using fires are explored here.

The green products scenario requires all palm oil plantations and their supply chains to comply with principles, criteria, and indicators (standard) of sustainability as documented in RSPO, ISPO or other sustainability standards. The standards prohibit the uses of fires in land preparation and palm oil replanting. Applying a green products scenario would urge plantation developerss to use only non-forested land for palm oil plantations. Forest conversion is only allowed if it is conducted legally, and the cut-off date for legal forest conversion is still being debated. The green products scenario ensures that fires are not used and this will increase the cost of FFB production.

[1] http://infokehutanan.jambiprov.go.id/file/perda/PERDA%20NO%2002%20TH%202016.pdf.

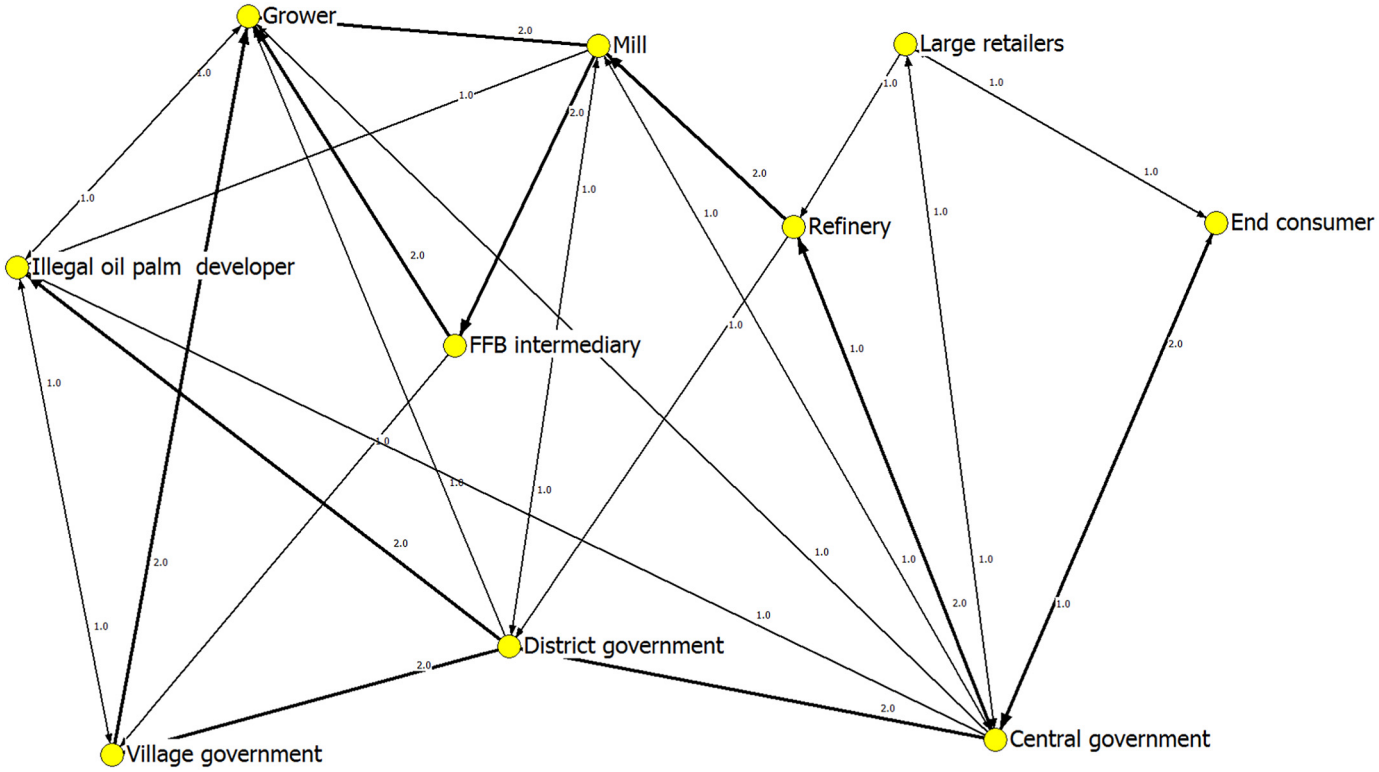

Fig. 5. How actors are connect with other actors in the value chains.

People would be willing to pay a conservation-grade premium ranging palm oil based products from 15% to 56% (Bateman et al., 2015). The growers benefit is about USD 1030/ha/year (Table 4). If growers benefit adjusted based on percentage of willingness to pay, benefit will be USD 154–577 higher. As shown in Table 6, the growers can incentivise palm oil developers to grow in more sustainable way, it means without fire. Likewise, mill by selling green product will get paid higher. The mill can incentivise the oil palm developers not to use fire through FFB intermediaries and the growers. Market incentives for not using fires, in line with ISPO and RSPO are potentially able to compensate for the cost of cleaning up the supply chains.

The small-scale association scenario would improve growerss' bargaining position against intermediaries. Through this growers association, it is expected that growerss could enjoy better prices and have better negotiation power in selling FFB to market. At least they could lessen the role of FFB intermediaries. FFB intermediaries get benefit from a hectare of oil palm plantation is about USD 150/yr (Table 4). This money can be used to incentivise palm oil developerss not to use fire in land preparation for palm oil plantations.

Big corporations generally have their own mills and can maximize their value added accordingly. Growers, through the association, can move up to own or invest their shares in regular or mini-scale mills. Building a mill requires an investment of millions of US dollars, which is impossible to finance alone or through underfunded associations. This 'moving up' scenario can increase value added obtained by growerss. Mills benefit from a hectare of oil palm plantation is about USD 203/ha/yr (Table 4). Mini mill has capacity ranging from 1 ton FFB/h for 200–300 ha of plantation, 5 ton FFB/h for 1000–1500 ha of plantation, and 10 ton FFB/h (2,000–3000 ha of plantation) (Fadli and Santoso, 2004). With this economic scale, plenty of money will be obtained if the growerss can develop their own mills. Partly this money can be used to incentivise not to use fire in land preparation for palm oil plantations.

The smallholder association can also negotiate with the government their land legality. Idsert and Schoneveld (2016) provide the typologies of smallholders including land legality, in which many smallholding palm oil are not yet legal. Once the smallholders institution is strengthened, the members can negotiate with Government of Indonesia to obtain land that has become available as a result of agrarian reform or social forestry in former production forest for concessions. It would also be essential for the government to recognize the roles of the growerss. Altogether, the smallholders or growerss provide 41% of palm oil plantations, which could produce 40% of FFB to be processed to become CPO and PK. With the new Presidential Regulation *(Peraturan Presiden)* No. 88, 2017 on solving land conflict inside forest zone, local communities can claim the land legally when they deserve according to that new regulation. With this legality they can incentivise themselves to prepare the land without fire.

Incentives not to use fires may come from Fire Free Alliance (FFA), which is a voluntary multi-stakeholder group made up of forestry and agriculture corporations, NGOs and other concerned partners keen to resolve Indonesia's fires and haze problems arising from land burning. FFA programs include no burn rewards, crew leaders, agricultural assistance, awareness programs and monitoring of fires and smoke.[2] Direct collaborations with corporations can provide better price for growerss' FFB as well as incentives not to source their plantations from those who use fires. These better FFB price and incentive can be used to incentivise and influence palm oil developerss not to use fires.

5. Discussion

5.1. Methods

VCA and governance analysis are very useful methods. VCA provided the opportunity to understand the actors involved in palm value chains, the flow of products, and value added distribution. VCA uses a system view for a particular product from upstream to downstream. The system-based coverage for the study resulted in data used for the

[2] http://www.firefreealliance.org/.

analyses coming from various sources, i.e. previous study, field data from interviews, and secondary data. While this may reduce accuracy in calculating value added for a particular site, it can provide a system-wide view of palm oil in Indonesia.

The VCA can link domestic and overseas markets of palm oil to fire reduction in systematic and analytical ways. Each actor, even end consumers, can realize how they are connected to fire, haze, and environmental destruction. Since most forest and agricultural products are buyer driven, then buyers need to demand FFB that were not produced using fire.

Governance of value chains can provide framework of analysis how to reduce fire thorugh understanding power contestation and value added obtained by participating actors. ACP provides powerful deliberate tool to understand and analyze actors' contestation. Therefore, ACP is a key method in understanding governance and promoting good governance. Indeed, the emerging of self-governing network as an alternative to hierachy and market based structures (Rhodes, 1997) makes ACP is more relevant. In self-governing network, actors through their power and networks at local, national and international level influence decision-making processes to fulfil their interests and to accumulate power. Legal and illegal economic benefit or corruption can occur from the misuse of power (Jain, 2001).

5.2. Results

VCA provides estimates for value added distribution for every actor in the chain. Value added for growerss was calculated as USD 70 per ton FFB produced. This number is relatively high compared with that found by Putri et al. (2013) and Rogayah (2016), with farmers' profits of USD 38 and 65 per ton of FFB, respectively. Value added from mills to the refineries level was about USD 53 per ton CPO and PK produced. It is in the range of the amount found by Budidarsono et al. (2012) of USD 43–164. Different localities can provide different value added numbers.

Palm oil can be a locomotive for local, national, and regional economic development. Improvement of household incomes to make them fairer and more equitable along the supply chain is demanded (Muradian and Pelupessy, 2005; Gereffi et al., 2005). Through various national initiatives such as RSPO, it is expected that palm oil will be more environmentally friendly and better for local people, who want to increase their economic welfare in legal ways. Land access and institutional support are needed to increase their welfare. Land reform and social forestry along with law enforcement are viable options.

A supply chain of palm oil that is equitable and uncontaminated by burning should continue to be pursued. Partnerships that are of mutual benefit for the community and the company are required (Purnomo and Mendoza, 2011). Indonesia should be able to distinguish between good palm oil actors who wish to benefit properly and bad rentiers who succumb to moral hazard. The government should strengthen political access for the good corporations (Purnomo et al., 2012a; Purnomo et al., 2012b).

Good governance is able to reduce fire in palm oil value chains in two ways i.e. coercion and (dis)incentive not to use fire. Coercion comes from actors who hold power in developing and implementing laws and regulations, while (dis)incentives come from those who have economic advantages such as palm oil business as well as governments. Direct incentives can be given from different certification schemes and third party. Bigger value added can compensate the use of of fire byb smallholders. This bigger value added can be generated from smallholder association and moving-up to higher value chains.

Regarding green products, palm oil stakeholders can learn from the forestry sector. Indonesia has been developing government-based and mandatory timber certification, which is called the Timber Legality Verification System (SVLK). SVLK was developed based on the European Union–Indonesia Voluntary Partnership Agreement in 2003. On November 15, 2016, SVLK was transformed into the Forest Law Enforcement, Government, and Trade (FLEGT) license. Indonesian timber can enter EU markets without due diligence. Two essential things that the palm oil sector can learn are multi-stakeholder processes and transparency. Government, CSOs/NGOs and private sector actors are actively involved in the development of SVLK standards. The legality of timber is assessed by an accredited certification body that is independent from the company and government. CSOs/NGOs take roles of independent monitoring in the certification process.

5.3. Theoretical insight

The ‘green product’ scenario needs to be examined by combining market incentive and public policy. The scenario involves the vertical dimension of a value chain that is composed of ‘market’ and ‘hierarchy’ relations. Public policy is more effective when it is more hierarchical, whereas a market incentive is more effective when it is more market based. The ‘association’ scenario lies in the horizontal dimension of the palm oil value chain and mostly concerns how to strengthen the capacity of the growerss and their institution. This scenario will work well if it is clearly able to provide incentives to market FFB with higher value added as well as to obtain land at low cost, which public policy may need support. The last scenario of ‘moving up’ is based on market incentives for growerss to have mini-scale mills to obtain better value added. This will decrease the role of intermediaries. However, this scenario depends on how strong they are. This scenario would be more effective if it were executed after the ‘association’ scenario.

Good value chain governance requires a hybrid approach of public policy and private standards. Public policy has the capacity to enforce a conducive policy environment to make sustainability possible. Private practice standards such as RSPO can provide market incentives to actors or firms along the chain to comply. Incentives can come from better market penetration and premium prices (RSPO, 2017; RSPO, 2014; MPOB, 2012). Growerss who previously used fire as part of their agricultural practices will not able to comply with private standards if there is no land policy to provide them with access to land. If legal land access is only given to big corporations, then most smallholder will access the land illegally. If the land is owned or managed illegally, then agricultural practices develop on that land that cannot be considered to be environmentally friendly. The use of fire cannot be avoided in such circumstances.

This hybrid approach provides a public–private arrangement (Rana and Chhatre, 2017). However, it suffers from weaknesses on both sides. ISPO is an example of a hybrid approach. About 1.5 million ha of palm oil plantations in Indonesia have been ISPO certified. It is public policy to demand palm oil sustainability in Indonesia, and a set of standards was developed by the Ministry of Agriculture with which private sector actors should comply. As a government policy, it has chronic weaknesses. There is a lack of transparency inherent in this standard as regards the palm oil sustainability assessment and ensuing decisions. The absence of independent monitoring makes this standard suffer from global criticisms. As a private standard, those who comply with the standard demand better profits or more incentives from the market. However, when the standard is not recognized by buyers, then the market will not provide those incentives.

Achieving a combination of the strength of public policy and private standards was can be done by greening and strengthening ISPO. As a government policy, a strengthened ISPO would provide third-party independent assessment of palm oil sustainability accompanied by independent monitoring by NGOs/CSOs. The strengthened ISPO is in line with the principle of good governance, which reflects balanced power among government, NGOs/CSOs, and private sector actors in defining, implementing,and monitoring sustainability. As a private standard, a strengthened ISPO would provide market incentives once it was recognized by buyers, similar to the RSPO. Indeed, certification can provide governance-generating network, in which international NGOs such as Greenpeace can provide pressure or coercion to comply with environmental standard (Tysiachniouk and McDermott, 2016).

6. Conclusions

Palm oil is a solution for regional and national economic development if it is managed sustainably. Palm oil contributes significantly to local and national economic development, yet at the same time it also contribute to fires and environmental destruction. Good governance of value chains is able to reduce forest and land fires. The fire uses in land preparation can be altered by using coercion, dis(incentives) and dominant information that held by district and central governments, growers and mill. The potential benefits from green products, a strengthened growers' association, moving up scenarios can be used to compensate the 'benefits' of using fire.

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