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Sustainable Palm Oil Supply Chains:

Complexity, Custody and Contention

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Abstract

Demand for palm oil is strong. It and other products of the oil palm are pervasive in modern society. The sustainability of oil palm cultivation is, however, contested. Different interpretations of sustainability have created conflict at the point of production with perceived Western values conflicting with the perceived needs of palm oil producing countries. This paper contributes to the sustainable supply chain management literature by discussing how stakeholders, with differing objectives, influence behaviour along complex palm oil supply chains. Based on field observation and interviews with these key stakeholders, the paper considers economic, ethical and environmental aspects emerging from efforts to create sustainable palm oil supply chains. In particular, the paper looks at efforts to achieve traceability of supplies and the impacts of such efforts. Insights from this research will help raise awareness of the supply chain dynamics of the palm oil industry, the conflicting challenges faced by downstream buyers and upstream producers, and how well-meaning efforts to support socio-economic development potentially harms efforts to drive sustainable production of oil palm.

Keywords: Palm Oil; Supply Chain Management; Sustainable Supply Chains; Product Certification; Traceability

1. Introduction

Global demand for palm oil has steadily grown to a point where it dominates world vegetable oil markets with annual production, in December 2016, standing at 64.5 million tonnes (USDA 2016). Reasons behind oil palm's growth as a product and industry are multifaceted but largely driven by Asian demand for cheap readily available foodstuffs amplified by other regions' increasing use of palm oil as an affordable substitute for trans-fats, animal by-products and as a source of biofuel (see Buckland, 2005; Corley 2009; Rival and Levang 2014; Hamilton-Hart 2015; Guest 2017). The oil palm is the most productive of the commercially grown oil crops. In terms of yield per hectare, it is up to 10 times more productive than the likes of sunflower, soy and rapeseed (Sime Darby 2014). Oil palms grow almost exclusively in humid tropical areas leading its commercial production to be largely centred in biodiverse equatorial and equator bordering countries, most notably those of Southeast Asia. As a commodity, it has thus become key in the development of several countries (e.g., Sayer et al. 2012); notably that of Indonesia and Malaysia who together produce 85% of the world's current supply of palm products. The tangible benefits that the palm oil industry has brought to producing countries and an approximate 3 million smallholder farmers are manifold (Sayer et al. 2012; Majid Cooke et al. Accepted). Indeed, many smallholders and their families, for the first time in some cases, have access to the basics many take for granted, such as electricity, education, healthcare, transport infrastructure and shop bought food (see Feintrenie et al. 2010; Guest 2017; Majid Cooke et al. Accepted). For some smallholders and their families, oil palm cultivation has in fact become a livelihood strategy (Cramb and Sujang 2013)

Notwithstanding benefits to many, oil palm cultivation is surrounded by a variety of environmental, economic and social issues (Cramb and Curry 2012). Indeed, from an

environmental perspective, oil palm cultivation is associated with the increasing loss of some of the oldest rainforest in the world and their endemic flora and fauna (Fitzherbert et al. 2008; Wilcove and Koh 2010; Sayer et al. 2012). Regular burning of carbon rich peat and scrub to prepare land for palm cultivation, liberal and/or inappropriate use of chemical fertilisers and pesticides once palms are planted, contribute to climate change and the pollution of land, air and waterways (e.g., Fitzherbert et al. 2008; Abdullah and Sulaiman 2013; Hamilton-Hart 2014). Furthermore, though some indigenous peoples have benefitted from land clearance and the introduction of oil palms, others have lost their ancestral lands (Colchester et al. 2006; Cramb and Curry 2012), and in some cases, their way of life (e.g., forest nomads such as the Penan in Borneo) (Colchester et al. 2007).

In countering these well-publicised issues, however, there are suggestions that oil palm cultivation is not the direct cause of mass deforestation, with cultivation of palms instead being a post-logging productive use of land (e.g., Basiron 2007; Fitzherbert et al. 2008; Guest 2017). Such a suggestion can be compelling when coupled with the arguments that palm has brought economic development to many - and palm certainly cannot be blamed for all of the environmental or social issues that exist in Southeast Asia related to land use. Nevertheless, such arguments and justification of actions, rational or not, do not meet the supply chain management needs and operational policies of many businesses. Large brand name corporations in particular cannot be seen to be complicit in any environmental or ethical issues that may be directly or indirectly associated to their industry or the raw materials they rely on (Vermeulen 2015). Western companies in particular are regularly subject to intensive scrutiny and high profile and potentially brand-damaging campaigns by NGOs. In turn, they are increasingly encouraged to take responsibility for their wider actions and their impacts on the environment and society (Wolf 2014; Hörisch et al. 2015).

Taking responsibility for supply chain impacts can contribute to an increase in demand -side businesses placing sustainable production and social responsibility requirements on their suppliers (Ras and Vermeulen 2009; Kogg and Mont 2012). The implementation and conveyance of an environmental policy, third party-certification and other codes of conduct along a supply chain, is indeed relatively commonplace (Grosvold et al. 2014). Addressing sustainability in supply chain management is "critical" (Ageron et al. 2012:168). It forms a distinct part of risk and supply chain management (Giannakis and Papadopoulos 2016). By definition, however, the development of an environmentally sympathetic and risk averse supply chain must start upstream with production of primary raw materials. In the global agri-food sector, however, 'upstream' is regularly populated by significant numbers of smallholder farmers based within developing countries. It is widely observed that smaller entities in supply chains regularly do not possess the resources or simple know how to meet the demands of larger downstream buyers and their cascaded policies on standards of production (e.g., Hatanaka et al. 2005; Ageron et al. 2012). This is, likewise, the case with smallholder oil palm farmers (Nagiah and Azmi 2012).

There has to be high or significantly increasing demand for a given product to make its production commonplace. The demand for cheap conventional palm oil in Asia, particularly India, China and Indonesia itself, is far greater than that for certified sustainable palm oil in European or other Western countries. Domestic consumption of palm oil in Indonesia, India and China, as of January 2017, accounted for almost 40% of all global palm oil stocks (USDA 2017). However, downstream businesses based in these countries have, largely, shown neither historic nor current interest in purchasing palm oil produced to third-party certified sustainable standards (see Wilcove and Koh 2010; RSPO 2017). Given the contentious nature of palm oil in the West, how to influence and manage supply chains originating in and outwardly dominated by the needs of developing countries, is a major issue

for European businesses. Indeed, this is essentially an exercise in how to manage supply chain risks within the context of multiple practical and ethical challenges. This study provides an empirical examination of how some companies have sought to manage these supply chain risks and protect their image in the context of operating within global supply chains that cross disparate geographic regions in terms of national development, priorities and business culture. Specifically, the study addresses the question: how have consumer facing companies in the palm oil supply chain used product certification to promote the perceived sustainability of their product? In particular, the study considered the action, relative success and impacts of implementing supply chain custodies and much vaunted 'traceability' of supplies.

The research presented in this paper derives from a wide ranging multidisciplinary study looking at resource optimisation and innovation at the mill level of the palm oil industry in addition to the ability of smallholders to benefit from these innovations and other agri-tech developments. The following sections detail the study approach and present an overarching review of the growing body of work in Sustainable Supply Chain Management (SSCM). A brief review of palm oil certification schemes is provided. Key study findings are then provided in respect of the study's research question and objectives. The paper concludes by discussing the current and ongoing role and value of certified sustainable palm oil supply chains and by providing suggestions for future research.

2. Study Context

There is clear evidence, albeit anecdotal, to show that businesses can be seriously harmed by sustainability issues that exist within their supply chains (Hofmann et al. 2013). As such, management of risk within global supply chains is important. The management of supply chain risk does not only concern the security of supplies, however, it also increasingly

incorporates consideration of multifarious social and environmental issues relating to who produced raw materials, where and how (Closs et al. 2011; Dittman 2014; Ethical Corporation 2016). Not managing such risks leaves an organisation open to criticism, bad publicity, legal action, potentially damaging campaigns from NGOs and, ultimately, loss of business. Sustainable Supply Chain Management (SSCM) is increasingly a route by which sustainability and other ethical supply chain issues and risks are managed (Giannakis and Papadopoulos 2016). SSCM involves the coordination and integration of the social, environmental and economic goals of its actors (Carter et al. 2008), e.g. the so-called triple-bottom-line. It is explicitly considered as the interconnection between the fields of Supply Chain Management (SCM) and sustainable development and has been shown to be the subject of increasing academic research and numerous special issues over the last two decades (Seuring and Müller 2008; Ageron et al. 2012; Asby et al. 2012; Beske and Seuring 2014; Meixell and Luoma 2015).

Summarising the emergence of tangible SSCM, Meixell and Luoma (2014) link its implementation directly to awareness raising by stakeholders, both internal and external. They suggest stakeholders influence SSCM in three progressive stages: firstly, in creating awareness of a sustainability issues (through internal self-learning or external media or NGO attention); then in the adoption of a sustainability goal that, by definition, must follow awareness raising and, again, has its form shaped by stakeholders; and, lastly, in the implementation of a given sustainability practice, such as product certification. Notably, Meixell and Luoma (2014) highlight that the stakeholder pressure that created awareness of an issue, may not be the one(s) that influence the setting of sustainability goals nor the form of SSCM adopted. Arguably, such a scenario and its consequences can be seen with the high profile campaigns of the likes of Greenpeace, which were aimed at several brand name

European palm oil users (see The Economist 2010), and their consequent criticisms of the remedial SSCM actions taken by many of the same stakeholders (e.g., Greenpeace 2013).

As sustainability issues arise, companies require effective strategies to anticipate and mitigate for any detrimental consequences. SSCM should therefore, it is argued, incorporate more proactive strategies rather than reacting to those that arise from responses to the aforementioned external pressures of stakeholders (Wolf 2014; Beske and Seuring 2014). Proactive strategies for companies can and do regularly include the utilisation of predominantly third-party certifications as evidence of sustainable management practices and assurance that the supply chain members are following what are considered to be reasonable and responsible practices (Grosvold et al. 2014). Certification schemes are invariably trusted by companies and consumers alike to judge whether the criteria for sustainability are met. In the case of complex global supply chains, however, the risk management dimension of SSCM can be particularly challenging (Schaltegger and Burritt 2014), particularly for palm users and their need to work across large geographical distances and with supplier countries that may have different and often conflicting political and cultural differences.

Given sustainability standards' emphasis on achieving 'traceability' of supplies (Lemielleur 2013), managing such competing supply chain dynamics can be challenging. The difficulties involved in managing global supply chains to agreeable standards, could be a reason why supply chain standards are suggested to still be too low (e.g., Greenpeace 2013; Hofmann et al. 2013). Indeed, media and NGO stakeholders continue to highlight a multitude of sustainability issues and force big companies' hands in terms of recognising issues in their supply chains (Hofmann et al. 2013; Wolf 2014). However, even with the recognition of issues and reactive adoption of the likes of SSCM, some businesses do not have robust systems in place to measure if their supply chain demands are being met or have been

achieved. This is a recognised demonstration of decoupling of sustainability strategies from measurement of their performance (Hassini et al., 2012; Grosvold et al. 2014). Both decoupling and even 'loose coupling' of company policy and actual practice can be a high risk approach to SSCM, potentially leading to environmental and reputational damage (Grosvold et al., 2014). Thus, proactive SSCM is increasingly a facet of large companies, particularly those with formal management systems that are constructed around the principle of continual improvement.

Realising proactive SSCM initiatives and policies, however, requires supply chain members to think about the operation of the whole system, not just one or an isolated part of it (Grosvold et al. 2014). Indeed, all of a supply chain's stakeholders play a part in facilitating or potentially hindering sustainability aspects of supply chain management (Meixell and Luoma 2015). As has been recognised by others notably studying agri-food production, implementing supply chain standards not only affects the form of the commodity being produced, but also the dynamics and organisation of the supply chain (Lemielleur 2013 and citing Reardon 1999). This relates to the idea that supply networks are complex systems (Choi et al. 2001), in so far that proactive attempts of a stakeholder to control the supply chain and its constituent parts, in a manner suited to its needs, can lead to additional, emergent, unpredicted results. Thus, within any robust proactive attempt to manage a supply chain network, there has to be careful monitoring of all emergent effects of SCM and a readiness to address and potentially realign strategies to meet management goals (Choi et al. 2001). Achieving such readiness and awareness in the realm of SSCM, however, would need a clearer and wider understanding of all facets of sustainability, not just environmental sustainability.

The content and focus of the messages conveyed in this growing body of SSCM literature, however, still leaves significant gaps to be addressed. Hassini and colleagues (2012) identified a need for more industry specific SSCM studies whilst, simultaneously, more insight needs to be gained on the trade-offs that exist or can arisein supply chains shaped by conflicting 'triple-bottom-line' SSCM objectives (e.g., Meixell and Luoma 2015). Notably, much has been written about the environmental and ethical dimensions of supply chains (Closs et al. 2011). However, for some there is a lack of discussion relating to sustainability and formal supply chain risk management (Hofmann et al. 2013). For others there is a gap in specific reference to sustainability and social issues (Seuring and Müller 2008). Indeed, Mani and colleagues (2015) recently suggested that there is a need to improve our understanding of the relationship between the environmental and social dimensions of sustainability within supply chains, particularly within and along developing country supply chains. Arguably, these possible gaps, resonate with Boons and colleagues statement that, although there is a growing body of literature on sustainable product supply chains, there is an unfortunate lack of holistic understanding due to: "imperfect linkages across a number of research communities that have taken up this issue" (Boons et al. 2012: 134).

By providing insight into palm oil supply chains and their management across disparate business and national cultures, this paper helps to fill several gaps in the literature relating to empirical case studies, industry specific research, global supply chain dynamics and the lack of studies considering the social dimensions of SSCM.

3. Certified Sustainable Palm Oil

Given large companies' constant assessment of risk within their supply chains and need to protect their brands from bad publicity (Wolf 2014), the palm industry has been subject to the

development of several schemes aimed at raising standards and the industry's image. Some are national compulsory schemes that lean toward the socio-economic development aspects of sustainability - such as the Indonesian Sustainable Palm Oil (ISPO) and Malaysian Sustainable Palm oil schemes. Others are voluntary third-sector schemes that have a more general and wide-ranging sustainability remit - such as the Roundtable on Sustainable Palm Oil (RSPO) and, the more general biomass and bioenergy focussed, International Sustainability and Carbon Certification (ISCC).

Of the dedicated palm oil certification schemes, RSPO is the most mature and has the widest international reach and credibility amongst the private sector; it has been found to be the most concise, robust and transparent in terms of meeting the wider definition and interconnected social, environmental and economic aspects of sustainability (Efeca 2016). RSPO was the product of several businesses and the WWF coming together to create a mechanism for ensuring palm oil was produced to sustainability standards mutually agreeable to its membership. RSPO certification standards are formed around performance indicators which focus on several guiding principles, ranging from 'Commitment to Transparency', 'Use of Appropriate Best Practices by Growers and Millers', 'Environmental Responsibility and Conservation of Natural Resources and Biodiversity' through to 'Responsible Consideration of Employees, and of Individuals and Communities Affected by Growers and Mills' (RSPO, 2013).

Any organisation can become a member of RSPO. However, to sell Certified Sustainable Palm Oil (CSPO), or certified palm fruit kernel, a group of smallholders, an estate, plantation and/or mill has to be audited by a third-party against the Roundtable's 69 performance indicators and overriding 'Principles & Criteria' (see RSPO, 2013). Following a successful third-party audit and RSPO certification, CSPO produced by a mill can enter the

palm product supply chain via one of four methods. Each method has to be separately certified to RSPO supply chain standards (separate to the P&C standard) to allow end-users to claim that their product truly is, or supports, CSPO. The four supply chain options are:

1. 'Identity Preserved' (IP) CSPO; which is physically produced by known RSPO certified plantations and mills, sold at source and kept separate from non-CSPO palm oil from the point of production through to the point at which it is ready for end-use within a given product. Theoretically, IP allows an end-user to trace who, where and how their palm product was produced and allows a Consumer Goods Company (CGM) and or retailer to make such a claim.
2. 'Segregated' (SG) CPSO; palm oil which has been produced by a RSPO certified producer but the oil is mixed with that of other certified RSPO certified growers. The mixed CSPO is kept apart from non-CSPO oil throughout its production through to its supply to manufactures. Though the end-user has some assurance the material they have purchased is 100% physical certified sustainable, the end-user does not specifically know where or who produced the product they have purchased. Users of SG palm oil, its derivatives and/or kernel based products are permitted to claim that their products contain certified sustainable palm oil.
3. 'Mass Balance' (MB) system. This supply chain system entails a known percentage of CSPO being mixed, potentially at more than one location, with non-CSPO oil. Users of MB palm oil are permitted to claim they contribute to the production of CSPO to a known volume (e.g., n%). End-users will be aware that the palm oil, kernel or other derivatives they use will contain some amount of physical certified sustainable material mixed with non-certified conventionally produced oil.
4. 'Book and Claim' (BC); involves issuing what are/was known as 'GreenPalm certificates' ('RSPO Credits' as of January 2017) to growers. One certificate is issued

to a grower for every tonne of RSPO certified palm oil they produce. Buyers of BC certificates are effectively offsetting the sustainability impact of their use of a given palm product. Though there is no guarantee that the actual palm product used by a downstream manufacturer has been grown in a sustainable or socially responsible manner, BC users are permitted to claim that they actively support the production of CSPO.

4. Research Approach

In addition to the review of SSCM literature, the study approach was shaped by a comparative analysis of corporate documentation relating to several prominent brand name users of palm products and their role in the production and supply of certified sustainable palm oil. Insights derived from the document analysis complimented the authors' first-hand practitioner experience of assessing and managing the environmental performance of businesses in Europe and Malaysia and in-the-field observations of palm oil industry stakeholders in Southeast Asia. Questions raised from these activities were duly posed to stakeholders in the production of palm oil and use and development of sustainable palm oil supply chains. Semi-structured interviews were held with stakeholders covering all positions of the oil palm supply chain (n = 7), including representatives of major European based retailers, multinational consumer goods manufacturers, Malaysian oil refineries, palm oil mills and oil palm estates. Further interviews were held with influential stakeholders external to the supply chain who are active in several aspects of the environmental and social impact of palm oil cultivation (n = 4), including product certifiers and NGOs based in the UK and Southeast Asia. Notably, several interviewees held positions with companies who sit within more than one tier of the supply chain and offered perspectives on each tier they covered.

Questions posed to stakeholders were focussed around the general perception of oil palm cultivation in Southeast Asia and in terms of the roles different stakeholders take in the development and implementation of sustainable production and supply chain standards. Aside from one Sarawak based refiner and one plantation manager, all interviews were audio recorded. Notes taken during the interviews and consequent interpretation and analysis were reviewed by the interviewee for accuracy. All recorded interviews were transcribed verbatim. Interpretation of interviews was inductively shaped by the findings of the document analysis; and, deductively, from the authors' respective academic and practitioner backgrounds in the social sciences, environmental management, operations management and logistics. Given their prominence in the study findings, the 'triangulated' draft results and conclusions were forwarded to all downstream stakeholders. Resultant comments by one certifier and the two consumer goods companies, relating to resonance and/or validity of findings, were incorporated into the presented version of the manuscript. For purposes of anonymity, observations deriving from interviewed stakeholders are cited in respect of the year the interview took place and the primary tier of the supply chain they represented or, in the case of stakeholders external to the supply chain, the type of organisation they represent (i.e., Retailer, CGM, Refiner, Mill, Plantation, Certifier, NGO).

5. Results and Analysis

Results are presented in respect of stakeholders' perceptions and understanding of CSPO supply chains, the practicalities of managing sustainable palm oil supply chains and in respect of the effects of adopting sustainable supply chains. Results are provided in discussion form followed by summarised key findings and exemplifying statements made by interviewees.

5.1 Stakeholders Perception of Oil Palm Supply Chains

Complex was how interviewed CGMs, certifiers and the NGOs described the palm oil supply chain. All stated that much of this complexity derives from the presence of millions of smallholders and, in the case of one CGM, in the fact that they use small amounts of palm oil fractions and derivatives rather than bulk, more traceable, crude oil, olein and/or stearin. Indeed, without the purchase large difficult to manage volumes of material, use of small amounts of palm based derivatives, which can go through significant levels of processing, makes the use of IP supply chains difficult for that company and others operating within the personal and home care sectors. The complexity involved in the presence of 3 million smallholders who are not easily identifiable and auditable was said to be exacerbated by the number of palm fruit brokers operating in cultivation areas. These brokers collect produce from numerous sources with little or regularly no record of the conditions palm was cultivated under (NGO1 2015) (see Figure 1 and Key Finding 1).

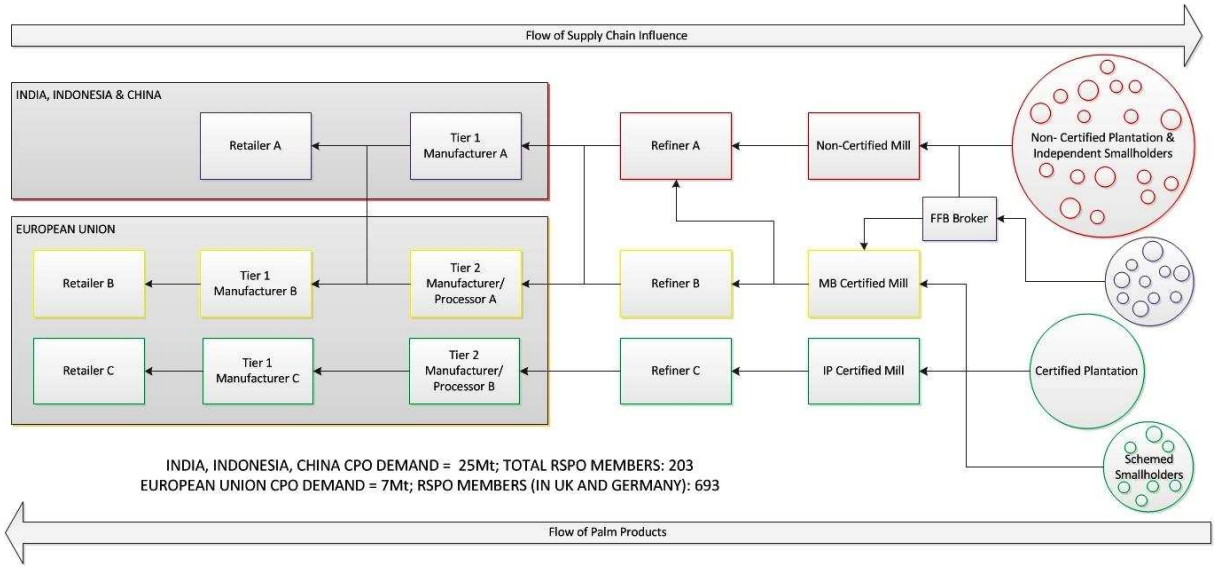

Figure 1. Schematic of Palm Oil Supply Chains

Note: Figure 1 provides a simplified representation of the supply chain options available to the downstream buyers of palm oil and other palm based products. Downstream is based on current geographic market trends, recognition of RSPO and demand for CPO (certified sustainably

produced or otherwise). Upstream of Figure 1 was based on the actual facilities and types of growers operating within close proximity of the mill and refinery interviewed within this study. Following the chain upstream, tracking the origin of oil and/or its derivatives beyond the mill can be difficult. Beyond the mill many different types of farmers regularly operate in the same areas and work to potentially different sustainability (or indeed unsustainable) standards. It can be seen from Figure 1 that it is possible for the produce of many different growers to be mixed within the supply chain.

5.2 Managing Risk in the Palm Oil Supply Chain

As it is theoretically possible to determine where, how and by whom palm oil was produced using the SG and particularly the IP CSPO supply chain options, it is increasingly proving to be the routes by which large brand name companies, particularly European companies, are sourcing their palm oil, kernel and other palm based materials (e.g., Unilever 2014; Nestlé 2015; Certifier1 2015; CGM1 2016; Retailer1 2016). This is, among other things, a direct response to attempting to manage the complexities, risk and uncertainty present in the conventional supply chains (NGO1 2015). Conversant with the SSCM literature, the potential to be associated to environmental and ethical issues that draw the attention of damaging NGO campaigns was found to be the specific risk that stakeholders were attempting to manage (Certifier1 2015; NGO1 2015; CGM2 2016). An IP supply chain, and consequent, or perceived ‘traceability’, is outwardly seen as the best form of SCM for proving the sustainability credentials of a palm product (Certifier1 2015; NGO1 2015; CGM2 2016; NGO2 2016). From a technical perspective, however, the complexity that is inherent in global palm oil supply chains can perhaps make manufacturers claims of traceability erroneous or amusing (Certifier1 2015; CGM2 2016; Guest 2017) (see Key Finding 2).

Notably, upstream interviewees did not refer to traceability, in name, as being a preferred method for assuring the provenance of palm products. The IP and SG systems require all members of the supply chain to be audited and certified, including refineries, mills, plantations and, importantly, any smallholder farmer supplying to the mill. For many smallholders this, however, is particularly difficult for a multitude of financial reasons, perceived inability to meet certification demands, or simple disinterest in such schemes (Plantation1 2015; Martin et al. 2015; Majid Cooke et al. Accepted). Furthermore, it is not technically possible for a smallholder to be individually certified and thus able to access a CSPO supply chain in their own right. As notably recognised by both interviewed product certifiers, this is largely due to a lack of access to capital to pay for cultivation improvements and/or the auditing and certification process demanded by, effectively, downstream buyers (Certifier1 2015; NGO1 2015; Certifier2 2016; NGO2 2016). Though working to more sustainable standards should provide growers with many cost savings and greater crop yields in the long term, the upfront cost of meeting the demands of certification is perceived by many to be excessive (Certifier 2015; NGO1 2015).

As such, to create necessary chains of custody across the supply chain, proactive businesses have circumvented these perceived problems by encouraging the creation of smallholder groups linked to suitably certified mills (NGO1 2015; Mill1 2015). The mill and other stakeholders invariably provide the training and tools necessary to allow smallholders to be certified to RSPO standards. In return, smallholders are asked to exclusively sell their FFB to the supporting mill. For some big brands, the support of smallholders through their supplying mills and NGOs has formed part of their CSR exercises rather than a way of securing supplies of certified FFB. One of the largest palm users, Unilever, has stated: "We see the importance of sourcing palm oil from smallholders and will prioritize purchasing from suppliers that have volumes that can be traced to known smallholders" (Unilever 2014:

2). Notably, even with such support from large brand name buyers, there is no guarantee for smaller growers that there will be a buyer for their Fresh Fruit Bunch (FFB). Though a mill can help a smallholder to meet downstream certification requirements and, in return, expect them to exclusively supply to them, the mill is under no obligation to buy from the smallholder if it already has sufficient stock, sometimes from their own plantations (Certifier1 2015; Mill1 2015; Refinery1 2015; NGO2 2016). Such a scenario can further reduce smallholders' interest in adopting or maintaining sustainable cultivation standards.

5.3 Upstream impacts of Sustainable Supply Chain Management

A smallholder engagement and support scheme, of any form, does not help smaller farmers who for varying reasons will not join a certified group of growers. Indeed, some smallholders are seen as having a distinct disinterest in working to the standards required by certifying schemes and, more importantly, by downstream buyers (NGO1 2015; Mill1 2105; Martin et al. 2015). In some cases, this is apparently due to a perception by smallholders that they are not capable of meeting the standards, in other cases it is because they think it involves: "too much work" with little or no financial benefit (NGO2 2015). There is thus an ethical problem for Western companies, particularly those with policies relating to suppliers and working to recognised standards that are subject to the pressures and continual monitoring of influential entities (e.g., NGOs). As already noted above and in the literature, definitions of sustainability within the palm industry, embedded in certification systems, are created by and for large corporate users (Khor et al. 2015). This is highlighted here: certified sustainably produced or not, palm fruits should be delivered to a mill within 24hrs of harvest to minimise the build-up of undesirable free fatty acids. Consequently, for those who cannot work or are not interested in working to certified standards of larger downstream buyers, there is the possibility that they

will be isolated and excluded from a supply chain if all mills in the area are IP/SG certified or MB certified and have met their required volumes of conventional fruits (Certifier1 2015; NGO1 2015; NGO2 2016; CGM1 2015). This creates difficult to align ethical issues that transcend the environmental sustainability needs of downstream buyers in the West and the social sustainability needs of upstream producers in Asia (Certifier 1 2015).

5.4 Summary of Key Findings and Exemplary Quotes

Key Finding 1: Multinational corporations, in response to environmental and social NGO media campaigns, as much as their own SSC risk management and operational policies, have sought to create 'traceable' IP/SG chains of custody. The palm product supply chain is, however, inherently complex both technically and in managerial terms and determining product custody is difficult for some, largely due to the number of smaller, less visible entities operating upstream.

- Much complexity and the inherent SCM risk derives from the industry's 3 million smallholders who are: "largely invisible in the supply chain". Invisibility of smallholders and their practices are exasperated by the emergence of palm fruit traders (NGO1 2015).
- Fruit traders do not necessarily know how the smallholders they have purchased from operate: "no one keeps track of that, nobody has any idea whether the farmer is planting on a forest reserve or whether he is encroaching on a forest reserve whether he is planting on peat area which he is not supposed to be in, he is not managing it well or whether he has got his children working for him" (NGO1 2015).

Key Finding 2: The use and claims of traceability as a tool for implementing and/or showing the sustainability of supplies are thus questioned.

- Traceability "does not [really] equate to sustainability". A company publicised that 94% of the palm oil they use can be traced back to more than a thousand mills. Effectively the company had traced their supplies back to: "about half of the mills on the planet". *"Does that give you any reassurances as a consumer?*" (Certifier1 2015).
- CGM2: given the convoluted route palm oil takes from the field through umpteen processing and logistics steps to the point where a small fraction of palm is used as stearin in a pastry product, unlike traceability in other industries, for CSPO the claim of: "traceability is hilarious". "This is why it is a bit cloak and dagger about what people talk about" (CGM2 2016).

Key Finding 3: For smaller growers who rely on the income generated from palm fruits for their livelihood but are unable (or unwilling) to meet the technical requirements or cost of certification, the creation of traceable IP, SG and to a lesser extent MB CSPO supply chains can isolate and potentially exclude them from local buyers.

- Although it is not impossible to certify smallholders and thus allow access to the IP and segregated supply chains, it "involves a lot of work most companies are not interested to invest in". [Thus:] "In a situation whereby a mill has already sufficient FFB coming in from estates that are certified, they have an option to stop sourcing from non-certified sources to pursue a segregated (or identity preserved) model" (NGO2 2016).
- "*...a large company can establish its own chain of custody, ye*s, that is happening. I am not going to criticise them or question them or make any other comments other than I can understand that it does, or it can, leave smallholders out of the *equation"* (CGM1 2016).

Key Finding 4: One of the biggest challenges in relation to getting growers to commit to production of CSPO, and thus increasing access to all supply chains in a given area, is the

perceived cost of working and being certified to buyers' sustainability standards. Though recommended CSPO standards should in-time lead to production cost savings and increased yields, the increased upfront cost of being a certified producer is exasperated by the lack of an upstream premium for CSPO production.

- There has at times been an "eye watering" premium attached to the logistics of transporting segregated material but it is recognised that there is no fixed premium for growers. A *"premium should be realised*" [by growers], however, for the cost they incur working to the demands of downstream buyers: *"*We are trying to do this [SSCM] *for the right reasons. We are not trying to put money in peoples' pockets* who are undeserving. The intention is that the premium is given at source and is carried through the supply chain and deviating from that conceivably creates problem and mistrust. That is not what any of us really want." (CGM1 2016).
- Due to a lack of wider market demand: "*The issue is, what irritates everybody… not* all of it [CSPO] is sold as certifiable *oil"*; thus the issue with growers and smallholders who are asked by buyers to adopt costly CSPO standards: *"they turn* around and say: well why should I bother because all the certified oil is not being consumed anyway. It is a horrible catch-22 situation" (CGM1 2016).

Key Finding 5: Despite criticisms of their SSCM actions and consequent potentially exclusionary policies and practices, some bigger businesses are actively engaged in and keen to be seen to be 'doing the right thing' in terms of SCM and meeting their emergent environmental and social responsibilities.

- *"*[There] are big consumer companies that have quite vigorous programmes to try to better support and include smallholders: companies acknowledge the issue and I think are trying to do something about it… these companies recognise the issue [of excluding smallholders] and are trying to do something about it" (CGM1 2016).

Key Finding 6: Given the number of smallholders operating in the palm industry and their contribution to global stocks of palm oil, key stakeholder NGOs argue that significant

sustainable supply chain administration, management and certification costs could be better spent, on the ground, helping to educate and assist smaller growers to improve their cultivation practices.

- Supply chain certification costs would be better spent aiding small farmers: "to adopt sustainable cultivation methods by providing training, resources and sharing best *management practices"* (NGO1 2015).
- *"…money doesn't necessarily filter down to smallholders* [but] it should be directly used to empower the smallholders instead of being pumped into unnecessary administrative costs. More emphasis needs to be put on re-thinking and identifying if larger supply chain elements can directly invest in the smallholders*"* (NGO2 2016).

5. Discussion and Outlook

The following discussion is presented in the context of palm oil supply chain *'*complexity*'*, *'*custody*'* and *'*contention'. These terms proved prevalent throughout this study and in a variety of ways represent the core elements of palm oil within the context of sustainable supply chains.

Complexity: though stakeholders were not explicitly referring to complexity in the evolutionary or adaptive systems sense, supply chains can be seen as complex systems, with multiple actors, interdependencies and evolving influences and properties (e.g., Choi et al. 2001; Viswanadham and Kameshwaran, 2013). The ways in which supply chain actors are and can be affected by interdependencies with each other and other bodies such as governments and the public is nuanced. Reactions to influences reverberate through the chain and the CGM or other influential stakeholders can create new, unexpected, unintentional and sometimes unwanted supply chain properties. The policies and pressures faced by powerful Western palm oil buyers have created supply chain certification platforms that meet their needs. These same platforms, created to address one set of sustainability and/or specific

ethical issues, arguably create other issues and influences within the supply chain 'system'. These issues are heightened and complicated by the oil palm industry's inherent complexity, in terms of management and possession of millions of suppliers who are deemed to be largely invisible downstream.

The oil palm industry provides a clear example of clashing disparate national culture, ethics and agency, particularly in relation to product supply chains and sustainability. Understandably, government bodies from Malaysia and Indonesia have their own definition of sustainable palm oil which meets their respective country's desire for socio-economic development and have similarly motivated markets for their products, particularly domestically and overseas in the form of India. Such definition, however, does seemingly not fit with, in particular, European ideals regards to how consumers' favourite brands operate, produce their goods and to the detriment of who or what. Some businesses are built on and keen on being seen to be: "doing the right thing" (CGM1 2016). These same businesses are continually looking for options to do the right thing or at least be seen to be a 'good citizen' (e.g. Wolf, 2014). Notably, the products of the oil palm are all fungible in the food and personal and home care industries, however shifting to a substitute raw material could simply move environmental issues elsewhere. In fact, substituting another of the common oil fruits, vegetables and/or seeds for palm would arguably exacerbate environmental issues given the amount of land and inputs that would be required to produce the current globally consumed volumes of palm oil (Certifier1 2015; NGO1 2015; CGM2 2016). For the time-being, oil palm appears here to stay and defining sustainable practice, albeit contentious, thus becomes increasingly important.

Custody: traceability, or providing at least an illusion of traceability, and taking control of your supplies, is the favoured SSCM option of some for reducing supply chain

risks. However, for a globally pervasive and contentious product, such action can and does draw criticism of an: "*I'm alright Jack* attitude" which is "not good enough" (CGM2 2016). Aside from the potential disquiet created between end-users who are not able to adopt traceability for a variety of technical reasons related to the tracking of palm derivatives and fractions (CGM1 2016), such steps, furthermore, do not solve the wider contention attached to the oil palm industry. Adopting better, more resource efficient, more accountable cultivation practices initially (at least) takes capital; capital that many growers in the countries where oil palm cultivation takes place do not have. The incentive to invest, even if money were available, is decreased by the historical lack of a notable premium for growers of CSPO. Thus there is little capacity or incentive for smaller estates and smallholders in developing nations to work to the standards demanded by European consumers, particularly as there are willing buyers for fruits potentially produced to regularly questioned ethical and environmental standards.

Perversely, in creating the administrative and logistics infrastructure and systems required to track certified FFB products through a supply chain, CGMs are however paying premiums for CSPO that, albeit increasingly manageable, have at times been "eye watering" (CGM1 2016). There is an obvious argument that the sums of cash and effort employed in creating segregated supply chain infrastructure, which could isolate and discriminate against the most vulnerable in the supply chain, would be better spent on the ground directly paying for better cultivation practices or used in an educating and enabling manner. Instead of auditors, certifying bodies and logistics businesses profiting from the drive for sustainably produced palm oil, it could be argued that a more ethical approach would be to empower the industry's growers to work to the standards expected of an entity operating within a global supply chain, possibly free from formal third-party certification. Certification standards tend to be created by and for large corporations (Khor et al. 2015), this is, rightly or wrongly, often

done with minimal or belated regard for smaller enterprises' capacity to fulfil these requirements. For many years, downstream stakeholders have understandably placed demands on suppliers through company policies created both by themselves and external pressures and consequently improved standards along a supply chain. It could be argued, however, that it is not ethical to promote exclusionary SSCM practices when dealing with developing nations and their people.

It is debateable whether continued growth in palm oil cultivation can ever be sustainable. There is clear capacity and sufficient NGO expertise within the sphere of the oil palm industry, however, to help smaller entities reach standards commensurate with current social and environmental sustainability best practice. Some businesses have made publicised efforts to do promote such action (e.g., Unilever 2014; Cargill 2015; Nestlé 2015); however, such businesses still pursue and widely promote traceability of supplies as an apparent panacea to palm oil contention. Although traceability can indeed be deemed to be the 'gold standard' when ensuring the provenance of some commodities, without expensive efforts to ensure 100% compliance with accepted production standards, there are clear flaws with its application in complex oil palm supply chains, particularly for those who want to do 'the right thing' but are unable to adopt full traceability for a variety of valid technical and economic reasons. Notably, an immediate and blanket move to wide-scale Book and Claim use, rather than using segregated or mass balance supply chain options, would intrinsically create neither more, nor less, CSPO in the world!

Contention: it would seem from the upstream perspective of the supply chain and the countries these streams lay within, the more equitable CSPO supplies derive from the peculiarly criticised Mass Balance and Book and Claim options (e.g., Greenpeace 2013). Book and Claim certificates in particular, which notably most of the larger users of palm oil

have declared they are actively moving away from due to criticism of their lack of physical palm oil provenance, outwardly seem to be the best way of ensuring that all those wanting to produce FFB to sustainable standards can be rewarded, albeit minimally, for their efforts. There is, of course, an argument that one should not need a reward for implementing best practice in the form of sustainable production. Indeed, this is where government action or SSCM commitments to only working with likeminded businesses are arguably useful. Given the pervasiveness of oil palm products in modern society, however, it is simply unrealistic to implement a widespread 'do not buy' policy. And, where suppliers within developing countries are involved, perhaps, once again, unethical.

Those wishing to do the right thing, large or small, in the developing world or otherwise, are ultimately hampered by the willingness of some to purchase products emanating from areas where environmentally congruent practices have evidently taken a backseat to economic development. Indeed, markets for non-CSPO continue to be plentiful. Of the approximate 65 million tonnes of palm oil produced globally only 21% in 2015 was CSPO, of which approximately only 50% was actually sold as CSPO. With the credibility of two prominent RSPO producer members in 2016 being tarnished (FT 2016; Guest 2017), these figures could be expected to reduce further. A quasi 'race to the bottom' seemingly has stronger legs than a European led 'race to the top'. Presently there is little market influence, either way, to organically promote the exclusive production of CSPO to robust third-party standards. With such regional disparity over the image, production and demand of certified sustainable products, contention at both ends of the 'stream', and amongst influential actors external to the chain, will continue for the foreseeable future. In turn, brand name users will continue to look to develop risk free traceable supplies, potentially to the detriment of smaller local producers and the wider market.

In sum: this study and its findings are relatively unique in being empirically shaped by the observations and indeed practices of all key supply chain stakeholders. The paper identified a concerted effort by Western end-users of palm oil and other palm derived products to develop traceable certified sustainable supply chains. Such efforts are largely found to be an understandable result of SSCM and supply chain risk management activities and an effort to avoid the damaging effects of potential NGO campaigns. For some, however, efforts to implement a sustainable supply chain are simply a product of strong corporate responsibility and consequent attempts to 'do the right thing'. However, in doing the right thing, some smaller more vulnerable elements of the supply chain are at risk of exclusion from what could be a premium market.

The ability of smaller businesses and farmers to engage in certification standards has been discussed widely. In the case presented here, the smaller entities are almost entirely located within developing countries and are regularly the rural poor. The benefits to these individuals and families of adopting oil cultivation can be significant and life changing. Thus, their exclusion or hindered access to a buyer, for practical or financial reasons or indeed concerns over cultivation practices, raises ethical questions that transcend the three pillars of sustainability. Indeed, given their significant contribution to global palm oil production, greater not less engagement with smallholders, on all levels, is arguably paramount. The presented observations highlight the reactive-proactive nature of sustainable supply chain practices and contribute to discussions on supply chain stakeholders around establishing 'regulation without government'.

It is acknowledged that findings were largely shaped by European and Malaysian perspectives. There is a significant existing body of work on oil palm and its many issues in respect of production, but not in terms of the wider responsibilities and influences of its

supply and value chains. There is significant scope for further empirical research that builds on the exploratory work presented here, particularly in relation to validating presented findings and exploring the complex dynamics of the palm oil supply chain from different geographic perspectives. Building on the regulation without government agenda, exploring the ability of cascaded supply chain standards to transcend global business cultures and promote demand for sustainably produced goods, at source and to mutually agreeable standards, could provide significant academic and practical impact within and beyond the realms of palm oil and SSCM.

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