

ABSTRACT

Title of Dissertation: SOCIOECONOMIC ASPECTS OF FIRST-
GENERATION BIOFUEL PRODUCTION IN
THAILAND: THE ROLE OF PRODUCERS IN
CONSIDERATIONS OF SUSTAINABILITY

Simran Singh, Doctor of Philosophy, 2023

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First-generation biofuels production increased exponentially in the last fifteen years. However, research on the socioeconomic aspects of first-generation biofuels production in countries to which it has expanded to has been limited. According to the literature, food security due to land use tradeoffs between fuel and food crops and unclear inclusion of producers in sustainability governance for fuel crops are central concerns when considering the impact of first-generation biofuel production. Thailand is a key case to study sustainability dynamics of oil palm production due to its focus on biodiesel as a source of renewable energy and similarity to other countries to which oil palm and biodiesel production is expanding. The first part of this dissertation asks if palm oil has affected rice production in Thailand. Using an original province-level data on oil palm and rice production spanning thirty-three years for each Thai province in a multi-level VAR model, the first essay describes contemporaneous, temporal and between-province linkages between oil palm and rice at the country level. Results indicate complex

linkages between oil palm and rice, including that oil palm decisions may be indirectly linked to rice plantation decisions from a temporal perspective within a province. The second part of this dissertation examines whether smallholder values have been conscientiously included in fuel-crop sustainability decisions within predominant oil-palm sustainability governance. The literature has recognized that roundtables are the key form of fuel crop governance, and claim legitimacy based on the inclusion of producer stakeholders (farmers) in forming a vision of sustainability. However, evidence suggests that independent smallholders, a particularly vulnerable subset of producers, may not be included despite high-level policies for their inclusion in bodies such as the Roundtable on Sustainable Palm Oil (RSPO hereafter). After delineating an original framework for assessing conscientious inclusion based on an original synthesis of the literature on equity, participation, agency and perception, the second part of this research uses 94 field interviews to capture independent smallholder and elite perceptions of independent smallholder inclusion in the RSPO in Thailand. Results presented as themes according to the framework indicate both smallholders and elites perceive that independent smallholders have limited inclusion in envisioning sustainability in the RSPO across various elements of inclusion, compromising the legitimacy of the RSPO sustainability certification.

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PRODUCTION IN THAILAND: THE ROLE OF PRODUCERS IN
CONSIDERATIONS OF SUSTAINABILITY

by

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Chapter 1: Introduction

In recent years, the rapidly changing global climate has spurred an increased interest in renewable, sustainable fuel sources such as biofuels. IEA analyses show that the world biofuel supply has steadily grown over the past decade, and project that renewable energy consumption, including bioenergy consumption, will continue to increase through 2023 (International Energy Agency, 2018). Currently, first-generation biofuels, defined as “produced from edible biomass such as starch (from potato, wheat, barley, and corn) or sugars (from sugar-cane and sugar beet)” (Alalwan, Alminshid, & Aljaafari, 2019) comprise the majority of biofuel produced and consumed globally (Biofuel evolution perspectives, 2021). As outlined at the United Nations Conference on Trade and Development, first-generation biofuel is easy to produce and can also be scaled easily to smaller production capacities, making it a very likely “first step” for countries aiming to enter into, or expand, biofuel production.

However, first-generation biofuels are known to have major drawbacks – the materials used compete directly with crops grown for food, for example, as well as having low land-use efficiency (United Nations, 2008). These concerns are in addition to concerns about biofuel production impacting sustainability and environmental outcomes more broadly, such as the impact on local biodiversity, which is currently poorly understood (Tudge, Purvis, & De Palma, 2021). With the production of biofuel expected to increase in the coming years and the commitment

of several countries to obtaining some of their energy from biofuels, the impact of first-generation biofuel is expected to grow as well. As such, studying first-generation biofuel production and its impact on economy, environment, and policy is essential to both understand the situation in countries that already are producing large quantities of biofuels, as well as predict the future of countries that are looking to expand their production of these fuels.

First-generation biofuels currently produced mainly from grains and oilseeds, remain the primary contributor to the global supply of biofuel (Rulli, Bellomi, Cazzoli, De Carolis, & D'Odorico, 2016). First-generation biofuels (i.e. bioethanol, biodiesel and bioesters, biogas) are characterized either by their “ability to be blended with petroleum-based fuels, combusted in internal combustion engines, and distributed through existing infrastructure, or by the use in existing alternative vehicle technology like FFVs (‘Flexible Fuel Vehicle’) or natural gas vehicles” (Naik, Goud, Rout, & Dalai, 2010). First-generation biofuels, also called conventional biofuels, are produced from starches, sugars or vegetable oils. The most prevalent first-generation biofuels are bioethanol, biodiesel and biogas and the most common feedstocks are made from corn, oil palm, soybean, sugarcane, vegetable oils and other crop wastes (Naqvi & Yan, 2015).

The ideal feedstock for first-generation biofuel would have low cost and high yield of biomass; in general, compared to next-generation biofuels, first-generation biofuels are low cost but land intensive (Dutta, Daverey, & Lin, 2014). In terms of production,

after the cultivation of biomass, first-generation biofuels are characterized by structured markets for trading, freely available feedstock in some countries, relatively developed production technology, low conversion rate and costly development of building plants and processes relative to other renewable energy options (Awudu & Zhang, 2012).

First-generation biofuels are typically leveraged for their contribution to energy security goals; they also help in lowering reliance on oil and its imports, bolstering of agriculture and industry, GHG emission reduction and helping with ensuring and stabilizing demand and speculation (Awudu & Zhang, 2012). Typically cited advantages of first-generation biofuels include GHG savings, simplicity and cost effectiveness of conversion technology (Dutta, Daverey, & Lin, 2014). Other potential benefits include rural development and revitalization via opportunities for stable income, and local ownership by farmers and community members of bio-refineries (Kleinschmidt, 2007, Peskett, Slater, Stevens, & Dufey, 2007, Sunmonu & Rothwell, 2011).

Frequently cited disadvantages include low yields and potential impacts on food security due to arable land use being redirected to grow crops with fuel uses, as well as due to increased food prices caused by policy incentives to grow biofuel feedstock crops (Dutta, Daverey, & Lin, 2014, Singh, Nigam, & Murphy, 2011). In terms of local impacts, “intensification of energy crops has been linked to long term loss of livelihoods and local food/energy production through displacement of local

subsistence farmers and negative ecological impacts” (Van Eijck & Romijn, 2008) (Mohr & Raman, 2013). Other environmental concerns include loss of biodiversity from monocropping and forest conversion, as well as direct and indirect effects on water and nutrient resources due to the frequently large freshwater demands of first-generation biofuels crops. Additional issues with first-generation biofuels include competition with fiber production in arable land use, large fertilizer requirements, dearth of properly managed agricultural practices and market structures constrained by region (Singh, Nigam, & Murphy, 2011).

While the United States, Brazil, and the European Union still are often studied for the dynamics of biofuel production and consumption, Southeast Asian countries such as Cambodia, Malaysia, and Thailand are predicted to increase their production and specifically are predicted to become a crucible for sustainability dynamics of first-generation biofuels (OECD-FAO Agricultural Outlook 2016-2025). While production has slowed in the major countries in recent years, partially due to the COVID-19 pandemic’s impact on global travel and transportation, production is expected to increase in coming years. Various governments have implemented policies that promote the growth of bioenergy (Singh, Rodríguez Jasso, Gonzalez-Gloria, Rosales, & et al., 2019), and production rates can be expected to bounce back as the pandemic subsides and the effects of these policies become apparent. Additionally, the IEA predicts that “global demand for biofuels is set to grow by 41 billion liters, or 28%, over 2021-2026”, and that “the recovery to pre-Covid-19

demand levels accounts for one-fifth of this demand growth”, with government policies being the “principal driver of the remaining expansion” (Renewables 2021 Report Extract Biofuels, 2021).

Along with bioethanol, biodiesel is one of the most prominent biofuels used globally today. Biodiesel has emerged as a replacement for petroleum, as discussed by Ng et al. (Ng, Ng, & Gan, 2010). It falls under first-generation biofuels, and consumption is expected to increase over ten-fold between 2005 and 2025 (Rouhany & Montgomery, 2019). IEA analysis shows that demand for biodiesel was quick to bounce back from the drop caused by COVID-19, and also that Asia is due to surpass EU in terms of production. This means that there will likely be a greater emphasis placed on Asian countries for fulfilling the global demand for biodiesel (Renewables 2021 Report Extract Biofuels, 2021). Currently, the two major biofuels produced in Southeast Asian countries are bioethanol and biodiesel. Indonesia, for example, mostly produces palm oil biodiesel from its biofuel industry and is the world’s largest palm oil producer, and second largest palm oil exporter (Ritchie & Roser, 2021).

Among biofuels, the IEA also projects that global demand for first-generation biofuel will increase by 28%, or 41 billion liters, by 2026. This is a clear indicator that first-generation biofuel will continue to be regularly used in the future, making study of its impact continually relevant as well. In particular, the IEA predicts that Asia will see strong growth in biofuel production, with focus often being placed on China. However, while China’s growth is indeed impressive (China is expected to see

production reaching 160,000 barrels per day by 2026, compared to 70,000 barrels per day in 2020) (IEA, 2021), “wavering and uncertain policies and prices” cast doubt on the future of biofuel development in China (China: Biofuels Annual, 2021), especially in light of the importance of government policy as the key driver of biofuel growth.

On the other hand, trends in the region point to significant growth of biofuel production in Southeast Asia, as outlined by IRENA (International Renewable Energy Agency, 2017). Further, governments of this region are actively promoting the expansion of the biofuel industry, stating goals such as bolstering local energy security, stimulating the economy, reducing poverty, among others (Kumar, Shrestha, & Abdul Salam, 2013). Malaysia for example has its National Biofuels Policy, which was established in 2006, and has also announced a new biodiesel program which started in 2018. The Philippines also has a National Biofuels Program, designed to gradually increase the use of biofuels through 2025. Vietnam has its National Strategy on Renewable Energy, with the aim to increase both biofuel production and consumption (Ying, Phun Chien, & Yee Van, 2020). Laos also has a government-led Renewable Energy Development Strategy (Lao People’s Democratic Republic Peace Independence Democracy Unity Prosperity, 2011), which is scheduled to be in effect at least until 2025. In addition, palm oil manufacturing companies are actively looking to expand production in Laos, which is a smallholder and agriculture-dominated economy (Praiwan, 2018). While Cambodia does not

have any official policy regarding biofuel production or financial incentives, 92% of its total renewable energy supply was biofuel in 2017 with sugarcane and oil palm occupying the most planted land relevant to first-generation biofuel crops (Open Development Cambodia, 2021), indicating a strong base structure for domestic production in that country as well. Additionally, many of these countries also offer financial incentives to help expand the industry, such as tariff regulations, subsidies, and tax exemptions (Sorda, Banse, & Kemfert, 2010).

As such, it is vital to look at Southeast Asian countries in order to properly understand the impact of first-generation biofuel production in the future, as it is these countries that are likely to experience the most expansion, and thus experience the heaviest consequences over time. First and foremost, first-generation biofuel crops such as palm oil make up a majority of the global biofuel supply and thus are also some of the most intensively farmed crops as well (Fitzherbert, et al., 2008). However, both Dornburg et al and Correa et al found that these crops were associated with environmental destruction on a large scale (Correa, Beyer, Possingham, Thomas-Hall, & Schenk, 2017, Dornburg, et al., 2010). It is also known that Southeast Asia is a heavy producer of palm oil used in the production of biodiesel; Thailand, Malaysia, and Indonesia together produced 59% of the world's palm oil in 2021 (IPAD Palm Oil Explorer, 2021), and a majority of biofuel for domestic use in these countries also comes from first-generation biofuel crops.

Intensive farming of first-generation biofuel crops is projected to cause “substantial sustainability issues such as competition for land and water resources, food scarcity, loss of biodiversity, deforestation, destruction of peatland, greenhouse gas emission, soil erosion, rural development, social conflicts, and public health, among others” (Lau, Zhang, Bokka, & Ramakrishna, 2022). Specifically, in Indonesia and Malaysia, the key issues are deforestation, peatland degradation, increase in greenhouse gases, biodiversity reduction, and erosion of the rights of local communities (Yasinta & Karuniasa, 2021). Thailand faces a negative impact on food security, land use, farming practices, and also the marginalization of individual farmers and smallholders (Kumar, Abdul Salam, Shrestha, & Ackom, 2013). And in the Philippines, biomass removal from the soil could cause loss of soil fertility, while expanding biofuel farms are also causing soil erosion, increased competition for water, biodiversity loss, and food shortages (Mendoza & Mendoza, 2016). This highlights the current situation – countries that are most likely to expand their biofuel production are likely to use first-generation biofuels, but the long-term consequences of large-scale production of these biofuels is not clearly understood, and in fact raise serious environmental concerns of their own.

The concerns surrounding first-generation biofuel also have an impact on the relation to sustainable development goals, or SDGs. SDGs are 17 goals designed to improve the livelihoods of people around the globe while also tackling climate change, according to the UN (THE 17 GOALS - Sustainable Development Goals, 2022). The first SDG listed is the reduction of poverty – however, as of the current

situation, the effect of biofuel production on reducing policy is unclear at best. First, the way biofuel production is managed in the various Southeast Asian countries varies from location to location; state-owned biofuel companies are predominant in Malaysia and Viet Nam, while in Thailand local companies are much more significant (Schott, 2009). Studies in the literature have continued to find that “the consequences for local communities of expanding feedstock production were mixed, and that the espoused benefits for communities were not materializing as hoped” showing that the economic benefits of biofuel production are questionable (Larsen, 2015). Furthermore, first-generation biofuels are produced using food crops, which raises concerns about competition with food production, as well as land use competition with other staple cereal food crops (Immerzeel, Verweij, van der Hilst, & Faaij, 2014, Liu, et al., 2021a, Sims, Mabee, Saddler, & Taylor, 2010). Another noted SDG is “affordable and clean energy” – and while, as previously demonstrated, first-generation biofuels are affordable, the impact their production has on the environment is very much in question. However, more environment-friendly second-generation biofuels are limited because they require many costly technologies and special enzymes, meaning the energy produced would be far from affordable (Patel, Singhania, Sim, & Pandey, 2019, Singhania, et al., 2021b). While first-generation biofuels can be considered the most “accessible” biofuels, these concerns indicate that their sustainability is highly questionable and deserving more attention. As Southeast Asian countries are poised to expand in this industry, they deserve particular attention.

First-generation biofuels in S.E. Asia: Thailand as a key case

In terms of first-generation biofuel production, sugarcane is one of the most common crops to produce bioethanol, and oil palm is a frequently used crop for biodiesel production. In terms of global areas that grow these crops, the South East (S.E. hereafter) Asian region cultivates a high amount of both oil palm and sugarcane.

Sugarcane is indigenous to tropical Southeast Asia and is widely cultivated in Thailand, Indonesia, and Malaysia. In particular, Thailand and Indonesia frequently rank among the world's top sugarcane producing countries. As of 2016 FAOSTAT data, Thailand ranked 4th globally in sugarcane production, and the area harvested for sugarcane in Thailand has grown rapidly in the past decade, as illustrated in figure 1:

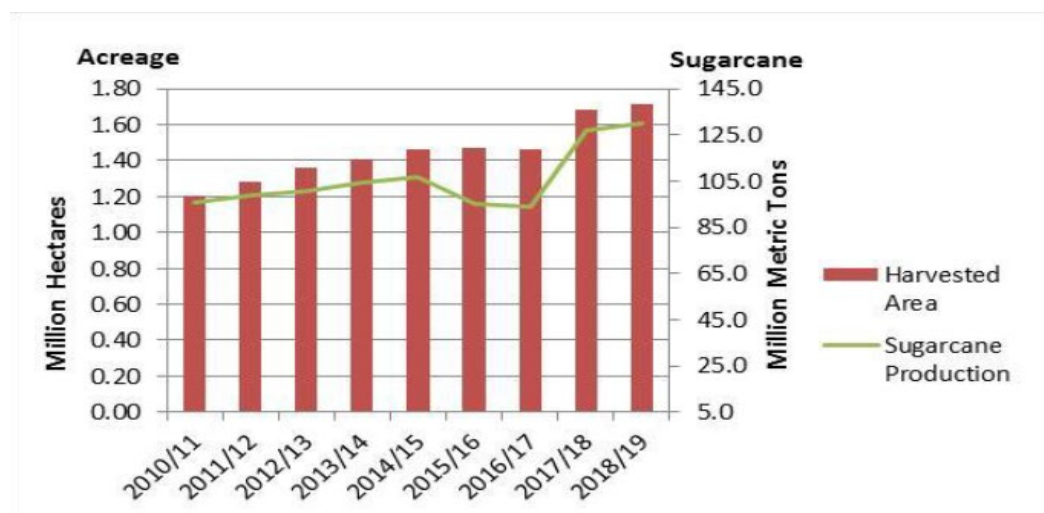


Figure 1: Sugarcane production in Thailand has expanded between 2010-2018

(USDA Foreign Agricultural Service. Thailand Sugar Annual 2018)

Palm oil has had a long history of cultivation in S.E. Asia and the region cumulatively produces close to 90% of global palm oil. The earliest cultivation of oil palm in S.E. Asia was around 1920 in Sumatra, Indonesia, by the Lever Brothers, a plantation-based company and a predecessor to the current Belgian company SOCFIN (Byerlee, 2014). To move away from the declining rubber industry, the Malaysian government strategically decided to diversify into palm oil by providing relevant policy incentives to investors and further expanded large scale plantations into Sabah and Sarawak in the 1970s (Hai, 2002). Indonesia ranks first in the global production of palm oil, Malaysia ranks second, and Thailand third. Indonesia and Malaysia together produce 85% of global palm oil, whereas Thailand produces around 1.2% (USDA Foreign Agricultural Service, 2017).

Cumulatively, bioethanol in S.E. Asia is primarily produced from cassava and sugarcane, whereas oil palm is the primary feedstock for biodiesel (Schott, 2009). Most countries in S.E. Asia have had national plans for proliferation of production of biofuels and their incorporation into the renewable energy mix since the mid-2000s (Malik, 2012). Renewable energy targets in S.E. Asian countries (specifically Indonesia, Malaysia and Thailand) comprise an increasing percentage of biofuels as shown in table 1, therefore biofuel production is expected to increase both in terms of end output as well as feedstock crop cultivation.

Country	Recent % of energy mix	Future % of energy mix
Indonesia	0.4%(2016)	5%(2025)
Malaysia	3% (2017)	4%(2023)
Thailand	7%(2015)	25% (2036)

Table 1: A comparison of recent and projected future percentage of biofuels in the renewable energy mix (Asian Development Bank, 2016,Malaysia Energy Commission, 2016,USDA Foreign Agricultural Service, 2016)

Thailand is projected to have the largest percentage of its future energy mix obtained from first-generation biofuels, as well as the greatest increase in percentage growth of biofuels as part of its energy mix. In terms of expansion, biofuel expansion and related new government policies are expected in smaller, smallholder dominated countries like Cambodia and Laos. Thailand is a smaller country as compared to countries such as Indonesia and Malaysia, and first-generation biofuel production in Thailand is concentrated on smaller farms and dominated by smallholders rather than large corporations which is the case in Indonesia and Malaysia. Therefore, Thailand represents a vital case for studying both the impacts of first-generation biofuel production by independent smallholders as well as a baseline for future expansion of biofuels in the S.E. Asian region.

This dissertation will examine the impacts of first-generation biofuels in Thailand, from the angles the impacts of fuel crop production on staple food crops and ethics in terms of processes to include stakeholders in sustainability roundtables. To that end, the next section will discuss definitions of sustainability and its aspects related to first-generation biofuels, narratives around crops used for biofuels production and sustainability conceptions for first-generation biofuels in the broader context of ecosystem management. The section will conclude with areas for future research.

Sustainability impacts of biofuel production in S.E. Asia

In terms of sustainability of production, the sustainability of first-generation biofuels cannot be dissociated from their supply chain. The biofuel supply chain comprises a net of raw material producers (the biomass), processing mills - including biorefineries, storage facilities & blending stations - and users of the end products. While much of the literature has concentrated on technologies that convert biomass to biofuel, “in order to deliver a competitive end product to the end user markets, a robust, reliable and sustainable biofuel supply chain is essential” (Awudu & Zhang, 2012, Redman, 2008). The general structure of the biofuel supply chain is shown in figure 2, comprising elements such as: farms, storage facilities, biorefinery plants, blending facilities, retail outlets and transportation (Awudu & Zhang, 2012). The broad categories for sustainability concepts in the biofuel supply chain include economic, environmental, and social issues, which will be discussed with a focus on production of feedstock in this section. As key reasons for incorporating biofuels into

the renewable energy mix include enhancing energy security, reliability and delivery of cost competitive products to end user markets, “in order to achieve a higher level of optimization, ...biofuel supply chain management should apply models that incorporate uncertainty and sustainability concepts” (Awudu & Zhang, 2012).

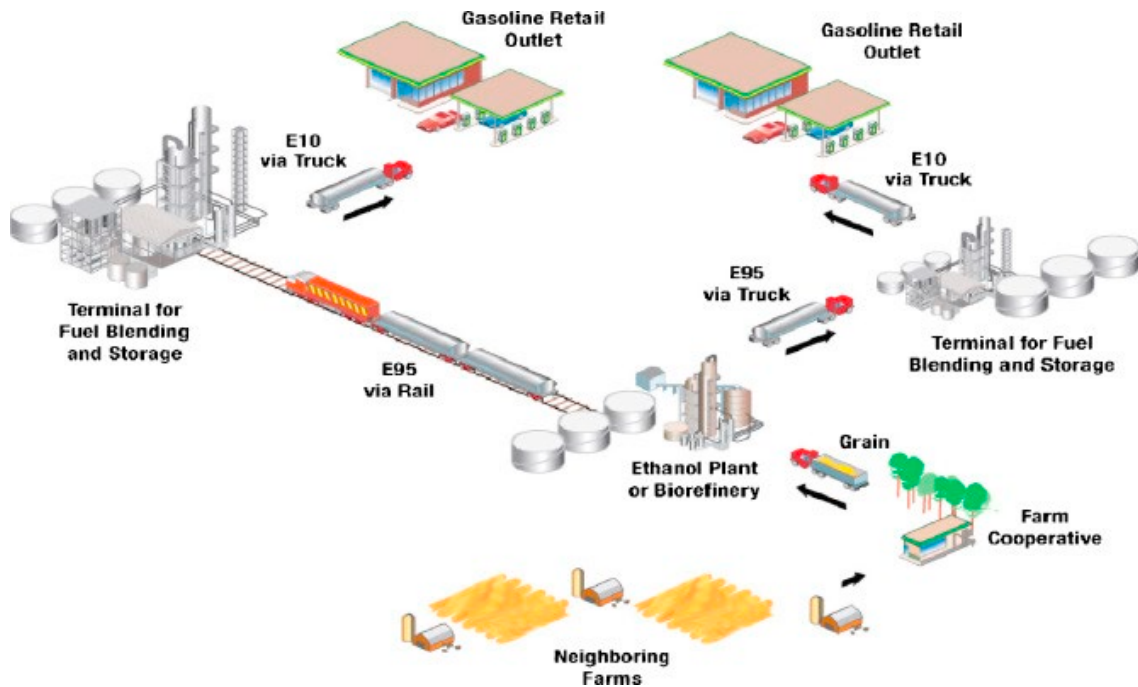


Figure 2: Broad structure of biofuel supply chain (Awudu and Zhang 2012)

In terms of economic considerations for sustainability, relevant aspects for first-generation biofuels include food-fuel tradeoffs or integrated management, energy balance and efficiency, and incentives for biofuels in policy. Concerns with fuel-food tradeoffs stem from: (1) fuel uses displacing food uses for crops such as sugarcane, oil palm and soy and (2) fuel crops or crops with fuel uses displacing food crops, especially staple food crops. Recommendations to alleviate these concerns often call on double crops and mixed cropping systems as “[d]ouble crops grown between the summer growing seasons of conventional row crops and harvested for biofuel

production before row crops are planted in the spring are representative of a class of land use options with potential to produce biofuel stocks without decreasing food production and without clearing wild lands” and “[m]ixed cropping systems in which food and energy crops are grown simultaneously present similar opportunities” (Tilman, et al., 2009, Heggenstaller, Anex, Liebman, Sundberg, & Gibson, 2008, Dale, Allen, Laser, & Lynd, 2009, Malézieux, et al., 2009). Energy balance and efficiency concerns stem from minimizing energy use to make the end product. Finally, incentives for proliferation of biofuels in policy can include those aimed at utilizing different land types (e.g. marginal lands) for cultivating appropriate crops, broadly increasing the area used to cultivate feedstocks and acquiring new land for feedstock crop cultivation.

Regarding social concerns for first-generation biofuel development, key issues include: (1) poverty reduction via rural development or revitalization, (2) indirect impacts of land use and crop cultivation and (3) impacts on resources such as water utility systems (Awudu & Zhang, 2012). In terms of poverty reduction, biofuel crop cultivation may help via increasing per capita incomes (Bell, Silalertruksa, Gheewala, & Kamens, 2011). In terms of land use, large areas of land are frequently allocated to biofuel crop cultivation, indirectly impacting the land tenure system and the choice of feedstock crop to invest in. For example, high and/or stable prices for oil palm incentivize farmers to increase the acreage of land under oil palm cultivation; such expansion may extend into lands previously earmarked for conservation. While

conventional management methods to distinguish such land uses utilize physical criteria, “actual land uses, not only change according to physical factors, but change in demands from market opportunities, society and stakeholders’ entitlement” (Peskest, Slater, Stevens, & Dufey, 2007, Phalan, 2009, Awudu & Zhang, 2012). In terms of impact on water and water utilities, rapidly increasing production of biofuels necessitates having access to quality water (Bass, Hughes, & Hawthorne, 2001).

In terms of environmental aspects, key issues related to first-generation biofuels include GHG considerations, soil degradation, quality impacts on water resources and concerns about biodiversity. Biofuels are often cited emitting lower GHGs than gasoline, and their resulting potential to reduce greenhouse emissions. However, burning biofuels can release other sorts of air pollutants, and contextual factors may determine their actual effectiveness in reducing GHG emissions (Fargione, Hill, Tilman, Polasky, & Hawthorne, 2008, Havlík, et al., 2011). Greater demand for water intensive crops such as sugarcane, as well as quality impacts on water for crops such as oil palm and policy-based incentives to increase acreage under cultivation of such crops may affect both the supply and quality of available clean water (Carlson, et al., 2014) (Hess, et al., 2016). Next, soil quality impacts include degradation and erosion concerns (Mohr & Raman, 2013).

In terms of synthetic sustainability aspects of first-generation biofuels in Asia, it is useful to group these under three key headings: (1) land-use change impacts, (2)

feedstock specific issues and (3) matters regarding technology and scale (Phalan, 2009). Specifically, for Thailand, the literature has included some assessments of GHG impacts, creation of employment opportunities and change in employment, and economic impacts on Thai GDP and trade balance. In the case of bioethanol production in Thailand, Silalertruksa and Gheewala found that GHG emissions depend on the production environment as well as how direct land use change is accounted for (Silalertruksa & Gheewala, 2011). In terms of socio-economic impacts, bioethanol production as compared to gasoline production in Thailand would require 17-20 times more labor with direct employment in agriculture comprising 90% of cumulative employment (Silalertruksa & Gheewala, 2011). However, the GHG, employment and positive trade impacts of bioethanol production in Thailand and the resulting net social benefits are subject to the bioethanol production systems in Thailand being sustainably managed (Silalertruksa & Gheewala, 2011). For the case of biodiesel production from palm oil in Thailand, such biodiesel has the potential to effect large GHG reductions compared to diesel; however “the energy and environmental performances depend on various factors such as the management efficiency of empty fruit bunches (EFB) and POME (emissions from the ponds treating palm oil mill effluent) and ...possible land use change” (Silalertruksa & Gheewala, Environmental sustainability assessment of palm biodiesel production in Thailand, 2012). Environmental concerns for oil palm based biofuel production include production and application of nitrogen fertilizer on the plantation and POME; “policy measures including the promotion of GAP [good agricultural

practices] to farmers nationwide to increase FFB yields and the [enhances] management efficiency of wastes and by-products generated in the biodiesel production system” would contribute to the environmental sustainability of oil palm production necessary for it to be viable in the long term (Silalertruksa & Gheewala, Environmental sustainability assessment of palm biodiesel production in Thailand, 2012).

In terms of land-use impacts, first-generation biofuel production is expected to make greater impacts moving forward due to policy incentives to increase cultivation of feedstocks and production of biofuels. While proliferation of feedstock cultivation could increase rural employment and income, “biofuel development also has the potential to undermine land and labor rights, especially in the case of large projects where land tenure is poorly defined”. For example, “forest lands used by indigenous peoples in Indonesia have been expropriated for oil palm plantations, ignoring their customary rights to the land” (Phalan, 2009, Cotula, Dyer, & Vermeulen, 2008, Tauli-Corpuz & Tamang, 2007).

Other land use issues include caution regarding the potential of marginal, abandoned or degraded lands, as while they may help alleviate competition for food crops, they may still be competition in terms of conservation uses, for example for biodiversity. In fact, whole “protected areas (both existing and future) are the main hope for preserving the biodiversity of Southeast Asia,” and over half of the 2262 protected areas with an acreage of 58.4 million hectares are in Indonesia and

Malaysia, “studies have shown that, in spite of their ‘protected’ status, some of these areas have become increasingly isolated and deforested” (Sodhi, Koh, Brook, & Ng, 2004, Curran, et al., 2004).

Additionally, while biofuels in principle are anticipated to lead to reduced GHG emissions, this is not true in an absolute sense. In particular, land use change is a critical factor as feedstock crops which directly lead to “the replacement of carbon-rich landcovers such as savannas, forests and peatlands, are likely to exacerbate rather than ameliorate climate change’ and ‘[b]iofuel crops that replace other crops are likely to have similar impacts via indirect land- use change, in the absence of effective land use planning and regulation” (Phalan, 2009).

Regarding biodiversity impacts, the largest effect of biofuel crops on biodiversity occurs via “direct or indirect conversion of natural landcovers such as forests, grasslands and wetlands” (Phalan, 2009). Southeast Asia is endemic to several unique flora and fauna, and as it “has the highest relative rate of deforestation of any major tropical region,’ estimates state it “could lose three quarters of its original forests by 2100 and up to 42% of its biodiversity” (Sodhi, Koh, Brook, & Ng, 2004). For example, in the case of oil palm-based biodiesel production in Southeast Asia, “oil palm plantations support much fewer species than do forests and often also fewer than other tree crops” with additional negative effects including fragmentation and pollution of habitat (Fargione, Hill, Tilman, Polasky, & Hawthorne, 2008).

In the case of oil palm plantations in southern Thailand, changes in bird communities following the '[c]onversion of forest to plantations resulted in a reduction in species richness of at least 60%, with insectivores and frugivores suffering in greater losses than more omnivorous species' and that a 'high proportion of species formerly present in the region are unable to adapt to conversion of forest to oil palm...plantations, resulting in large losses of bird species and family richness and the replacement of species with restricted ranges and high conservation status by those with extensive ranges and low conservation status.' (Aratrakorn, Thunhikorn, & Donald, 2006) In the case of sugarcane-based bioethanol, sugarcane plantations made from converted forests 'have been shown to threaten biodiversity, their effects extending beyond the cultivated areas to adjacent forests.' (Ferrante & Fearnside, 2018) (Ferrante, et al., 2017) Other feedstock related impacts include food-fuel tradeoff concerns and negative effect soil affect soil and water resources as previously discussed.

Areas for future research

Based on and as mentioned the discussion above, several areas for future research emerge, among which some critical areas are:

- (1) Region-specific assessments of pros and cons of first-generation biofuels production
- (2) Analyses of the process to include stakeholders in formulating sustainability criteria

Regarding the first area mentioned above, I will examine food-fuel impacts of oil palm production in Thailand on rice. Regarding the second, I will examine the process of one of the most common sustainability roundtables, the Roundtable on Sustainable Palm Oil. The conceptual framework underlying my areas of focus is outlined in the next chapter.

Chapter 2: The need for an adaptive management approach for first-generation biofuel feedstock and related research questions

First-generation biofuel crops as flex crops and the need for an adaptive management approach

Growing first-generation biofuel crops has several advantages and disadvantages that make it difficult to foresee the diverse ways in which this will impact sustainable development. Along with the several identified pros and cons with growing and using first-generation biofuels, another key issue is that several first-generation biofuel crops, including oil palm and sugarcane, are flex-crops, i.e. their use is relatively easy to switch between food and fuel uses. Flex-crops and commodities are “crops and commodities that have multiples uses (food, feed, fuel, industrial material) that can be, or are thought to be, flexibly inter-changed” (Borras, Franco, Isakson, Levidow, & Vervest, 2014).

Examples of flex crops include “soya (food, feed, biodiesel), sugarcane (food, ethanol), oil palm (food, biodiesel, commercial/industrial uses) and corn (food, feed, ethanol)...[t]hese may be considered to date, the most prominent and established ‘flex-crops’, although others are appearing or have the potential to appear on the horizon, including cassava, coconut, beets, rape seeds and sunflower” (Borras, Franco, Isakson, Levidow, & Vervest, 2014). Flex-crops represent an “underexplored dimension of the current era” as the “reconceptualizing [of] agriculture as a source

of biomass for a future bioeconomy...promotes flexibility of biomass feedstocks-
their sources, types, conversion processes and end products” (Borras, Franco,
Isakson, Levidow, & Vervest, 2014).

Strategies to promote flexibility “seek competitive advantage” for institutions of
production “becoming ‘backward integrated’ into multiple feedstocks and
converting them into multiple products” with the result that the “newly established
value chain will have room for non-traditional partnerships: grain processors
integrating forward, chemical companies integrating backwards and technology
companies with access to key technologies, such as enzymes and microbial cell
factories joining them” (Borras, Franco, Isakson, Levidow, & Vervest, 2014, WEF,
2010).

The multiple-ness property of flex crops refers to their actual current and future
diverse uses, some of which are made possible due to technological innovations,
which “necessarily alters the way we research the political economy of these crops
and commodities: how and to what extent capital accumulation, social relations, and
power and power structures are contested and transformed” (Borras Jr., Franco,
Isakson, Levidow, & Vervest, 2016). The new uses of certain crops and resulting
commodities is the beginning rather than the end of the discussion as it affects the
“flexible-ness” property of these crops as “if a crop or commodity use can be
switched from one specific purpose to another with technical ease and with
attractive economic return then a link between multiple-ness and flexible-ness may

have far reaching political economic implications” (Borras Jr., Franco, Isakson, Levidow, & Vervest, 2016, Cotula, Dyer, & Vermeulen, 2008).

Multiple uses of crops and commodities do not inevitably lead to their flexing; a number of factors shape the potential transition. Borras et al specify three basic requirements for crops and commodities that have multiple uses to become flex crops: (1) material basis, i.e. “the extent to which the chemical and physical constitution of a crop or commodity enables switching among multiple uses,” (2) technological possibility, “which allows for the possibility and/or ease of crop and commodity flexing” and (3) profit viability, i.e. flexing must make business sense and the technology required needs to be affordable (Borras Jr., Franco, Isakson, Levidow, & Vervest, 2016). When these three minimum conditions are fulfilled, the chances of flexing occurring is likely to be high; however these conditions “are shaped in the political economic context of contestations around property, development and control of technology, how a labor regime is shaped, and how political power is exercised in society” as well as class formation and context specific societal dynamics and state policies, including “public investment in R&D, agricultural subsidies and trade policies” (Borras Jr., Franco, Isakson, Levidow, & Vervest, 2016).

Furthermore, “there are cases where there is potential for crop use switching, but for some socio-economic and political reasons, actual flexing may not occur or may become publicly unpopular, especially if it comes up against a polarized food vs. fuel dilemma” (Borras Jr., Franco, Isakson, Levidow, & Vervest, 2016). In addition to

material and other types of flexibility, Hunsberger and Alonso-Fradejas argue that for flex crops such as corn, oil palm and soy, “*discursive flexibility*- the ability to strategically switch between discourses to promote an objective-equally shapes the political economy of flex crops, and thereby patterns of agrarian and environmental change” (Hunsberger & Alonso-Fradejas, 2016). The multiple uses of first-generation biofuel crops as well as the complexity of their effects necessitates a governance approach that is able to accommodate these intricacies and leverage synergies for efficiency and effective outcomes.

The adaptive management approach

The adaptive management approach is predicated on finding effective synergies to manage the production and consequences of production of feedstock. Adaptive management has been recognized in the literature as an effective strategy for managing the production of first-generation biofuel crops. While many in the literature recognize the need for adaptive management regarding the production of biofuel feedstock, few propose frameworks that explicitly incorporate bioenergy sustainability with food security and other resource concerns. Kline et. al propose a framework that explicitly identifies the nexus of key outcomes that surround effective policies for bioenergy sustainability, resource management and food security, as summarized in table 2 below.

Interaction	Key aspects
Bioenergy sustainability→ resource management	• Decreased GHG emissions

	• Focus on biodiversity and land use planning • Enhanced incentives to restore abandoned or wasted land
Resource management→bioenergy sustainability	• Improved productivity and efficiency of biomass • Opportunities and limitations on where to plant and harvest crops
Bioenergy sustainability → food security	• Improved and diversified income • Energy available to produce, process and transport food • Decreased market price volatility • Improved food crop sustainability
Food security→bioenergy sustainability	• Human capital for biomass markets • Surplus of flex crops for food security
Nexus of Bioenergy sustainability, resource management and food security	• Governance best practices • Extreme weather events • Social services • Integrated crop management • Technology • Infrastructure

Table 2: Aspects of interactions in food security, bioenergy sustainability and

resource management (Adapted from: Kline KL, Msangi S, Dale VH, Woods J, Souza

GM, Osseweijer P, Clancy JS, Hilbert JA, Johnson FX, McDonnell PC, Mugera HK.

Reconciling food security and bioenergy: priorities for action. Gcb Bioenergy. 2017

Mar 1;9(3):557-76.)

Kline et. al's focus is on building sustainable systems around interactions among resource management, bioenergy and food security. As Kline et al recognize that conceptions of sustainability are context specific, they propose, as also advanced elsewhere in the literature, that "local stakeholders should help set priorities, define the purposes of the assessment, and establish the temporal and spatial boundaries for consideration" (Dale, Efroymsen, Kline, & Davitt, 2015, Kline, et al., 2017, Sanchez, et al., 2012). One way by which Kline et. al's framework may be enhanced is by considering the interactions of resource management of bioenergy and food security. Through their conception, Kline et al identify a number of priorities to reach successful synergies, as summarized in table 3 below.

Category	Explanation
Communication	Communications need to be clarified with clear and consistent terms
Food and bioenergy needs for land can be simultaneously managed	Food and bioenergy crops need not compete for land and should be managed via an integrated system of resource management
Increase capacity and infrastructure	Invest in technology, rural extension and innovations
Flex-crops	Adopting flex crops with multiple end uses (products and services) including food
Inclusive participation processes	The full set of stakeholders should be engaged to recognize and evaluate individual opportunities for biofuel production to advance food security.

Table 3: Priorities to reach successful synergies in food security, bioenergy

sustainability and resource management (Adapted from: Kline KL, Msangi S, Dale VH, Woods J, Souza GM, Osseweijer P, Clancy JS, Hilbert JA, Johnson FX, McDonnell PC, Mugera HK. Reconciling food security and bioenergy: priorities for action. *Gcb Bioenergy*. 2017 Mar 1;9(3):557-76.)

Adaptive ecosystem management is widely recognized as critical in the innovative governance approaches necessary to mitigate multi-scale society-environmental dilemmas (Lee, 1993). However, the literature has tended to emphasize the role of science in surmounting information gaps and model building; “as a result translating ecosystem management principle into practice has remained a challenge” (Armitage, et al., 2009). From a policy perspective, adaptive co-management seems a promising approach as it “explicitly links learning (experiential and experimental) and collaboration to facilitate effective governance, defined...as the public and

private interactions undertaken to resolve societal challenges, and the institutions and principles which mediate those interactions” (Armitage, et al., 2009, Kooiman & Bavinck, 2005). Policy principles for successful conception and implementation of adaptive co-management are identified in table 4 below.

Condition of Success	Explanation
Well-defined resource system	Systems characterized by relatively immobile (as opposed to highly migratory and/or transboundary) resource stocks are likely to generate fewer institutional challenges and conflicts, while creating an enabling environment for learning.
Small-scale resource use context	Small-scale systems (e.g. management of a specific rangeland or local fishery) will reduce the number of competing Interests, Institutional complexities and layers of organization. Larger-scale resource contexts (transboundary stocks, large watersheds) will exacerbate challenges.
Clear and Identifiable set of social entities with shared Interests	In situations where stakeholders have limited or no connection to "place", building linkages and trust will be problematic. In such situations, efforts by local/regional organizations to achieve better outcomes may be undermined by non-local economic and political forces.
Reasonably clear property rights to resources of concern (e.g. fisheries. forest)	Where rights or bundles of rights to resource use are reasonably clear (whether common property or Individual), enhanced security of access and Incentives may better facilitate governance Innovation and learning over the long term. Such rights need to be associated with corresponding responsibilities (e.g. for

	conservation practices, participation in resource management).
Access to adaptable portfolio of management measures	Participants In an adaptive co-management process must have flexibility to test and apply a diversity of management measures or tools to achieve desired outcomes. These measures may include licensing and quota setting, regulations, technological adjustments (e.g. gear size), education schemes, and so on. In other words, economic, regulatory, and collaborative tools should all be available.
Commitment to support a long-term Institution-building process	Success is more likely where stakeholders accept the long-term nature of the process, and recognize that a blueprint approach to institutions or management strategies is probably not advantageous. Commitments of this type can provide a degree of relative stability in the context of numerous changes and stresses from within and outside the system.
Provision of training, capacity building, and resources for local-, regional-, and national-level stakeholders	Few stakeholder groups will possess all the necessary resources in an adaptive co-management context. At the local level, resources that facilitate collaboration and effective sharing or decision-making power are required. Regional- and national-level entities must also be provided with the necessary resources.
Key leaders or Individuals prepared to champion the process	Key Individuals are needed to maintain a focus on collaboration and the creation of opportunities for reflection and learning. Ideally, these Individuals will have a long-term connection to "place" and the resource, or, within a bureaucracy, to policy and its implementation. Such Individuals will be viewed as effective mediators in resolving conflict.

Openness of participants to share and draw upon a plurality of knowledge systems and sources	Both expert and non-expert knowledge can play productive and essential roles in problem identification, framing, and analysis. The tendency in most resource management contexts is to emphasize differences in knowledge systems. However, there are substantial contributions to social-ecological understanding, trust building, and learning, where the complementarities between formal, expert knowledge and non-expert knowledge are recognized.
National and regional policy environment explicitly supportive or collaborative management efforts	Explicit support for collaborative processes and multi-stakeholder engagement will enhance success. This support can be articulated through federal or state/provincial legislation or land claim agreements and the willingness to distribute functions across organizational levels. Additionally, consistent support across policy sectors will enhance the likelihood of success., and encourage clear objectives, provision of resources, and the devolution of real power to local actors and user groups.

Table 4: Ten conditions for successful adaptive co-management (Armitage, et al., 2009)

***Ethical considerations in the adaptive management of biofuels sustainability:
normative considerations for first-generation biofuel production***

In the case of biofuels, various discussions in the literature examine the ethical implications of various aspects of sustainability. For Gamborg et al, biofuels pose ethical dilemmas primarily due to the land use change problems their use incurs - and these can be analyzed from a consequentialist or non-consequentialist

perspective (Gamborg, Millar, Shortall, & Sandøe, 2012, Gamborg, Anker, & Sandøe, Ethical and legal challenges in bioenergy governance: Coping with value disagreement and regulatory complexity, 2014). In terms of the consequentialist perspective, the assessed environmental effects of biofuels can vary depending on details of production whereas from a non-consequentialist perspective, we would have to assess if this is the most appropriate use of land.

The case of Thailand is illustrative - its reasons for implementing biofuel policy concern both agricultural capacity and energy security. From a non-consequentialist perspective in energy security, we would have to assess if biofuels were the most appropriate use of land; alternatively, from a consequentialist perspective, we would have to collect carefully appropriate data, and also debate production assumptions (which for example can lead to widely varying estimates of available land) that we fed into models used to come up with estimates used to justify policy. One of the criteria to assess ethical biofuel policy proposed by Tait and Buyx is to assess whether benefits and costs of these policies are distributed in a fair way (Buyx & Tait, 2011). Even what could be considered a cost or benefit, and what constitutes the ultimate (economic) goal of maximizing utility can be debated in terms of a normative framework. Many constituents of utility may not be known or may not be able to be assigned a price or other quantitative metric, and so may neither be able to be included in commonly utilized models for empirical analysis, nor be coherently included in a policy analysis by practitioners.

Some attention has been paid to various elements of adaptive management in a policy setting; however, less attention has been paid to explicitly discussing such conditions in their clearly normative context. In particular, concepts such as equity, fairness and openness of participation are frequently mentioned; however, the normative foundation for implementing these concepts is less clear, impeding conceptualizing and implementation in a practical setting. It is also evident from the principles in table 4 that successful adaptive co-management depends on being able to have space for and integrate pluralistic world views; for example, condition nine states that “there are substantial contributions in social-ecological understanding, trust building, and learning, where the complementarities between formal, expert knowledge and non-expert knowledge are recognized.” (Armitage, et al., 2009)

Viewing the production of first-generation biofuels in terms of Norton’s framework for adaptive ecosystem management necessitates examining the process by which conceptions of sustainability are arrived at. Norton proposes a process that allows for various stakeholders to arrive at a shared conception of sustainability regardless of their starting point. Such a conception is particularly useful for complex issues such as first-generation biofuel production.

Bryan Norton provides a “constructivist, community based” framework for conceptualizing sustainability that incorporates the dual feedback of science and normative values via advocating for a process that remedies the manner in which present linguistic resources inhibit communal, multidisciplinary public deliberation

regarding objectives for the environment and relevant policy (Norton, Sustainable values, sustainable change: a guide to environmental decision making, 2015).

Norton's conceptualization of sustainability and related indicators thereby arises from an iterative process of shared consensus from stakeholder discourse.

Norton's renunciation of "the search for uniquely optimal solutions" and subsequent grounding in proceduralism stems from his start point of adaptive management as a solution to a wicked problem and several heuristics that characterize his approach to adaptive ecosystem management, these are summarized in table 5 below:

Number	Name	Implications
Heuristic 1	The process rationality heuristic	Focus on process. "The rationality of decisions depends more on finding an appropriate process than on making accurate predictions and calculations." (Norton, Sustainable values, sustainable change: a guide to environmental decision making, 2015)
Heuristic 2	The epistemological heuristic	Depend more on experience than ideology; examine everything, but not simultaneously. Favor experimentation. "Robust approximations are better than precise predictions." (Norton, Sustainable values, sustainable change: a guide to environmental decision making, 2015)

Heuristic 3	The normative sustainability heuristic	“Engage the community in a search for enduring values constitutive of its identity. While economic concerns and criteria are important to any community, truly normative sustainability requires a public discourse and the emergence of a ‘public’ that can identify key values that must be sustained if public interest is to be sustained.” (Norton, Sustainable values, sustainable change: a guide to environmental decision making, 2015)
Heuristic 4	The scale and boundaries heuristic	Note scale and self-organization in both physical processes and political institution building. “Whoever is affected by decisions within boundaries of the system bounded for management should be heard.” (Norton, Sustainable values, sustainable change: a guide to environmental decision making, 2015)
Heuristic 5	The process evaluation heuristic	“Think of evaluating change as an ongoing process; the goal of evaluation should be a comparison, and an ordinal ranking, of possible development paths into the future. A multi-scalar approach allows the evolution of development

		paths over multiple scales of time and space, capturing the idea of pursuing a multigenerational public interest for the community.” (Norton, Sustainable values, sustainable change: a guide to environmental decision making, 2015)
Heuristic 6	The boundary institutions heuristic	Focus on building boundary objects and institutions that foster a community of interests. “For most complex problems today, there is no ‘spatially appropriate’ institution or jurisdiction available; let emergent public voices articulate problems and bound appropriate institutions.” (Norton, Sustainable values, sustainable change: a guide to environmental decision making, 2015)
Heuristic 7	The sustainable indicator heuristic	Development paths should be assessed according to their likelihood of attaining the public interest, “conceived as a widely acceptable balance in protecting important variables - a suite of indicators deemed important enough to measure and monitor as sustainability indicators” (Norton, Sustainable values, sustainable change: a guide to

		environmental decision making, 2015). Opinions as to why a given indicator matters and should be observed reflect the values of participants in the process (Norton, Sustainable values, sustainable change: a guide to environmental decision making, 2015).
Heuristic 8	The dynamic evaluation heuristic	“Never assume values are fixed. Adaptive management provided opportunities to question and re-form values in process through social learning. Dialogue and deliberation should be inclusive, but shaping of values should aim at articulating and pursuing the emergent public interest.” (Norton, Sustainable values, sustainable change: a guide to environmental decision making, 2015)
Heuristic 9	The capabilities heuristic	Assess environmental change from the perspective of expanding the capabilities of both present and future generations. “Paying attention to capabilities emphasizes freedom of choice over many opportunities to achieve well-being and highlights ways in which physical processes support the multigenerational public interest.” (Norton,

		Sustainable values, sustainable change: a guide to environmental decision making, 2015)
Heuristic 10	The fitting many metaphors heuristic	Eschew solitary, controlling metaphors. "Metaphors close off as well as open up vistas and perspectives; therefore, work with a shifting kaleidoscope of metaphors that will also track shifts in language and conceptualizations. Seek integrative metaphors (e.g. Leopold's thinking like a mountain) that are more inclusive of greater visions and encourage a balance among varied social values flexible enough to evolve as situations change" (Norton, Sustainable values, sustainable change: a guide to environmental decision making, 2015).

Table 5: Norton's 10 heuristics for sustainability (Summarized from Norton BG.

Sustainable values, sustainable change: a guide to environmental decision making.

University of Chicago Press; 2015 Dec 16.)

Norton begins his advocacy for a pragmatic approach at value pluralism and subsequently advocates an experimental approach to environmental values, identifying the object of evaluation as possible development paths or scenarios that the relevant community could approach via picking appropriate policies. Norton is

broad in his conception of how this will be implemented in that he assumes “a full-fledged evaluation of policy alternatives will be embedded in an organized process of adaptive ecosystem management and that this process will include some appropriate form of input from community members and groups, such as a stakeholders or a citizens advisory committee...various ‘voices’ from the community will advocate policies on values they hold dear” (Norton, Sustainability: A philosophy of adaptive ecosystem management, 2005). Norton identifies the ideal case as specific proposals identifying relevant indicators that can be utilized to track stated environmental goals; defining an indicator as “a measurable index of change in valued states of a system” (Norton, Sustainability: A philosophy of adaptive ecosystem management, 2005). This implies that the indicator should be tied to the state of the system, a state that may change with communities’ choices about development paths.

Norton’s framework envisions participants in a public process who push for the safeguarding of values important to them by identifying and advocating a set of indicators most aligned with their preferred values as well as pushing for targets that maintain or attain stipulated criteria for those indicators. In addition, it is not problematic if there are coalitions supporting a diverse set of values behind a single indicator as this represents an opportunity to “form win-win strategies directed at achieving goals stated in terms of robust indicators with broad based support” (Norton, Sustainability: A philosophy of adaptive ecosystem management, 2005).

Norton also highlights the importance of the relevance of geographic location to policy making: “if environmental policy formation is going to reflect social values in a geographic place, it will be necessary to involve, in the development of indicators, citizens and stakeholders from that place who are affected by these policies” (Norton, Sustainability: A philosophy of adaptive ecosystem management, 2005).

Norton envisages a management process that includes two main factors: “(1) a multidisciplinary public discussion of goals, supported by a policy evaluation effort that is comprehensive, integrative and multidisciplinary; and (2) a lively tradition of mission-oriented science” (Norton, Sustainability: A philosophy of adaptive ecosystem management, 2005). Norton examines the potential of the evaluation process following from the management process, arguing for broadening “the scope of inquiry beyond static preferences’ and establishing what he calls *hypothetical constructs* to evaluating policies via an ambulation comprising a ‘dynamic, iterative process in which deliberation, social learning, and accommodation are expected to occur” (Norton, Sustainability: A philosophy of adaptive ecosystem management, 2005).

Resulting gaps and research framework

Some of the inadequacies of prevalent frameworks in the literature for the sustainability of first-generation biofuels include a lack of accounting for multiple uses of a single crop, a lack of procedure or clarified conception of how various stakeholders will interact, limited support to understand competing policy narratives

around a single crop, and a lack of hierarchies in frameworks, impeding prioritization in policy making and understanding the complex interactions of factors in a cohesive manner thereby preventing clear policies around first-generation biofuel crop management essential to achieving a range of sustainability objectives.

Underlying these gaps is a basic paucity of explicitly normative frameworks that pragmatically consider how to effect equity of stakeholder vision for an inclusive vision or direction of sustainability. In this regard, context-specific studies are useful as the intricacy of factors underlying first-generation biofuel crop management from the perspective of sustainability is dependent on context. Specifically, the food-fuel tradeoff may be viewed from the perspective of whether biofuel crops with food uses are affecting the production of staple crops such as cereal crops. In terms of the broader direction of sustainability, it would be useful to study whether the voices of producers and other marginalized stakeholders are considered in what constitutes sustainability for a specific context.

Part 1

First-generation biofuel production is often linked to food security, especially from the perspective of land use. In terms of the crop production for biofuel end use, the crops produced are typically cash crops grown in monocropping systems. In the Thai case, these cash crops are palm oil and sugarcane; and their cultivation is expected to increase in coming years due to increasing targets for biofuel use in Thai

renewable energy policy. While the literature includes studies on specific regions in Thailand and models with future projections, no single study has examined the impact of increased flex-crops for fuel production on staple food crops and agricultural crops for food more generally in Thailand.

Prior studies in the literature have investigated various aspects of the impact of palm oil and sugarcane expansion on regional food security in Thailand, but none so far have investigated it for the entire country. To the best of my knowledge, no recent study exists to quantify the national-level impact of converting areas that used to be harvested for staple crops - the primary such crop in Thailand being rice to oil palm and sugarcane judging from data for all provinces. When viewing this problem, it is helpful to consider that Thailand is currently a net exporter of rice and its rice policies are set up to reflect that, and also support farmers who are growing rice.

It is also helpful to consider that while oil palm and sugarcane indeed have end uses that are food uses, these uses are oil and sugar, which are arguably different than a staple like rice when considering impacts on food security. To investigate this further, we can consider the role of palm oil, rice and sugar for food in Thailand. First, these three food groups are not substitutes for each other. Between oil and rice, rice is consumed in greater quantity than palm oil. Second, palm oil increases come from land conversion rather than yield increase, and income from oil palm production is subject to volatility - for example in 2016, the Thai oil palm industry

experienced the adverse impacts of severe extended drought, which began in 2015 and extended up to the first half of 2016, leading to a 12.3% year on year output drop in 2016 (Sakchai & Prasertsri, 2016). Next, rice is a staple food all over Thailand with few commonly accepted substitutes: “A proper Thai meal is constructed around rice, and is made up of rice (khaw) and side dishes or with rice (khab khaw). Rice is intricately bound up with Thai notions of self. Wealthy Bangkokians may still teach their children to acknowledge the Rice Goddess before starting their meal in an upscale Japanese restaurant” (Walker, 1996).

This will lead to my first research question:

Part 1 (Food Security): Does increased fuel crop production (oil palm) affect (staple) food crop production in Thailand?

The first research question necessitates a quantitative approach, which I will implement using multi-level VAR modeling on an original dataset comprising multi-year plantation and harvest data for various relevant crops in Thailand.

Part 2: First-generation biofuel production governance and equitable smallholder involvement Issues with using inclusion as the basis of legitimacy of sustainability governance in the context of first-generation biofuels

First-generation biofuel crops are “flex” crop type agricultural commodities with global markets and global supply chains, necessitating governance systems that can claim legitimacy across a range of scales and stakeholders. Flex-crops and

commodities are “crops and commodities that have multiples uses (food, feed, fuel, industrial material) that can be, or are thought to be, flexibly inter-changed”; “these include, but are not limited to soya (food, feed, biodiesel), sugarcane (food, ethanol), oil palm (food, biodiesel, commercial/industrial uses) and corn (food, feed, ethanol)...[t]hese may be considered to date, the most prominent and established ‘flex-crops’, although others are appearing or have the potential to appear on the horizon, including cassava, coconut, beets, rape seeds and sunflower”(Borras, Saturnino et al., 2014, p. 2). First-generation biofuel crops like palm oil and sugarcane have global supply chains and a “value-web” of value chains arising from the multiple uses of these crops. These value-webs include a broad range of stakeholders including non-governmental stakeholders such as corporate actors that cannot be accommodated fully by state governance mechanisms, and whose incentives are frequently market driven, and at least operative in a market context. Non-state governance that accommodates global markets and supply chains and includes a broad range of stakeholders seems eminently suited for regulating the context of first-generation biofuel crops.

Existing non-state market driven (NSMD) governance includes a wide spectrum of mechanisms with common characteristics that aim to achieve political legitimacy, defined as “the acceptance of shared rule by a community as appropriate and justified”, to justify enforcement of their policies (Bernstein & Cashore, 2007, p. 348). NSMD governance includes a wide variety of mechanisms and instruments,

including payments for ecosystem services (PES), commodity roundtables and voluntary sustainability standards, geographic indicators and relevant moratoria (Auld et al., 2009; Cashore et al., 2005). NSMDs share five common characteristics: non-reliance on state sovereign authority for policy making, dynamic consensus-based governance that includes a wide range of stakeholders over a long period of time, authority derived from producers, consumers and other stakeholders in the market's supply chain, a goal to reshape markets on a global scale by mitigating problems that firms do not have incentives to address and include procedures for verifying compliance and punish non-compliance (Bernstein & Cashore, 2007). To bolster legitimacy, NSMDs have historically leveraged calls to legitimize their decision-making process by including elements of democracy and have sought to heed these calls via including spaces for a range of stakeholders and relevant actors to deliberate.

Multi-stakeholder organizations (MSIs) are the most notable type of NSMD governance that employ consensus-based practices that, in theory, seek to be transparent and democratic. MSIs are defined as voluntary rule-centered schemes for sustainability "governed by stakeholders who jointly cross the profit/non-profit and state/non-state boundaries" (de Bakker et al., 2019, p. 346). MSIs can be either principle-based where those governed are not subject to verification, such as the Global Reporting Initiative (GRI), or they can be rule-based, where those governed are subject to compliance, such as the Forest Stewardship Council (FSC), Fairtrade,

and the Roundtable on Sustainable Palm Oil (RSPO) (de Bakker et al., 2019).

Regardless of type, the signature feature of MSIs is their inclusiveness via including the range of affected and governing stakeholders in their governance and rule-setting activities (Schleifer, 2019, p. 52). As a result of their purported inclusiveness, MSIs are frequently considered the gold-standard for transnational private governance as the “multi-stakeholder” aspect is generally deemed an indicator of legitimacy (Fransen, 2012; Schleifer, 2019).

However, there is significant variation in how the feature of inclusiveness of MSIs is used for legitimacy in practice across MSIs. Schleifer (2019) demonstrates the differences in inclusiveness between the Roundtable on Sustainable Biofuels (RSB), the Roundtable on Sustainable Soy (RTRS) and Bonsucro. While the RSB exemplifies a balanced and transparent governance structure, RTRS and Bonsucro have a dominance of industry actors in their decision-making processes with more limited levels of openness to scrutiny (Schleifer, 2019). Common critiques of the legitimacy of the ground-realities of the inclusiveness criterion in MSIs include the inhibition of minority voices, local knowledge and non-technical discourse (Bitzer & Glasbergen, 2015; Cheyns, 2014; Fuchs et al., 2011; Ponte & Cheyns, 2013; Schouten & Glasbergen, 2011). Those suppressed are frequently at the producer level of the supply chain or those who are particularly impacted by the production of agricultural commodities (Cheyns, 2014; Fuchs et al., 2011). In addition, producers specifically may face greater transaction costs due to knowledge gathering and compliance with

standards prior to any governance input or role, and these costs may be prohibitive, especially for producers in developing countries as MSI sustainability standards may necessitate much more divergent and additional compliance with existing national and local policies as compared to producers in more developed countries (Dingwerth, 2008).

Even where included, typically marginalized stakeholders are frequently relegated to consultative or representative roles, rather than decision-making roles that accord them real power, sometimes due to the focus on technocratic understandings of sustainability being preferred to deliberative ones (Fuchs et al., 2011; Hatanaka, 2020). Technocratic-democratic procedures and their resulting issues with inclusiveness are particularly salient in the standard setting organizations that are a subset of MSIs; these organizations are also those where producers are directly included and impacted in the production process. The proliferation of non-state MSI organizations who create voluntary sustainability standards (VSS) to reduce the socio-environmental impacts of global production and international trade, frequently by multinational businesses, has led to an emphasis on the technocratic aspect of democratic procedures to deal with the huge variation in contexts. Inclusiveness in voluntary standard setting organizations is salient for first-generation biofuel crop governance as many of the MSIs that regulate these crops subject their producers and suppliers to “voluntary standards” that are increasingly perceived by consumers as a signal of sustainable production and fair inclusion of

producers in standard setting. Variation in producer and organization context is salient as producers in different regions or countries may experience these standards very differently and be affected by them in ways specific to the dynamics of their region.

Issues with including producer stakeholders in MSIs governing first-generation biofuel feedstock: theory and practice

Analyses of MSI voluntary sustainability standard setting organizations (VSSOs) frequently recognize their stated intent to engage a variety of stakeholders, the challenges associated with making such engagement meaningful and the corresponding implications for legitimacy. In particular, producer inclusion in VSSO governance can confer both broad stakeholder inclusion benefits as well as benefits specific to including producers. Excluded or minimal participation by certain types of stakeholders, in addition to broadly reducing the advantage of inclusive governance, may also contribute to reduced credibility, damaged accountability, weakened standards, structural prejudice in favor of elites and diminished benefits for intended beneficiaries (Bennett, 2017). Specifically including producers confers benefits contributing to legitimacy from a human rights and democracy promotion perspective as well as from a development (for example, sustainable development goals) perspective (Dingwerth, 2007; Maher & Buhmann, 2019; Schouten et al., 2012). Additional benefits from including developing country producers can facilitate a standard setting governance organization's understanding of and response to

micro-level dynamics, thereby increasing its broader support base for “production in developing countries” (Wong, 2012).

Excluding producers attenuates the benefits MSI VSSOs specifically create for producers, and leverage for their own goals and legitimacy, as other groups then craft policies for their own benefit. In particular, VSSOs can increase both their market signaling as well as social benefit elements by including producers; doing so increases producer investment in the organization, aids producers in moving from compliance to co-leadership, increases producer competitiveness in the market, generates broader support by improving producer and broad working conditions due to increased understanding of local dynamic, and aligns various stakeholder groups closer with the intended VSSO core values for better and more resilient accountability systems (Bennett, 2017). Excluding producers in governance also exacerbates issues of multinational corporations leveraging private governance to relegate costs and responsibility to producers in countries with low income and low institutional protection, thereby concretizing power imbalances in global value chains (Ponte, 2019; Schleifer et al., 2019).

However, producer inclusion even in theory is not without its difficulties. Tradeoffs to increased and more diverse stakeholder inclusion include slower decision-making, increased probability of gridlock, and more difficult negotiations around broad vision and specific objectives (Auld & Gulbrandsen, 2010; Bennett, 2017). Several studies have demonstrated increased fragility and conflict occurrence as well as reduced

control of individual stakeholder groups in more inclusive private governance (Boström & Hallström, 2013; Schleifer, 2017; Gulbrandsen, 2008). Specifically including producers exacerbates the challenges of including different knowledge bases for production and divergent incentives to produce as well as highlighting the impact of a variety of policy and socio-environmental contexts for production, even in a relatively micro and delineated geographical context.

Producer inclusion in sustainability standard making remains elusive in central decision-making bodies of MSI organizations creating voluntary standards for commodities even in theory, despite these organizations' stated intent to include them in decision-making. Ponte and Cheyns' detailed case study analysis of standard setting MSIs finds that experts dominate knowledge inclusion and process management in policy, and the ability of small-scale developing country actors to shape standards and processes critically depends "not only overcoming important structural differences in endowments and access to resources" but also on more understated power-plays including "promoting the enrolment of one expert group or kind of expert knowledge over another, using specific formats of negotiation, and legitimating particular modes of engagement over others" (Ponte & Cheyns, 2013, p. 459.).

Analyses of policy and constitution documents of MSI type of VSSOs substantiate concerns of weak producer inclusion. Bennett's analysis of the governance structures of thirty-three VSSO constitutions found at most a quarter of these could

be classified as giving producers actual votes and less than a fifth accorded producers veto power (Bennett, 2017). Similarly, Schleifer et al.'s analysis of the institutional design and content of regulations of forty-seven transnational private government organizations (TGPOs) which develop sustainability standards for commodity production in developing countries across twelve commodities found that producers were severely underrepresented in their central-decision making bodies, with just thirty-five percent of the studied organizations according producers any formal decision-making power (Schleifer et al., 2019). In addition, Schleifer et al. recently found that producers had no participation in over 40% of their studied TGPOs included in the Standards Map of the International Trade Centre, indicating producer inclusion continues to be a problem after more than a decade of identifying this issue (Dingwerth, 2008; Schleifer et al., 2019).

Issues with including stakeholder inclusion in roundtables governing first-generation biofuel feedstock with a focus on producers

Roundtables have emerged as a notable non-state market driven (NSMD) and MSI type VSSO governance mechanism for commodity regulation, including for the most common first-generation biofuel crops such as oil palm and sugarcane. Roundtables have been noted for their potential for additionality or the benefits of roundtable sustainability certification above what would be anticipated given existing national practices and policies. For example, Garrett et al.'s study on the Roundtable for Sustainable Palm Oil (RSPO) and the Roundtable on Responsible Soybeans (RTRS)

found the roundtable certification had a significant impact on attenuating the conversion of native vegetation to cropland over and above the anticipated conversion given 'business-as-usual' with existing national policies (Garrett et al., 2016). Roundtables have been used for biofuels and first-generation biofuels crop sustainability certification since at least 2004, with the formation of the Roundtable on Sustainable Palm Oil (RSPO) for oil palm sustainability certification. Other roundtables for biofuels and biofuels crop certification include the Roundtable for Sustainable Biofuels (RSB) for biofuels in general and the Better Sugar Initiative (Bonsucro) for sugarcane production.

Many roundtable initiatives include significant private sector leadership that is supported by multi-stakeholder approaches. For example, the RSPO was founded in 2004 as an outcome of an informal dialogue prompted by the WWF in 2002 with the Malaysian Palm Oil Association companies Unilever, Sainsbury's Aarhus United UK Limited, Migros and Golden Hope Plantations Berhad (Partzsch, 2011). Private sector standards and certifications perform a growing role in biofuels sustainability; however, gaps in standards and certification procedures, low market uptake, the appropriateness of such systems to perform governance functions in the biofuel production context, and issues with power dynamics between and within stakeholder groups remain key concerns(de Man & German, 2017).

Roundtables as multi-stakeholder initiatives (MSIs) claim to improve sustainability of a supply chain as they provide a convenient platform for diverse stakeholders to

engage in sustainability governance. Notably, “the concept of ‘roundtabling’ emphasizes the fitting of a variety of commodity-specific sustainability situations into a form that not only ‘hears more voices’ (as in ‘multi-stakeholder’), but also depicts giving equal standing at the table of negotiations (roundtable); thus, raising higher expectations of accountability, transparency, and inclusiveness” (Ponte, 2014, p. 1). Regarding transparency and accountability, roundtables facilitate information access regarding procedures for setting standards for concerned stakeholders. In addition, roundtables in theory allow for public consultation when standards are revised, as well as publicly accessible information regarding producers and processors of the relevant commodity (Garrett et al., 2016).

However, significant challenges concerning transparency and accountability are associated with roundtable governance for sustainability. Industry involvement in the process of setting sustainability standards may lead to weakened stringency compared to standards set via civil society governance systems as industry stakeholders are likely to oppose standards with high-cost compliance (Garrett et al., 2016). Concerningly, there is weak evidence that revealing sustainability information enables appellants in sanctions or consequences against those deemed liable, calling into question the expected effect that increased transparency results in better accountability or redress (Mason, 2020). In short, roundtables are frequently associated with equity in terms of the opportunity for and intensity of participation,

and the legitimacy of their outcomes is founded on the claim that these are reached by consensus.

Stakeholder inclusion is one of the key components of legitimacy of roundtables as an extension of its importance for MSIs. Experimentalist governance justifications in the literature seek to reconcile the differences between roundtables as empirical formulations of governance built to satisfy stakeholder expectations of positive environmental outcomes and the moral or normative concerns of roundtables in theory. For example, Brassett et al's analysis of several key primary commodity roundtables, including those for biofuels and biofuel crops "suggests that the legitimacy of innovative forms of governance, including private regulatory regimes, might be evaluated in terms of their successes, or failures, in realizing a process of 'social learning' through experimentation"; their three core ideas underlying experimentalist governance include stakeholder inclusion, polyarchy and democratic destabilization (Brassett et al., 2012, p. 369; Cohen & Sabel, 1997).

Stakeholder inclusion facilitates social learning via sharing pertinent information and deliberation on competing opinions or arguments. In theory, "direct participation helps because participants can be assumed to possess relevant information about the local contours of the problem and can relatively easily detect both deception by other and unintended consequences of past decisions" (Cohen & Sabel, 1997, p. 326). In theory, stakeholder inclusion attenuates the dominance of powerful interests over marginalized actors as long as stakeholders actually choose to support

the roundtable by participating and the institutional design accords equal opportunities for agenda setting across stakeholders in central and local governance units (Elgert, 2012; Fung, 2003; Sabel & Zeitlin, 2011).

However, how stakeholders are included in roundtables and whether stakeholder inclusion occurs on the ground despite theoretical justification and the stated intent of roundtables is a matter of debate. MSIs in general, and by extension, roundtables, typically function in environments where stakeholders disagree about the emphasis and prioritization of norms, making the deliberative democratic goals of reconciling universal reason and contextual appraisal challenging in practice (Reinecke & Ansari, 2015). In addition, scholarly analysis of stakeholder inclusion and discourse has recognized that theoretically justifiable normative constructs for discourse ethics cannot remain unaffected by the ground-realities of real-world communication that is inextricably influenced by unequal power distributions among various stakeholder groups (Gilbert & Rasche, 2007). DeBakker et al's analysis of inclusiveness and deliberation in their extensive review of the literature on MSIs for sustainability implies that although there has been much effort to study how a variation in inclusiveness during the standard-setting process impacts legitimacy, there has been less effort to understand how this element fits broadly into theories of legitimacy (de Bakker et al., 2019). Importantly, there has been little synthetic analysis of how value-oriented morals, pragmatism based and cognitive sources of legitimacy

function individually and concurrently, as well as how legitimacy of roundtable based MSIs evolves over time (de Bakker et al., 2019).

As anticipated, evidence on the general effectiveness of roundtables in terms of including stakeholders in practice remains mixed. Common barriers to inclusiveness comprise financial, language and knowledge constraints as well as a lack of participation due to ideological differences. For example, Ruyschaert and Salles study on the ineffectiveness of the RSPO in achieving conservation objectives in Indonesia shows that stakeholder groups postponed the conflict laden conversations that would facilitate decisions and progress on conservation issues, a situation resulting from “the management-dominated discussions through which the stakeholders establish their power relationships” (Ruyschaert & Salles, 2014, p. 442). Pye’s study of the influence of the RSPO on development and environmental impacts of the palm oil industry underscores that certification roundtables like the RSPO commodifies sustainability to ease consumer concerns in developed countries (Pye, 2019). The RSPO’s focus on technical standards and managerial solutions for sustainability obscures the issue “that it is not the commodity itself but the social relations of nature in the production of the commodity that need to become more sustainable” (Pye, 2019, p. 218).

In fact, MSI and roundtable claims of engaging stakeholders are frequently questioned as past experience shows that communication in such platforms is frequently influenced or even usurped by a few interest groups with bargaining

power. Fougère and Solitander's analysis of the RSPO and the Bangladesh Accord on Fire and Building Safety counters the notion that consensus-led MSIs definitely result in more democratic checks on more powerful stakeholders (Fougère & Solitander, 2020). Ingram et al.'s study of cocoa, soy, tropical timber and palm oil value chains demonstrates that end-of-chain stakeholders are frequently much more influential in making decisions regarding commodity sustainability standards (Ingram et al., 2018). In fact, end of chain stakeholders make vague broad sustainability standards decisions and shape their normative and positive environmental impacts with limited input from stakeholders from earlier parts of the value chain, such as early stage producers, specifically around concepts like "sustainable inclusive growth", "natural capital" and "green economic growth" (Ingram et al., 2018). In fact, present critical analyses of roundtables even by informed stakeholders may be unable to recommend producer participation of broader normative concepts and integrate such participation structurally. Glasbergen's analysis of voluntary standards and certification schemes argues that most analyses of the sustainability by roundtables like the RSPO take voluntary standard based certification schemes and their associated procedures as their point of reference, tacitly approving a problem definition that "is not necessarily aligned with the needs, interests and preferences of smallholder producers in a developing context" (Glasbergen, 2018, p. 243).

Even if commodity producers might want to have input on broader concepts directly related to sustainability, structural issues such as industry and smallholder incentives as well as the politics of the broader political context of the locations of production inhibit such participation. First, farmers are often underinformed or even unaware of the specifics of the standards and certification schemes they are participating in, many are not aware of the normative understanding underpinning the sustainability certifications they do join (Glasbergen, 2018; Hidayat et al., 2015; Ibnu et al., 2015). Pye's study of the RSPO and the dynamics of oil palm production in Indonesia and Malaysia shows how capital accumulation for oil palm as an industry requires large, inexpensive swathes of land and lots of workers (Pye, 2019). As a result, producers "compete on a global market that is defined primarily by bulk and price, leading to the concentration of capital and to regional production networks consisting of refineries, mills and plantation" (Pye, 2019, p. 221). In addition, the production and market dynamics mean that mills, who pay producers by volume of production of oil palm, are situated close to producers and exert significant influence over them.

Roundtables and experimentalist governance: the consequences of and main theories substantiating attenuated stakeholder participation

The difficulties with producer inclusion and participation in first-generation biofuel commodity VSSO type roundtables question the execution of democratic destabilization that is central to the experimentalist governance characteristic of roundtables. Democratic destabilization refers to the influence of deliberative

procedures resulting from peer review between macro (central) and micro (local) level units of primary commodity roundtables. As the theoretical objective of such roundtables is to include technical perspectives but not be reduced to technocracy, “the process of peer review has destabilizing effects, as it establishes a contest between competing sources of technocratic authority, which undercuts the threat of rule by a unified corpus of policy elites”, facilitating the inclusion of “different actors and societal perspectives in the policy making process” via “triggering inclusive processes of reason giving between and within affected parties” (Brassett et al., 2012, p. 376; Cohen & Sabel, 2005). Difficulties with stakeholder, specifically producer/smallholder, engagement and inclusion in deliberative processes calls into question the input legitimacy of commodity roundtable type MSIs overall. Input legitimacy is the view that “decisions are derived from the preferences of the population in a chain of accountability linking those governing to those governed” (Mayntz, 2011, p. 10).

Sustainability governance, specifically in the form of roundtables, is therefore recognized as being a complex process where policies or intent do not translate into envisioned outcomes in a straightforward way. A large literature exists on stakeholders that are included or excluded in roundtables and MSI more generally, and the mechanisms that lead to stakeholders being included or excluded. Theoretical approaches to analyzing MSIs have focused on overt and more subtle power dynamics between stakeholders. The two broad approaches are the political

economy and post-structuralist approaches; these differ in how power is conceptualized.

Scholars who use political economy approaches conceptualize stakeholders bringing their interests to the table, engaging strategically, and therefore not in an equitable manner, as stakeholder access to resources is unequal. Political economy analyses also emphasize that “neutral” general standards interact with inequalities in terms of power and resources at the local level, implying that even if standards were neutral at their conception, they do not remain neutral in their enactment (Cheyns & Riisgaard, 2014b). In the context of first-generation biofuel feedstocks, the outcomes of burgeoning alliances between government actors, multi-national corporations and large scale producers who are ensconced in global industrial crop production systems are that these “biofuel alliances are reinforcing processes and structures that increase pressures on the ecological integrity of tropical forests and further wrest control of resources from subsistence farmers, indigenous peoples and peoples with insecure land rights” (Dauvergne & Neville, 2010, p. 1).

Political economy approaches are thus systemic approaches to power that accentuate how particular social systems construct the options that individuals possess for action by allowing for a set of abilities and inclinations for only some actors but not others, underscoring the avenues via which wide-ranging historical, social, political, economic and historical influences permit some actors to apply power over others (Cheyns & Riisgaard, 2014a). Literature leveraging this approach

includes analyses of sustainability standards from diverse perspectives, for example, the consequences of certification in developing countries especially for marginalized stakeholders like smallholders, benefit-cost analyses of compliance to sustainability standards, or the association between sustainability standards and value-chain structures of governance or with restructuring within international trade (Cheyns & Riisgaard, 2014a; Gibbon & Lazaro, 2010; Ponte, 2008).

Post-structuralist analyses criticize political economy approaches in that their “interest format conceals the fact that politics is implicit in the elaboration of choices” made with the support of “an agro-industrial model of agriculture founded on a ‘market-industrial’ compromise” (Cheyns & Riisgaard, 2014b, p. 419) . Instead, scholars who leverage post-structuralist explanations identify “approaches to power which incorporate diffuse oppressions through forms of knowledge, of information, and of engagements” (Cheyns & Riisgaard, 2014b, p. 415) . Essentially, post-structuralists “challenge the political liberal model and the view which prevails in it, arguing that even if MSIs operate with an adequate “balance of interests,” this political model sidelines some forms of knowledge and participation which would permit the accommodation of justice concerns or attachments” which “reinforces the marginalization of small-scale farmers and rural community voices” (Cheyns & Riisgaard, 2014b, p. 417).

Post-structuralist approaches are thus constitutive approaches to power that emphasize the role of narratives in contrast to the role of social structures

underscored by the political economy approaches. In post-structuralist explanations, “constitutive and cognitive devices, embodied in specific normative orders, discourses and narratives” establish the distribution of power (Cheyns & Riisgaard, 2014a, p. 11). For example, Cheyns shows the mechanisms by which characterizing the discussion via stakeholder interests distracted discussants from holding a debate regarding the tenets of justice and confronting injustices that local smallholders and communities wanted to broach regarding farming practices and land issues (Cheyns, 2014). The bias towards certain stakeholder interests when framing the debate was underscored when smallholders attempted to debate the concept of sustainability and expressed reservations regarding the market and industrial frames that had been normalized in the RSPO. Other stakeholders denied smallholders an opportunity for open debate by leveraging concerns regarding urgency, practicality and threats to the stability of the community, and instead relegated these concerns to be addressed on a case-by case basis with plantation corporations. In addition, smallholders using emotion to address their individual experience with lost land as a result of palm oil expansion was considered unusable due to the personalized, rather than generalized, interest format smallholders communicated in. Marginalization thereby occurs as personal experience and related requests for intervention are delegitimized unless they conform to a generalized format that is often not accessible or feasible for smallholders to leverage in their communication with other stakeholders.

Roundtable based sustainability governance for oil-palm in Asia: broad stakeholder categories and producer inclusion in the RSPO

Although there are a few roundtables related to sustainable biofuels production in Asia, for oil palm production specifically, the most pervasive standard is the RSPO, with over 350 certified oil palm mills (Naiki, 2016). The RSPO brings together seven different categories of stakeholders: oil palm farmers, refiners or traders, consumer goods manufacturers, retailers, banks & investors, environmental or conservation NGOs and NGOs that are involved social and developmental issues (Wangrakdiskul & Yodpijit, 2012). Some of these categories comprise groups, including smallholders, that are traditionally marginalized in decision-making regarding sustainability. Given the format of the RSPO, we can gain insight into whether the theoretical construct of inclusion manifests and in what ways, by examining the principles of the RSPO and the processes by which these principles are applied. The RSPO “claims to make palm oil production more sustainable through its regulation of members and system of certification” (Köhne, 2014). To that end, the RSPO has sought to attempted to improve smallholder engagement via iterative strategies to increase smallholder participation in RSPO supply chain and ultimately, increase input in the standards upheld by the RSPO and the processes by which these are executed.

Roundtables are associated with equity in terms of diverse and equal participation. Yet, it is unclear how much the language of equity is included in the principles and the criteria of the RSPO. The word equity is not included in its principles and criteria;

tabulating the word equal and its context seem to refer to employment conditions rather than fundamental participation in the construct of what its vision of sustainability means. In this way, the marginalized smallholder remains marginalized. However, we do not know intent of the RSPO in terms of including smallholders as true to the concept of roundtables incorporating the elements of inclusiveness and consensus , the RSPO does mention its intent to have “smallholders operate in a more level playing field, with a stronger position to negotiate based on improved access to information” (Cheyns & Riisgaard, 2014b; RSPO, 2018). The recent smallholder strategy has a focus on increasing smallholder certification by reducing barriers to access via more funding and easier access to and clarity of information and dialogue relative to the “business case for smallholder inclusion in the smallholder system”; but the language of equity as relevant to sustainability is missing, calling into question the type of consensus that will be achieved (RSPO, 2018, p. 14).

Roundtables for Palm Oil (RSPO) and their Associated Smallholder Strategies-

General

The RSPO is a multi-stakeholder organization that implements a voluntary sustainability certification scheme for oil palm. The RSPO was established in 2004 with the stated goal of “promoting the growth and use of sustainable oil palm products through credible global standards and engagement of stakeholders” (RSPO, 2015a). Although the RSPO was formally registered in 2004, it was conceived by the

WWF as early as 2001 and developed via an informal coalition of corporate and civil society actors. Early participants in discussions that led to the formation of the RSPO include Aarhus United UK Limited, Migros, Unilever and the Malaysian Palm Oil Association. In fact, WWF Switzerland organized a group meeting in September 2002 with predominantly European stakeholders representing various parts of the oil palm supply chain, including oil palm plantation and processing companies, financial companies, consumer protection and sustainability focused institutions, food and retail companies (de Man & Juranics, 2002).

The RSPO was set up for corporations and non-governmental organizations to hold decision-making power with smallholders and farmers in a more adherent role. At the September 2002 WWF meet, the variety of stakeholders agreed to promote sustainable palm oil, leading to the formation of a roundtable for promoting responsible oil palm production, called the Roundtable for Sustainable Palm Oil (RSPO). The RSPO was officially established in 2004, following which it organized a multi-stakeholder forum to generate consensus-based global principles and criteria for sustainable oil palm production, along with a process for verification, certification and traceability of oil palm supply chains. Following rounds of revision and testing, these principles and criteria were formally adopted during the 2007 RSPO General Assembly. While the initial principles and criteria explicitly recognized some of the challenges faced by smallholders, it placed the responsibility on corporations and mills to treat smallholders fairly. The role of smallholders

themselves was largely to gain information on sustainable oil palm growing practices and be able to file grievances. Table 6 provides a timeline of milestones on the RSPO's development.

Date	Key Milestones
2001	WWF conceives and investigates the possibility of a roundtable for sustainable oil palm
2002	WWF forms an informal coalition with Aarhus United UK, Migros and the Malaysian Palm Oil Association. WWF Switzerland organizes a preparatory meeting with predominantly European stakeholders for exploring consensus building on sustainability principles across stakeholders.
2003	Inaugural RSPO meet of 200 stakeholders across 16 countries in Malaysia to adopt the Statement of Intent (SOI), a non-legally binding endorsement of the Roundtable process.
2004	RSPO officially registered under Article 60 of the Swiss Civil Code. 47 organizations sign the SOI, signaling their intent to participate in the RSPO process.
2005	RSPO Principles and Criteria (P&C) were adopted in November piloted for trial by two companies.
2006	RSPO members' code of conduct formed and adopted.
2007	RSPO Criteria Working Group reviews P&C with input from pilot field trials, public consultations, smallholder taskforce representatives and national interpretations. RSPO certification system approved and adopted in the RSPO General Assembly in Malaysia.

2008	Approval of national interpretations of RSPO P&C for Indonesia and Malaysia, among others. United Plantations Berhad is approved for the first P&C certification. RSPO Supply Chain Certification Systems (SCCS) completely formulated. Rotterdam received first shipment of RSPO certified sustainable palm oil
2009	RSPO SCCS reviewed and adopted. RSPO complaints system instituted to attend to complaints against RSPO members or the RSPO system.
2010	RSPO reaches 500 ordinary members.
2011	RSPO trademark launched. Development of the Remediation and Compensation Procedure is initiated via the Compensation Task Force under the Biodiversity and High Conservation Task Force (BHCV WG).
2012	Start of review procedure for P&C 2007; RSPO becomes a member of the ISEAL Alliance.
2013	Revised P&C approved and adopted via General Assembly. Accreditation Services International (ASI) is approved as the first external certification body to perform RSPO certification. Human Rights Working Group (HWRG) established per the human rights condition in the revised P&C. Dispute Settlement Facility (DSF) developed for members in land-related disputes or other conflicts with one another.
2014	RSPO RED (RSPO CSPO for biofuels) enters Europe. RSPO membership reaches 1902 members across 72 countries.
2015	Jurisdictional approaches to RSPO certification are established by Central

	Kalimantan in Indonesia and Sabah state in Malaysia. RSPO NEXT, a voluntary set of more stringent certification criteria, are introduced as an addendum to the P&C from 2013. RSPO board of governors approve revised new planting procedure as well as remediation and compensation procedure.
2016	Launch of RSPO Trademark App for consumers to find products with RSPO trademark. Singapore introduces the Singapore Alliance for Sustainable Palm Oil (SASPO).
2017	Review of P&C 2013 starts RSPO Smallholder strategy is reviewed and approved. RSPO Theory of Change (ToC) is approved. North American Sustainable Oil Palm Network (NASPON) is launched Modified Complaints and Appeals Procedures are approved.
2018	Development of an additional and separate standard uniquely for independent smallholders is initiated Revised P&C (P&C 2018) are adopted RSPO membership expands to 4000 members across 92 countries.

Table 6: Key milestones in the development of the RSPO (Adapted from RSPO,

2017, 2018, 2019, 2020a and 2021 a-c)

RSPO certification is based on indicators derived from eight original key principles introduced in 2005 and revised in 2007, 2013 and 2018; the RSPO functions via verifying a set of context appropriate indicators for these criteria via third parties. To obtain RSPO certification, producers must comply with indicators reflective of each

of these eight principles and be assessed by a third-party certification body with RSPO accreditation every five years with a yearly audit for maintained compliance. As of 2021, 19% of global palm oil, or 12.43 million tons, is RSPO certified (RSPO, 2021a). Regarding smallholder specific production of oil palm, 84009 scheme and independent smallholders are RSPO certified with a total certification area of 304706 hectares. Out of members by countries, of Indonesia, Malaysia and Thailand, only Malaysia makes the list of the top 10 countries with memberships with 138 members; however, Indonesia is the more relevant comparison for Thailand both from prevalence and weight of smallholders-for example, 'Satpa Tunggal Mandiri' the world's largest independent smallholder group, a group of 2700 independent smallholders cumulatively comprising 5500 hectares of production exists in Indonesia, and received RSPO certification in 2016 (RSPO, 2016, 2021a). In general, whereas 40% of oil palm area and CPO production is contributed by smallholders in Indonesia with over 724 certified smallholder members, only 11% of oil palm planted area is contributed by smallholders in Malaysia with no independent smallholder yet being RSPO certified (RSPO, 2020a).

RSPO standards are voluntary but stringent; in addition to national interpretations of the RSPO criteria themselves, national initiatives have typically formulated to have an alternative standard at the national level that is easier to comply with (mainly to facilitate easing the concerns of countries exported to). For example, Indonesia has the Indonesian Sustainable Palm Oil System, a policy executed by the Ministry of

Agriculture for the Indonesian government since 2011 and mandatory since 2014. However, only 16.7% of palm oil plantations in Indonesia have been certified, and major critiques of the ISPO include “inadequate environmental protection, neglect of human rights, weak law enforcement and poor governance” (EIA, 2018). The equivalent standard for Malaysia is the Malaysian Sustainable Palm Oil Standard (MSPO). In a study where the treatment of smallholders in national palm oil standards (ISPO and MSPO) was assessed against four metrics accounting for their ability to access markets to sell their FFB, whether they could access fair credit, and whether the standard included stipulations for producers to receive a fair price for their FFB, the standards were lacking commitment to adequate socio-economic infrastructure for smallholders and none required that smallholders have access to fair credit; in terms of fair contracts, the ISPO contained no requirements for smallholder contracts, whereas the only stipulation the MSPO makes is that smallholders receive training to increase productivity (Forest People’s Program, 2017). In fact, even having more comprehensive and narrowly focused requirements for smallholders may impede their participation in such initiatives if the deficit between the high costs of compliance and their likelihood of securing fair credit and access markets that pay a higher price generates a deterrent for smallholders to get certified or maintain their certification (Forest People’s Program, 2017).

The RSPO has sought to engage smallholders in various ways, however it is neither clear how much agency smallholders have in shaping conceptions of sustainability

nor how directly they can engage in these discussions within the RSPO. As discussed in the introduction, smallholders constitute major producers of oil palm as well as depend on its cultivation for their livelihood while simultaneously risking being undermined by oil palm production especially in the context of the RSPO. The RSPO and its underlying principles seem to imply engaging all stakeholders equitably by virtue of being a roundtable, meaning the conception of the voice of smallholders is fundamental to discussions of sustainability in this context. In the past, the RSPO sought to incorporate smallholders through funding initiatives such as the RSPO Smallholder Support Fund (RSSF) and initiatives to facilitate smallholder certification by development of 'Guidance of Group Certification of FFB Production' (RSPO, 2018).

Criticisms of past strategies and criteria of the RSPO for smallholder engagement include: (1) delays in translation of key texts into national languages, containing accessibility for smallholders and NGOs and (2) lack of direct involvement of representatives of indigenous peoples, farmers and plantation workers (Vermeulen & Goad, 2006). Most recently, these criticisms initiated the development of the RSPO smallholder strategy in consultation with smallholders and in March 2017, the RSPO Board of Governors "approved the strategic framework that underpins the full RSPO Smallholder Strategy" (RSPO, 2018). The RSPO currently seeks to improve smallholder yields while also prioritizing their livelihood, delivering support, tailoring sustainability requirements to smallholders, providing for localized approaches to

smallholder inclusion and improving farmer self-sufficiency (RSPO, 2018). The new strategy seeks to be implemented over 5 years and is currently in its third year.

As part of its smallholder engagement strategy, the RSPO introduced a standard specific to independent smallholders in 2019 that allows independent smallholders phased entry into the RSPO.

Oil palm smallholder considerations in S.E. Asia with a focus on Thailand

Thailand has an ambitious biodiesel mandate and a resulting expansion of oil palm production on predominantly smallholder farms, and is looking to develop local and regional (ASEAN) standards for sustainable palm oil production. Thailand's efforts are an opportunity for change and focus in the current dynamic of smallholder inclusion in sustainability criteria for oil palm production, and in global networks for food and fuel security owing to crucial food and fuel uses of palm oil. Establishing such criteria is set to become increasingly urgent as the EU, a major export destination for palm oil, is increasingly concerned about sustainability of oil palm production in S.E. Asia.

Thailand is currently using existing leading regional sustainability standards as a reference while it develops regional and national standards for its smallholder dominated and proliferating palm oil production. Key global sustainability roundtables for oil-palm production like the RSPO and existing national standards in Indonesia and Malaysia (ISPO and MSPO) currently dominate the process of arriving at sustainability standards as well as defining and enforcing currently predominant

sustainability standards. However, the most prevalent sustainability standard is the RSPO, and it is the RSPO that will be the focus of this analysis, with a focus on smallholders as outlined in the introduction. However, country standards will be used as applicable to inform the analysis as they exist in tandem with the RSPO.

While the oil palm industry was historically started by and is currently characterized by large-scale plantations, it has been making a well-documented shift to smallholders across S.E. Asia. The earliest cultivation of oil palm in S.E. Asia was around 1920 in Sumatra, Indonesia, by the Lever Brothers, a plantation-based company and a predecessor to the current Belgian company SOCFIN (Byerlee, 2014). To move away from the declining rubber industry, the Malaysian government strategically decided to diversify into palm oil by providing relevant policy incentives to investors and further expanded large scale plantations into Sabah and Sarawak in the 1970s (Teoh, 2002). Despite the prevalence of large scale-plantations, there has been a marked shift towards smallholders, consistent with broader agrarian trends for commercial crops in the region (Byerlee, 2014). For example, Malaysia established the Federal Land Development Authority in 1956 to incorporate smallholders, particularly ethnic Malays, into growing oil palm, although the configuration of production was often centralized in the manner of larger scale plantations (Pletcher, 1991). Similarly, Indonesian regulations on instituting oil palm originally mandated up to 80% of land area be provided to smallholders related as out growers (Byerlee, 2014). In addition, the number of independent smallholders in

Indonesian oil palm production grew as a result of the increased density of mills to the extent that smallholders now account for over 40% of Indonesian oil palm production (DJP, 2015, p. 69; Rist et al., 2010).

The shift to smallholders in oil palm production is even more sudden and marked in Thailand, and Thailand has uniquely favorable conditions for smallholder operations in S.E. Asia. Originally, oil palm production in Thailand grew substantially from a planted area of 110,000 ha in 1988 to 320,000 ha in 1999 - a result of the efforts to diversify from natural rubber owing to its falling market price in the late 1960s (Phitthayaphinant et al., 2013; Vermeulen & Goad, 2006). The southern provinces of Thailand have the most suitable climactic conditions for oil palm production-in fact, oil palm plantation was started there, and therefore account for 90% of the land cover from oil palm. However, Thailand's aggressive policies to encourage oil palm production led to an expansion in the East, North, and Northeast regions since 2004 due to considerable land constraints to expansion in the South (Sethaputra, 2014). By 2011, 70 to 80% of oil palm produced in Thailand was planted by 120,000 smallholders with an average landholding of 3.9 ha (Chao, 2012; Dallinger, 2011).

Oil palm planters in Thailand can be classified into three main groups by their type of holding: the smallest holding comprising smallholders in land settlement with holdings of fewer than 8 ha each, private smallholders with land settlement areas of fewer than 160 ha each and commercial companies, most of which have landholdings of greater than 160 ha each (Phitthayaphinant et al., 2013). The land

settlements are initiated by the Thai government, and under its assistance. There are a large number of oil palm planters, most of whom fall into the first two categories, with the second category (private smallholders) having more money to invest in the fields as compared to smallholders in land settlement (Phitthayaphinant et al., 2013).

Compared to Indonesia and Malaysia, conditions for smallholders in Thailand are better because of two main factors. First, Thai oil palm policy provides significant incentives to invest in processing mills, encouraging competition and providing more options for independent smallholders to sell their fruit; second, Thailand forbids foreign control of farmland (Byerlee, 2014). It is worth noting that most of the oil palm grown in Thailand is headed for domestic consumption, very little of the products from oil palm are exported. Growers of oil palm have two main avenues by which to sell their produce: through selling FFBs (fresh fruit bunches) directly to crushing plants or local assemblers. The other channel to trade oil palm products is through sales of palm oil, but those do not directly come from the producers; rather, processing mills sell the palm oil obtained from FFBs to various industries for diverse end uses. Concurrently, Thailand consistently supports smallholders and has a well-run agricultural bank that provides long-term loans for tree crops to smallholders, the majority of whom have secure land titles (Byerlee, 2014).

Conceptual framework and resulting research question for Part 2

Roundtables are a notable example of the proliferation of private and hybrid regulation of sustainability. Notably, “the concept of ‘roundtabling’ emphasizes the fitting a variety of commodity-specific sustainability situations into a form that not only ‘hears more voices’ (as in ‘*multi-stakeholder*’), but also depicts giving equal standing at the table of negotiations (*roundtable*); thus, raising higher expectations of accountability, transparency, and inclusiveness” (Ponte, 2014). Among the various initiatives for sustainable oil palm, roundtables for sustainability are among the most prevalent. Key global roundtables for palm oil-based biodiesel include the Roundtable for Sustainable Biomaterials (RSB) and the Roundtable on Sustainable Palm Oil (RSPO). Founded in 2007 as a partnership between WWF and biofuel/feedstock producers, the RSB initiated a global certification system in 2011 via a group of sustainability criteria with a set of minimum criteria that must be fully complied with (Forest Peoples Program, 2017). Although there are a few roundtables related to sustainable biofuels production in Asia, for oil palm production specifically, the most pervasive standard is the RSPO, with over 350 certified oil palm mills (Naiki, 2016).

The RSPO has sought to engage smallholders in various ways, however it is neither clear how much agency smallholders have in shaping conceptions of sustainability nor how directly they can engage in these discussions within the RSPO. As discussed in the introduction, smallholders constitute major producers of oil palm and also

depend on its cultivation for their livelihood while simultaneously risking being undermined by oil palm production especially in the context of the RSPO. The RSPO and its underlying principles seem to imply engaging all stakeholders equitably by virtue of being a roundtable, meaning the conception of the voice of smallholders is fundamental to discussions of sustainability in this context. In the past, the RSPO sought to incorporate smallholders through funding initiatives such as the RSPO Smallholder Support Fund (RSSF) and initiatives to facilitate smallholder certification by development of “Guidance of Group Certification of FFB Production” (RSPO, 2018). Criticisms of past strategies and criteria of the RSPO for smallholder engagement include: (1) delays in translation of key texts into national languages, constraining accessibility for smallholders and NGOS and (2) lack of direct involvement of representatives of indigenous peoples, farmers and plantation workers (Vermeulen & Goad, 2006). Most recently, these criticisms initiated the development of the RSPO smallholder strategy in consultation with smallholders and in March 2017, the RSPO Board of Governors “approved the strategic framework that underpins the full RSPO Smallholder Strategy” (RSPO, 2018). The RSPO currently seeks to improve smallholder yields while also prioritizing their livelihood, delivering support, tailoring sustainability requirements to smallholders, providing for localized approached approaches to smallholder inclusion and improving farmer self-sufficiency (RSPO, 2018). The new strategy seeks to be implemented over 5 years and is currently in its second year.

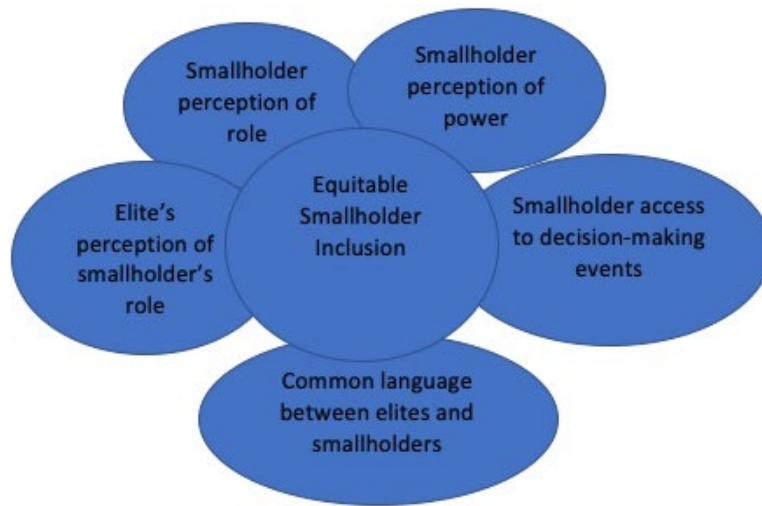


Figure 3: Key elements of smallholder inclusion from survey of literature (author)

In order to determine whether smallholders are included in the decision-making process in an equitable way, it is necessary to focus on five major factors as in the above figure. The smallholders' perceptions of their role (whether or not it is appropriate to provide input and suggestions) and their power (whether their input will have a measurable impact on the decisions made) both are indicators of whether the smallholders see themselves as being included. Smallholder access to decision-making events such as meetings are a physical, measurable factor of inclusion - if meetings are held in areas or at times which make them difficult for smallholders to attend, then it is difficult to suggest that smallholders are included. Common language means that the elites and smallholders are able to discuss policy and goals from a shared set of priorities, rather than each side not fully understanding where the other side is coming from. Finally, the elites' perception of

the smallholder's role is vital to measure smallholder inclusion: if the elites don't view the smallholders as a party that merits inclusion in decision making, equitable smallholder inclusion is constrained.

These considerations lead to the second research question:

Part 2 (Equity): Do roundtable-based sustainability certifications include a process to obtain the voice of the smallholder in an equitable way?

The second research question will be examined via a qualitative approach comprising analysis of detailed semi-structured interviews with oil palm smallholder and elite across six major oil palm producing provinces in Thailand.

The analysis will focus on whether the RSPO's claims regarding including independent smallholders are substantiated on the ground and examine differences in perception of independent smallholder inclusiveness between elites and smallholders. To this end, the analysis will include 3 major components:

- a. Explore the inclusion of independent smallholders via smallholder perceptions of their equity in the RSPO. It will provide evidence on independent smallholder views of their perceptions of the benefits they receive by speaking about their views vs. listening to elite/ top-down instructions. It will also elucidate whether farmers view their engagement as speaking up individually or as participation in a shared vision.

b. Explore the perceptions of elites towards the inclusion of independent smallholders in the RSPO. The evidence this study comprises the perceptions of elite stakeholders as to how they frame and view the role of independent smallholders in the RSPO and in general, as well as elite perceptions of the benefits independent smallholders gain by listening to instructions or descriptions versus participating via among other ways, asking questions or clarifications, proposing amendments to executing policy initiatives, proposing amendments to policies themselves or proposing entirely new policies. The study will attempt to provide insights as to whether elite stakeholders view smallholder access to training and non-training meetings and listening to instructions as comprising independent smallholder inclusion and participation and provide an assessment of where interviewed elites would place smallholder inclusion broadly and participation on the scale defined in Chapter 4.

c. Compare differences in elite perceptions of the inclusion and role of independent smallholders against elite perceptions to participate, including profit or resource related and knowledge related reasons, and provide insights into elite perceptions of underlying power relations between independent smallholders and elites.

Chapter 3: Does oil-palm production impact rice production in Thailand? A country level analysis.

Introduction

First-generation biofuel production is often linked to food security, especially from the perspective of land use. In terms of the crop production for biofuel end use, the crops produced are typically cash crops grown in monocropping systems. In the Thai case, these cash crops are palm oil and sugarcane; and their cultivation is expected to increase in coming years due to increasing targets for biofuel use in Thailand's renewable energy policy. Biofuel use targets have been a substantive part of Thailand's renewable energy policy and will continue to be significant in the future. According to the most recent Alternate Energy Development Plan (AEDP 2018-2036), Thailand aims for 30% of power generation via renewables, with biofuels playing a leading role in this plan as biofuel production is expected to quadruple to 253 million liters of biodiesel and bioethanol per day, accounting for nearly a quarter of renewable fuel demand (Ministry of Energy, Thailand, 2018). The majority of this demand is expected to be met by first-generation biofuels at least in the initial to medium term, as the development of later stage biofuels is still in the research and development phase and not near commercialization (Ministry of Energy, Thailand, 2018).

Both oil-palm and sugarcane are flex-crops, which are crops that have diverse and flexible uses for fuel, food products and other industrial or commercial uses. Oil

palm has multiple uses, for example: palm kernel oil, which is used for food and soap products, palm kernel cakes, crude palm oil products such as Carotino Premium, which is used for cooking oil and/or vitamin production, palm olein which is used for cooking oil, deep frying or frying in industrial food processing, margarine production, palm stearin which is used for cleaning products, cosmetics and margarine, as well as biodiesel, which is used for fuel purposes (Alonso-Fradejas, Liu, Salerno, & Xu, 2015). Sugarcane is the world's largest crop, with diverse food related and non-food-based uses; for example, the food uses of sugarcane include sucrose, molasses, rum and animal feed, whereas the non-food uses of sugarcane include ethanol for liquid fuel and steam energy from bagasse (fibrous waste material of cane stalks) (Borras, et al., 2018). The impacts of the increasing influence of flex crops include food insecurity, unclear benefits in terms of renewable energy use, competing uses of flex crops with other land uses and issues of crop quality and safety due to continuous modification (Borras, et al., 2018)

However, oil palm and sugarcane have very different growth cycles. Whereas oil palm has a long growing cycle, sugarcane has a short growing cycle. Oil palm is one of the most important crops globally as 40% of all traded vegetable oil can be sourced from oil palm (Murphy, Goggin, & Paterson, 2021). The process of seed to harvest in oil palm production represents a significant time investment. Prior to being planted on the field, oil palm seeds are first cultivated in a nursery for a period of 12 to 13 months; the process of growing the seeds and planting them in the field

requires inputs of suitable land, seeds, water, fertilizer and herbicides (Willems, 2015). The oil palm saplings grow and start to bear fruit after 2.5-3 years, and the fruit is ready to harvest after a total of five years; no machines are needed at the harvest stage as the fruit is manually harvested (Willems, 2015). An oil palm tree has a natural life of over 30 years, however the tree is often replanted after 25 years as the height gets too inconvenient for maintenance and harvesting (Willems, 2015). While intercropping is possible with oil palm, it becomes more difficult as the oil palm matures, as crops planted with oil palm compete for resources (ETA, TBI, 2021). Moreover, the region of intercropping typically represents a minority of the land planted. In addition, palm oil is typically grown as a monocrop as knowledge about intercropping oil palm is rare (Serrano, 2020).

Sugarcane production on the field comprises “field preparation, plant cane farming, treatment and harvesting” (Silalertruksa & Gheewala, Environmental sustainability assessment of bio-ethanol production in Thailand, 2009). Farmers first prepare the land by ploughing, then sections of cane are planted, followed by irrigation and treatment, and finally harvesting (Silalertruksa & Gheewala, Land-water-energy nexus of sugarcane production in Thailand, 2018). Initially, sugarcane is grown via small sections of cane called plant cane; the grown cane is cut and regrown (ratoon cane) for three to four years before replanting with new cane sections (Silalertruksa & Gheewala, 2009, Silalertruksa & Gheewala, 2018). Whereas planting is mostly mechanized via billet planters, for harvesting, the manual method is still typically

used together with cane trash burning prior to harvest (Silalertruksa & Gheewala, 2018). The crop cycle for sugarcane varies by the type planted and the region it is planted in; the time to maturity for harvesting is normally considered to be between ten and fourteen months, or a year on average (Manivong & Bourgois, 2017). Due to the longer timeframe for oil palm growing, it is more difficult to change the type of crop grown once the decision to plant oil palm has been made. It is relatively easier and much quicker to prepare a field to be converted to some other crop from sugarcane. This makes studying the dynamics of oil palm from annual data more feasible than studying sugarcane dynamics as the time frame for decisions for sugarcane production is shorter.

While past studies have studied the tradeoff between palm oil and rice, they have done so on a regional level or for a limited time period. For example, Saswattecha et al found that land converted to grow oil palm was mainly converted from existing cropland, including prior rice cropland, in the Tapi river basin (Saswattecha, Hein, Kroeze, & Jawjit, 2016). Dumrongrojwatthana et al find that land use change to oil palm due to price supports for oil palm constitutes a threat to rice farming in on the Sathing Phra peninsula in Southeast Thailand (Dumrongrojwatthana, Wanich, & Trébuil, 2020). Gheewala et al find that rice production is impacted by oil palm production in the years 1991-2012 (Kochaphum, Gheewala, & Vinitnantharat, 2015).

No recent study has done this across provinces in Thailand based on crop data. This is a gap in the literature as no study leads up to the period of the most recent AEDP.

This chapter will consider broad descriptive trends regarding the impact of increased production of palm oil on rice, the major food crop in Thailand. To that end, this chapter will examine how oil palm and rice are linked at the national level using data from all seventy-six provinces in Thailand. The rationale for this chapter is that while the literature includes studies on specific regions in Thailand and models with future projections, there has not been an effort to examine the impact of increased flex-crops for fuel production on staple food crops in Thailand using already existing data. This study will serve as an introductory component to develop the main framework for analyzing the role of independent smallholders in sustainability bodies for oil palm in the following chapters.

Data Collection

This chapter considers data from 1984-2017 to analyze trends in oil palm and rice plantations. The data themselves come from Thai statistical yearbooks. The Office of Agricultural Economics (OAE) under the Ministry of Agriculture and Cooperatives (MOAC) publishes annual yearbooks with annual agricultural data. These data are primarily collected by the Center for Agricultural Information (CAI) and regional OAE offices, and aided by efforts from other agencies in the MOAC, including the Ministries of Commerce, Defense, Finance, Information and Communications Technology and Natural Resources and the Environment. These efforts are

supplemented with information from the Food and Agriculture Organization (FAO) at the United Nations and the United States Department of Agriculture (USDA). The agricultural data provided include production statistics for crops, fisheries and livestock. Crop data are classified into food, fiber and oil crops per the Thailand Standards Industrial Classification and include data for rice and oil palm production. Rice is classified as a food crop whereas oil palm is classified as an oil crop.

Yearbooks are in Thai, with some English translation. At the time of collection, some of the thirty-three relevant yearbooks were available online, whereas others only in paper format at the library of the Office of Agricultural Economics. A Thai translator helped scan the yearbooks that were not available online, as well as locate the appropriate pages and sections for relevant data. The yearbook data was then manually compiled into a usable format as data files were not directly available.

Crop data on area planted, area harvested, production weight and yield were collected for oil palm and rice. Data were categorized by year, region, and province.

Annual crop data are available by geographical regions and provinces in Thailand. The classification of regions used in the agricultural statistics yearbooks is different from the typical classification of Thai provinces into five regions. In the yearbooks used, Thailand is divided into four regions: northern, northeastern, central and southern, each of which comprise some of the total seventy-six provinces of Thailand. The northern region comprises seventeen provinces including Chiang Rai, Phayao, Lampang, Lamphun, Chiang Mai, Mae Hong Son, Tak, Kamphaeng Phet,

Sukothai, Phrae, Nan, Uttaradit, Phitsanulok, Phicit, Nakhon Sawan, Uthai Thani and Phetchabun. The northeastern region comprises nineteen provinces including Loei, Nong Bua Lam Phu, Udon Thani, Nong Khai, Sakhon Nakhon, Nakhom Phanom, Mukdahan, Yasothon, Amnat Charoen, Ubon Ratchathani, Si Sa Ket, Surin, Buri Ram, Maha Sarakham, Roi Et, Kalasin, Khon Kaen, Chaiyaphum and Nakhon Ratchasima. The central region comprises twenty-six provinces including Saraburi, Lop Buri, Sing Buri, Chai Nat, Suphan Buri, Ang Thong, Ayutthaya, Nonthaburi, Bangkok, Pathum Thani, Nakhon Nayok, Prachin Buri, Chacheongsao, Sa Keo, Chathaburi, Trat, Rayong, Chon Buri, Samut Prakan, Samut Sakhon, Nakhon Pathom, Kanchanburi, Ratchaburi, Samut Songkhram, Phetchaburi and Prachuap Khiri Khan. Finally, the southern region consists of fourteen provinces, namely Chumphon, Rayong, Surat Thani, Phangna, Phuket, Krabi, Trang, Nakhon Si Thammarat, Phattalung, Songkla, Satun, Pattani, Yala and Narathiwat.

Data compiled by the OAE have been used with some regularity to identify trends in oil palm and rice production. For example, Gheewala et al's study used OAE data on area planted and area harvested for various crops to ascertain whether oil palm driven land use change worsens GHG emissions (Kochaphum, Gheewala, & Vinitnantharat, 2015). OAE crop data are frequently referenced in USDA grain and feed annual (GAIN) reports for Thailand while conducting various analyses.

Data Analysis

Descriptive Statistics

Table 7 shows the mean and standard deviation of each variable.

Variable name	Total N	Mean	SD
Oil palm planted	1950	42488.75	145201.74
Oil palm harvested	1950	30492.04	123669.54
Oil palm yield	1950	1231.42	880.41
Oil palm produced	1950	92889.51	378606.60
Rice planted	1950	852586.93	904539.23
Rice harvested	1950	792069.28	813968.60
Rice yield	1950	731.58	14599.22
Rice produced	1950	286156.24	277148.40

Table 7: Summary statistics of key variables in rai

Detailed descriptive analyses were run for each of the 76 provinces. The example below is for the province of Patum Thani.

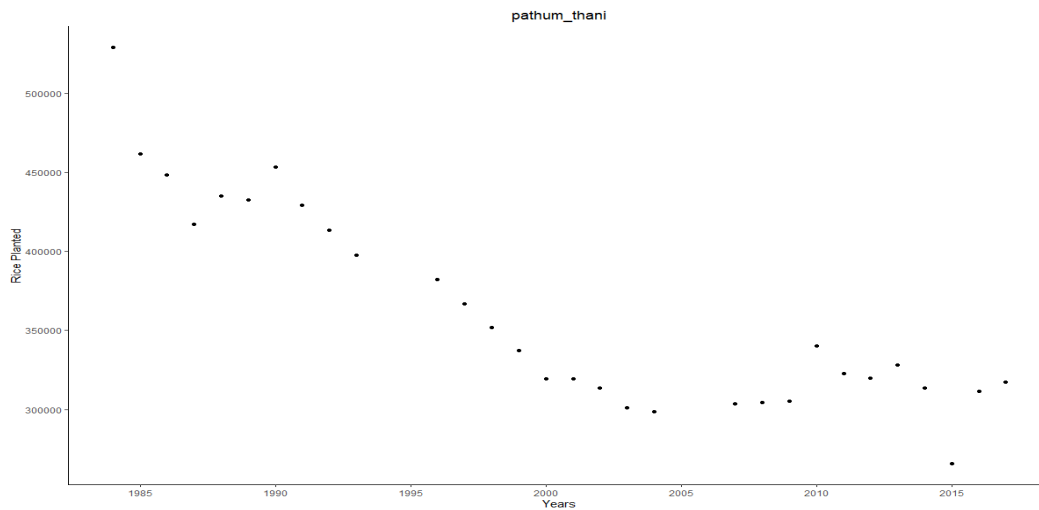


Figure 4: Rice planted over time

Figure 4 above shows that rice planted generally declined over the considered time period.

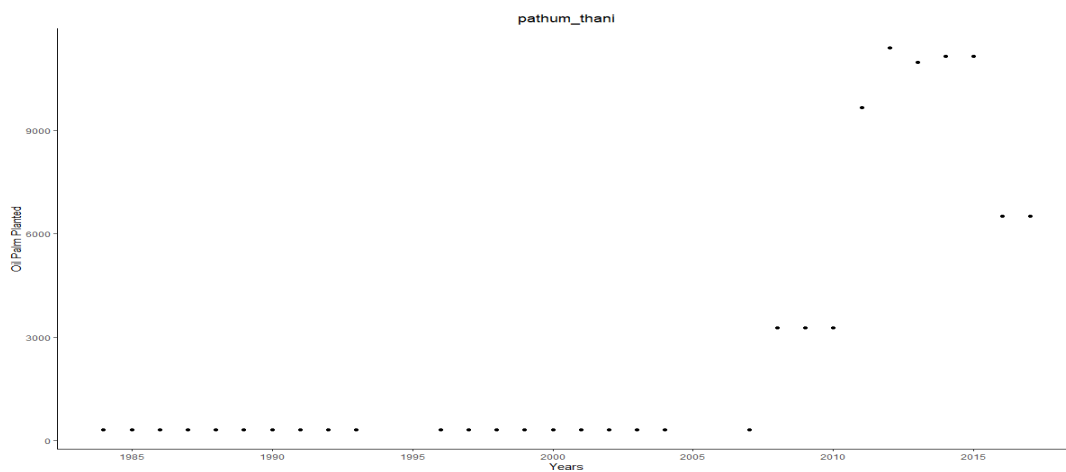


Figure 5: Oil palm planted over time

By contrast, figure 5 shows that the amount of oil palm planted generally increased.

Similar visualizations were generated for all the variables for which data were collected for each province in the considered time period.

Based on these and a network model exercise outlined in the appendix, the following section provides some inferences.

Overall

Oil palm and rice are likely related by complicated dynamics, which are more extensive within provinces than across. In the temporal network, annual planted rice and annual produced rice predict oil palm variables in the subsequent year, but the direction is not reversed within a prototypical province. In the annual network, oil palm harvested and oil palm produced are associated with rice variables, and rice yield is associated with oil palm variables. There are no associations between rice variables and oil palm variables in the between network. Given these trends, at least three inferences can be made:

- (1) Rice produced is likely temporally linked to oil palm planted and oil palm harvested, so oil palm production decisions may be indirectly linked to rice plantation decisions from a temporal perspective within a province.
- (2) In the contemporaneous network oil palm produced, oil palm harvested and rice yield are likely are associated; however, oil palm harvested is likely negatively associated with rice yield whereas oil palm produced is likely positively associated with rice yield. These dynamics may indicate a latent

variable impacting oil palm harvested and rice yield as well as oil palm produced and rice yield within a prototypical province each year.

- (3) Given the likely lack of association between oil palm and rice variables in the between network, there may not be consistent associations between oil palm and rice across provinces as well as across time. This would indicate the need to deeply examine within province dynamics for each individual province to obtain overall country level insights between rice and oil palm in Thailand. This finding may not be surprising considering that unlike Indonesia and Malaysia, Thailand has a large number of independent smallholders involved in producing oil palm, so the dynamics of these smallholders may have both random and province limited undercurrents.

Importance of such considerations

This is the first recent consideration of how oil palm and rice are linked in Thailand to use agricultural yearbook data across provinces to provide insights on possible temporal and contemporaneous associations between rice and oil palm variables in the prototypical province in Thailand. This is also the first study to attempt network approach to examine links between oil palm and rice variables using a multi-level VAR (1) model, indicating these associations may hold when a nomothetic (country-level) approach to modeling is used as opposed to an idiographic (single province) approach.

Limitations

This effort does have a number of limitations. First, although rice and oil palm are the staple crops in the areas of major food crops and major oil crops, other crops are grown in these categories that may significantly influence individually or jointly the dynamics of rice and oil palm production in Thailand. Second, the dynamics identified while indicative of what is happening given the long period of implementation of biofuel crop promoting policies, cannot be linked to a specific policy. Next, the network modeling framework limits the type of estimated relationships to linear relationships between variables. It is possible that oil palm and rice variables are linked through higher order relationships. Finally, as this effort is constrained to Thailand, the results cannot be generalized to other oil palm producing countries with a large number of smallholders, but can provide an approach to initially study the dynamics between staple food cereal and crops for biofuels in these countries.

Strengths and directions for future research

This effort demonstrates that there are grounds to study the links between oil palm production and rice production in Thailand, and it cannot be assumed that oil palm production does not impact rice production. Next, the effort provides recent directions supporting Gheewala et. al's conclusion that oil palm planted area does affect rice planted area in the period of 1991- 2012 (Kochaphum, Gheewala, & Vinitnantharat, 2015) giving reason to continually examine the sustainability of crop

production for biodiesels in Thailand. Third, the effort provides support for the need for empirical rather than estimated data on the amount of oil palm grown that is used to produce biofuel. Future research would include conducting state level analyses of crop data to parse out the dynamics of how oil palm and rice production are related, potentially examining for the impacts of biofuel policy if the policy was implemented in different regions of a state in different time periods. An intra-state network approach would be useful to describe the complex dynamics that link rice and oil palm production. Fourth, this effort could help with a triangulation approach for inference for studies that use other sources of data. Next, the results indicate the need for qualitative studies specific to province that gather granular insights on what motivates growers to shift from rice to oil palm and vice versa, as well as the reasoning that underlies their production decisions. Such studies could shed light on potential latent variables. In summary, the results of this effort combined with prior studies indicate a need for caution when examining whether biofuel crops impact staple food crops.

Chapter 4: Are the RSPO's claims regarding including independent smallholders in its vision of sustainability substantiated on the ground? A framework and hypotheses for assessing the claim by examining differences in perception of independent smallholder inclusiveness between elites and smallholders

As previously discussed, significant variation exists in process of inclusiveness in multi-stakeholder initiatives (MSIs) that govern crops for first-generation biofuel production, leading to the marginalization of specific categories of stakeholders who have very little power. Producer stakeholders frequently are marginalized and rarely included, even in terms of policy documents in MSIs. Roundtables are a common type of MSI with multiple categories of stakeholders. They claim legitimacy based on stakeholder inclusion, but the evidence on actually including all categories of stakeholders is unclear at best, calling into question the effectiveness of roundtables in sustainability governance. Roundtables depend on the concept of democratic destabilization that characterizes the experimentalist governance they leverage. The possibility of democratic destabilization is called into question due to the previously discussed issues with producer inclusion. Problems that exist in the process of governance itself can be categorized into political economy types- where one group manipulates another to gain disproportionate influence or post-structuralist types; where only accepting certain knowledge types excludes those that cannot use those to contribute to the discussion, thereby “steering the narrative” towards those who can utilize the accepted knowledge formats.

This paper provides a conception of what inclusion could mean in the context of a roundtable; specifically, for the case of independent oil palm smallholders in Thailand who engage with the Roundtable on Sustainable Palm Oil (the RSPO). While equity, participation and agency are frequently discussed in the context of inclusion, there is a lack of clarity in terms of how these concepts can be operationalized to assess inclusion of marginalized stakeholders. Further, it is useful to have these concepts included as part of an overall framework as that allows for more cohesive evidence for the level of inclusion of marginalized stakeholders.

Oil Palm smallholder considerations in the RSPO in the context of Thailand

The RSPO is a more recent fixture in Thailand as compared to Indonesia and Malaysia, and the RSPO in Thailand has had more of a focus on smallholders. In the Thai case, a multi-stakeholder group coalesced in 2009 to develop national interpretations of the RSPO principles and criteria, which were approved by the RSPO Executive Board in July 2010 (Dallinger, 2011). Owing to the predominance of smallholder rather than large scale plantation production of oil palm in Thailand, the RSPO recommended initiating a procedure to develop guidance and criteria for smallholders, which was initiated in September 2010 (Dallinger, 2011).

Smallholders are defined as owning land less than 50 hectares and on average, they cultivate 4 hectares of land compared to large plantations, which on average cultivate 800 hectares (Degli Innocenti & Oosterveer, 2020). In Thailand, estimations vary from 70% or more of all oil palm production originating from independent

smallholders (RSPO, 2015). Most smallholders are not directly contracted by a mill and instead must rely on local intermediaries to supply their fresh oil palm produce (FFBs) to the crushing mills that extract the palm oil from the oil palm fruit (Degli Innocenti & Oosterveer, 2020). These local intermediaries have become a larger source of service provision, from transportation services to support with planting, pruning, fertilizing and harvesting of oil palms (Degli Innocenti & Oosterveer, 2020). The local intermediaries also are the bargainers with the mills, in addition to collecting large volumes of FFBs from smallholders; a mill may cultivate ties with multiple local intermediaries to ensure their supply needs are met all through the year.

It was recognized at the time of initial approval of Thai national interpretation of RSPO principles and criteria that smallholders compared to large firm plantations would find it more difficult to comply with the management requirements of the RSPO principles and criteria. In addition, multiple elite stakeholders recognized that smallholders would need assistance with the costs of certification, in addition to incentives to become certified (Dallinger, 2011). In particular, independent compared to schemed smallholders would need assistance selling their produce directly on the market. It was also recognized that smallholders organizing themselves into groups could make the process of certification easier and more efficient. Independent smallholders were subsequently required to comply with the RSPO standard for group certification in addition to the general RSPO principles and

criteria to get their produce RSPO certified (Dallinger, 2011). The Thai voluntary good agricultural practice (GAP) standard subsetting to RSPO principles and criteria are summarized in table 8 below.

RSPO Main P&C or Execution Criterion	Description
PRINCIPLE 1	Ethical and Transparent Behavior
Practice 1.1	Notify group manager of all visitors and requests
Practice 1.2	Group policy must be accepted and agreed
PRINCIPLE 2	Conform with pertinent laws and regulations
Practice 2.1	Endorse group agreement to abide by all pertinent laws and regulations
Practice 2.2	Establish perimeter of land and demonstrate legal proprietorship or lease, have record with history of land tenure and accurate legal usage of land
Practice 2.3	Exhibit the accreditation owning land for the purpose of an oil palm plantation
PRINCIPLE 3	Pledge to financial and economic feasibility for the long- term
Practice 3.1	Smallholder groups devise an annual business plan addressing long term economic viability of their ventures. These plans must consider costs related to yearly maintenance, possible expansion, replanting, and long-term feasibility of certification.
PRINCIPLE 4	Growers and millers use applicable best practices
Practice 4.1	Farm management practices
Sub- Practice 4.1 a	Plantation Management
Indicator 4.1.1	No burning of land in preparation of replanting or new planting
Indicator 4.1.2	Appropriate density, slope and sunlight considerations for plantation design
Indicator 4.1.3	Plot contains sub-road for drainage and transportation purposes
Indicator 4.1.4	Weeding around oil palms and oil palm rows at a minimum of twice annually
Indicator 4.1.5	No pruning of oil palm in 1 st 30 months, subsequently pruning for maintenance once annually
Indicator 4.1.6	Plot layout of appropriate shape
Indicator 4.1.7	Quality of oil palm seedling- reliable source, and appropriate age (8-10 months) and other measures depending on variety of oil palm
Sub-Practice 4.1 b	Pest, Insect and Disease Regulation
Indicator 4.1.8	Assess prevalence of Ganoderma disease in oil palm trees as well as infestation of pests, including leaf eating caterpillar, rats, rhinoceros beetles, rose beetle, and other pests
Indicator 4.1.9	Deploy pest and disease control methods when prevalence crosses economic threshold

Indicator 4.1.10	Deploy preventative pest control methods
Sub-Practice 4.1 c	Management of Fertilizers
Indicator 4.1.11	Send leaf and soil samples for laboratory tests for the purpose of fertilizer management
Indicator 4.1.12	Use fertilizer type, quantity and frequency depending on laboratory analysis of leaf and soil samples
Indicator 4.1.13	Perform appropriate checks for soil moisture and remove weeds prior to fertilizer application. Eschew fertilizer application in the events of drought or excessive rain
Indicator 4.1.14	Apply fertilizer appropriate to land slope- apply around tree cluster and for sloped areas, apply to mitigate fertilizer deficits due to leaching
Sub-Practice 4.1 d	Harvest Management
Indicator 4.1.15	Schedule harvest based on appropriate measures of ripeness of palm oil fruit and preparing for sales every fortnight to 20 days
Indicator 4.1.16	Retrieve all loose fruit from plot
Indicator 4.1.17	Decrease or stop activities that would lead to oil palm fruit being contaminated, e.g. maintain vehicular cleanliness
Indicator 4.1.18	Deliver oil palm harvest to collection point (middlemen or mill) within 24 hours of harvest
Sub-Practice 4.1 e	Administrative management
Indicator 4.1.19	Maintain appropriate farm records relating to endeavors for oil palm production
Indicator 4.1.20	Maintain records of training field personnel, e.g., for occupational safety and health, Integrated Pest Management execution and pesticide use
Practice 4.2	Use of Pesticides
Indicator 4.2.1	Be aware of current knowledge regarding various potential pests and applicable chemical use, as well as checking for pesticide source reliability and container safety
Indicator 4.2.2	Only use pesticides registered by the Department of Agriculture
Indicator 4.2.3	Apply best practices based on group consensus to pesticide storage
Indicator 4.2.4	Use appropriate protective wear like masks and gloves while applying pesticides
Indicator 4.2.5	Circumvent pesticide use near sources of water
Indicator 4.2.6	Correctly dispose pesticide containers
Practice 4.3	Measures related to Occupational Health and Safety
Indicator 4.3.1	Pregnant or breast-feeding women do not handle pesticides
Indicator 4.3.2	Group manager assesses occupational health risk due to farm work with workers
Indicator 4.3.3	Workers use relevant protective equipment for various farm activities
Indicator 4.3.4	Members and workers do blood tests for chemical contamination in the event of chemical usage
Indicator 4.3.5	Group manager apprised of all farm accidents

Indicator 4.3.6	First aid kit is available on work site in the event of field activities
Indicator 4.3.7	Farm equipment like harvesting tools and lawn mowers are always checked
Indicator 4.3.8	Harvesting tools are stored in location safely away from children
Practice 4.4	Management practices address sustainability issues
Indicator 4.4.1	Soil conservation practices such as those for improving moisture and mitigating erosion are practiced
Indicator 4.4.2	Integrated Pest Management techniques are practiced
Principle 5	Responsibility towards the environment, including preserving biodiversity and natural resources
Practice 5.1	Knowledge of the environmental risks resulting from oil palm farming
Practice 5.2	Rudimentary knowledge of High Conservation Value (HCV)
Practice 5.3	Be aware of the RTE species of oil palm and HCV plants from HCV assessment via communication with group manager
Practice 5.4	Contribute to the HCV assessment and participate in the implementation of the HCV monitoring and management plan to conserve or enrich HCVs.
Practice 5.5	Acquaint farm workers with RTE species and their status, as well as related punitive measures.
Practice 5.6	Formulate a plan for waste management and disposal that is conveyed to all workers.
Practice 5.7	Communicate and enforce no-burning for land preparation
Practice 5.8	Get assessment and approval of group manager for use of fire prior to burning
Principle 6	Employees, individuals and communities affected by millers and oil palm producers are treated responsibly
Practice 6.1	Growers and millers comprehend the social risks of their activities and have plans to mitigate these impacts
Practice 6.2	Growers and millers comprehend the group's communication and consultation practices
Practice 6.3	Growers and millers implement recorded grievance procedures and communicate these to all workers.
Practice 6.4	Grievance procedure will document the procedure used for dispute resolution and its outcome as relevant to scale
Practice 6.5	Group manager's assistance can be formally requested to ensure compliance with grievance procedure
Practice 6.6	Child labor policies are communicated and implemented
Practice 6.7	Group policies are communicated and implemented
Practice 6.8	Growers comprehend the purchasing mechanism of the buyer
Principle 7	New plantings are cultivated responsibly
Practice 7.1	Growers and millers are aware of the environmental and social risks of their operations

Practice 7.2	Comprehend management plan to prevent or reduce negative environmental and social impacts
Practice 7.3	Facilitate confronting negative environmental and social impacts in a consultative manner
Practice 7.4	Demonstrate correct comprehension of soil category and its appropriateness for planting oil palm
Practice 7.5	Ensure any new plantings from 2005 onwards have not taken the place of primary forest on any area designated for maintenance or augmenting HCVs
Practice 7.6	No plantings on marginal and fragile soils, including peat
Practice 7.8	No preparation of land via burning other than situations applicable under relevant policies
Principle 8	Pledge to improving continuously in major areas of operation
Practice 8.1	Contribute ideas and insights to Group Action Plan for continually improving by considering actions growers can implement to reduce primary negative environmental and social impacts
Practice 8.2	Record individual practices regarding use of fertilizer, pesticide application, production of FFBs via the standardized template supplied by the group manager
Practice 8.3	Review timing of replanting program with the group manager

Table 8: Thai GAP standard subsetting to RSPO principles (National Bureau of

Agricultural Commodity and Food Standards & Ministry of Agriculture and

Cooperatives, 2013)

The execution of RSPO principles via the GAP standard in Thailand does not specify where growers are involved in contributing to the development or revision of these principles. In fact, the majority of actions attributed to growers are execution actions, and they are supervised by the group manager. The actions are largely geared towards growers complying with the RSPO standard, such as under principles 2-7. Under principle 8, the ideas of growers are towards their own group action plan, and are implicitly vetted by the group manager.

Stakeholder participation in RSPO governance

Elite and non-elite members comprise the RSPOs seven stakeholder categories. These categories are: oil palm growers, oil palm middlemen, manufacturers of oil palm-based consumer products, sellers of oil palm-based consumer products, investors and banks and non-governmental organizations dealing with either environmental or development issues. Elite members are characterized by their high negotiating power, influence, capital resources and access to multiple knowledge networks within the formal governance and informal structures of the RSPO. Elite members comprise at least oil palm middlemen, manufacturers, sellers, investors and banks because of their control over smallholders for money purposes as well as some attending NGOs because some of these are influenced heavily by corporate interests. Moreover, larger NGOs that attend have incentives to engage at the larger scale to expand their own scope, but frequently have little on the ground power to execute what they advocate for (Wicke, 2019). In addition, NGO members comprise the minority of RSPO membership- their proportion was 1.2% as of 2013 and they remain in the minority for attendance at the RSPO GA (see Figure 6)(Nesadurai, 2013).

Trends in meeting attendance by various categories of stakeholders intimate the proportionally larger influence of elite members in the General Assembly. Table 9 provides attendance totals and smallholder percentages at RSPO General Assembly meetings between 2010 and 2019, gathered from meeting minutes provided by the

RSPO. In addition, smallholder attendees include here both independent and schemed smallholder representatives, with no breakdown by type provided in meeting minutes. On average, smallholder representatives comprised a third of all attendees between 2010 and 2019, and a majority of the remainder comprised attendees from the processor, consumer goods manufacturer, retailer and bank categories of stakeholders, who are elites. Similar trends can be located for the board of governors in the RSPO. Over the period of 2004-2015, about a third of RSPO Board of Governor members of the developmental North(Kruuse et al., 2019).

Year	Total	Grower Number	Grower Percentage
2010	187	52	0.278
2012	353	63	0.178
2013	216	53	0.245
2014	165	50	0.303
2015	172	45	0.262
2016	165	54	0.327
2017	103	31	0.301
2018	130	49	0.377
2019	160	60	0.375
AVERAGE	0.294		

Table 9: Participation in the General Assembly participation of growers in the General Assembly from 2010-2019. (RSPO, 2021)

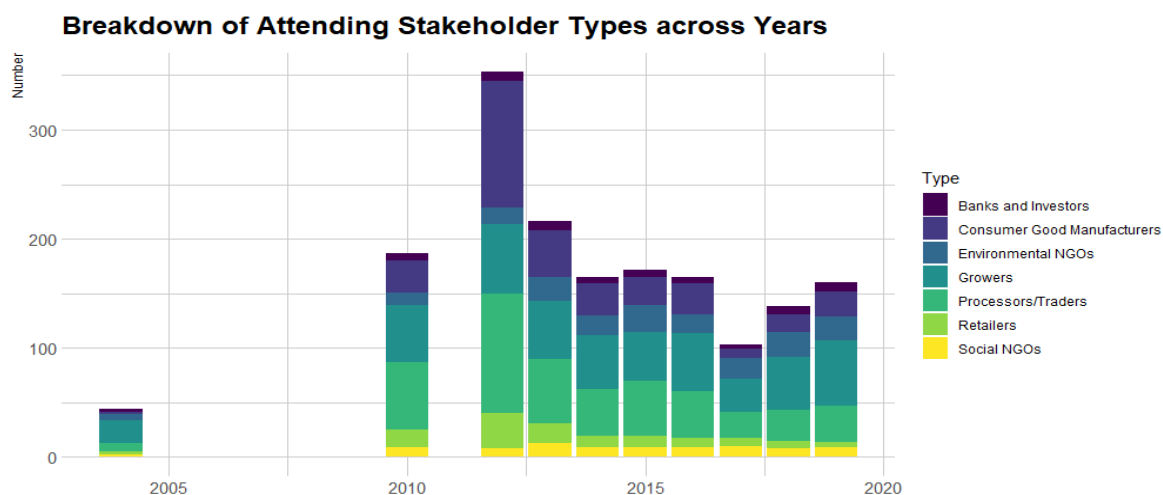


Figure 6: Breakdown of attending stakeholder types to the RSPO GA

Prior literature has noted that key issues with the RSPO include that RSPO sustainability certification can be onerous and costly on smallholders, who are then designated a lower participatory role or excluded altogether, and that smallholder concerns “tend to be less visible in public debates about palm oil and the RSPO that emphasize palm oil’s environmental unsustainability but...are no less important for those whose livelihoods” are determined and may be “undermined by oil palm cultivation” (Colchester 2011, Nesadurai 2013). There is therefore a real need to explore what it means for there to be an equitable process for inclusion in the first place, and whether such a process exists in the RSPO to include smallholders as it is central to how the RSPO would consider the concept of sustainability.

Smallholder growers can be of two categories: schemed and independent.

Independent smallholders, as opposed to schemed smallholders, are not formally

bound by contract to a specific mill and in theory do not have restrictions on what they can do with or grow on their land beyond laws that apply to everyone.

However, in practice, independent smallholders face many limitations. Oil palm producers, particularly smallholders, frequently fall into the non-elite category of stakeholders due to their reduced income, social status, native land and current work with oil-palm agro industries (Nkongho et al., 2014). In addition, independent smallholders' low negotiating power could lead to structures where they comply with restrictions from a mill or middlemen not due to formal contracts, but due to income incentives and the lack of other options.

While the RSPO has developed a specific plan for ease of inclusion of independent smallholders, the outlined vision and objectives are caretaking rather than agency focused. Independent smallholders must form a group in order to be certified, and this necessarily creates a hierarchy structure with a group of independent smallholders being led by a group manager. The RSPO certification is then awarded to the group as a whole after the group demonstrates that it has complied with various certification requirements. In particular, the plan outlines different tasks for independent smallholders vs. group managers. Whereas group managers have supervisory and information-acquisition type tasks, smallholders have compliance-based tasks. In addition, good governance is nodded to in the people part of the strategy, but not codified in any specific way. Some of this can be attributed to vagaries in context; however, no specific mention is made to the right to agency of

smallholders. All this is in addition to the lack of understanding of how specifically independent smallholders are represented in the RSPO's general assembly and board of governors. The current Board of Governors has a number of corporation based representatives that could feasibly address schemed smallholders, but none that is clearly representative of independent smallholders (RSPO, 2021b).

While there is a smallholder standing committee designated as a governing body for smallholders, its leverage and inclusiveness in terms of independent smallholder representation remains unclear. For instance, the composition of the body in the terms of reference of the Smallholder Standing Committee (SHSC) designates a single smallholder representative for four major palm oil growing countries (Malaysia, Indonesia, Thailand and Papua New Guinea) and one representative each for major palm oil growing regions of Africa and Latin America (RSPO, 2020). It is unclear whether these smallholder representatives are for schemed or independent smallholders, who have fundamentally different issues as they interact with each other, middlemen and corporations in differing ways. In addition, the mandate for the SHSC encompasses executing of the RSPO Smallholder Strategy, decision-making during implementation of the strategy, forming a "Working Group or a Task Force responsible for delivering a specific output of the strategy", supervising the budget for implementing the smallholder strategy as well as recounting matters concerning smallholders to the board of governors (RSPO, 2020, p. 3). The mandate is primarily for execution of the strategy rather than making the strategy itself or revisions to it,

and it is unclear how matters concerning smallholders are brought up or documented. In addition, the smallholders affiliated with smallholder organizations rather than corporations in the list of substantive members are region specific but limited to Indonesia and West Africa, so their familiarity with country specific issues that independent smallholders face is unclear.

The RSPO's smallholder strategy addresses the role of smallholders in terms of their incentives to participate and their economic wellbeing. For example, the RSPO itself describes the smallholder strategy as "a five-year action plan, endorsed by the RSPO Board of Governors, which strategizes the RSPO's approach to include more smallholders" as part of the larger RSPO vision to "transform markets and make sustainable palm oil the norm" (RSPO, 2016, 2018, 2021a). Essentially, the document describes the smallholder's role as needing to strategically fit within the RSPO. The base assumption is that it is the RSPO's vision to transform markets and define what is sustainable, and the smallholder needs to fit in to this larger vision rather than shape it.

The RSPO sees the role of smallholders as fundamentally incentive-focused, and as such smallholder incentives to participate in RSPO certification are viewed in terms of improving their livelihoods. In fact, the two working groups stemming from the SHSC are the livelihood working group and the certification working group (RSPO, 2021c). The three areas of impact defined by the RSPO are reflective of a top-down vision of smallholder inclusion as seen from the standpoint of the elites. The three

impact areas are as follows: prosperity, which focuses on optimizing “productivity, efficiency, positive impacts and resilience”; people, which emphasizes poverty reduction, sustainable livelihoods and the upholding of human rights defined by the RSPO as following legal requirements, upholding land rights, and respecting “community wellbeing”; and planet, reflecting preservation and conservation goals for ecosystems and more broadly the environment in general (RSPO, 2021a). However, the envisioned incentives for smallholders are limited to goals associated with the prosperity and people areas. Moreover, the concept of human rights and what role they play is ill-defined.

Equity frameworks in biofuel sustainability assessments: structural equity and its importance for participation

While equity concerns regarding biofuel sustainability assessments have been frequently raised in the literature, little work addresses in-depth incorporation of equity into these assessments. Blaber-Wegg et. al’s review of the impact of biofuels on equity highlights the dearth of equity considerations in formal methods of sustainability appraisal in the literature, and the subsequent insight that incorporation of manifold perspectives and stakeholder voices within sustainability assessments are likely to help mitigate inequities across various dimensions. Several studies have discussed individual aspects of equity in oil-palm producing regions (Blaber-Wegg et al., 2015). For example, Yengoh and Armah illustrate the increased need for locally focused land needs assessments as a result of the tradeoff between

land allocated for increased feedstock production and other needs locals express, such as preferences for increased biodiversity, food production and other culturally relevant uses (Armah et al., 2011). However, few models defining equity and its components have resulted from the widespread recognition that equity challenges in biofuel sustainability assessment necessitate clear frameworks for assessing equity.

Existing models of equity frequently identify various aspects of equity that clarify what equity entails and enable assessment of equity aspects of sustainability certification schemes for biofuels. McDermott et. al's framework for equity identifies three key dimensions of equity as well as recognizes different dimensions of equity may need to be prioritized given context, an issue they term parameter-setting. Key parameters are the framing of equity goals and the envisioned outcomes for equity across three defined dimensions of equity: procedural – whether stakeholders have equal vote, structural – whether stakeholders have equal capacity to participate and secure advantages, and distributive – whether risks and benefits are shared equally among stakeholders (McDermott, 2013). A key component of the structural component of equity is the capacity of stakeholders to access engagement, i.e. to participate.

The structural component of equity is fundamental to achieving it as it determines access to information and the ability to shape and maneuver narratives so as to make informed votes as well as understand the burden of risks and benefits. It is

widely recognized in the literature that being able to access and participate in making decisions is a vital aspect of equity in energy production systems (Eames & Hunt, 2013). For an example of first-generation biofuel production , in a comparative analysis of equity outcomes associated with three biofuel systems in Brazil, Ethiopia and Guatemala, Hodbod et.al show that different institutional settings led to “unequal opportunities for actors to access and participate in decision making” and conclude that enhancing equity in sugarcane-ethanol biofuel systems “will require greater openness in decision-making processes, in order that multiple voices are taken into account in the promotion, production and consumption of biofuels, particularly those of smaller and less powerful actors” (Hodbod et al., 2015, p. 211).

The engagement component of equity further has implications for energy justice, including within energy production systems such as first-generation biofuel production. Specifically, the engagement component of equity is a core component of procedural justice aspects and underpins recognition dimensions of justice related to energy production systems. Procedural justice entails access to decision-making processes” that manifest as “equitable procedures that engage all stakeholders in a non-discriminatory way” (Jenkins et al., 2016a, pp. 177–178). Drivers of calls for procedural justice include lack of access to multi-level legal or regulatory systems as well as non-regulatory stimuli such as norms, values, practices and behaviors (Jenkins et al., 2016b; Walker, 2009). Components of procedural justice include mobilizing local knowledge, increased disclosure of information and improved

representation in knowledge forming, decision-making and executing institutions (Jenkins et al., 2016a). Unequitable outcomes in the arena of procedural justice are strongly impacted by engagement concerns for marginalized stakeholders as their lack of access to engagement means that the process of arriving at and executing decisions cannot be considered equitable.

Recognition justice refers to the idea that individuals are not only tolerated, they are justly represented without repercussions of physical intimidation and are accorded full and equal political rights (Schlosberg, 2003). Marginalized stakeholders are frequently subject to lack of recognition due to political or cultural dominance of more powerful stakeholders, affronts, devaluation or misrepresentation of the views of marginalized stakeholders by labelling them inappropriate or subjecting them to contempt (Schlosberg, 2003). A call for recognition justice involves affirming differing perspectives embedded in the divergent socio-cultural and individual contexts of various stakeholders. Being able to engage stakeholders allows for the space to recognize divergent perspectives.

Placing equity considerations in a broader framework for sustainability: Bryan Norton's framework

The argument for equity, and therefore for engagement, builds on the literature that recognizes that including engagement considerations in sustainability governance will improve bioenergy sustainability outcomes in the long run. Reed's review of

studies regarding stakeholder involvement finds that stakeholder involvement can improve environmental decision-making due to more inclusive inputs; “however, the quality of decisions made through stakeholder participation is strongly dependent on the nature of the process leading to them” (Reed, 2008, p. 2417).

In terms of normative approaches to adaptive ecosystem management, Bryan Norton’s approach of a pragmatism centric approach to adaptive ecosystem management addresses the concerns outlined above by providing a coherent framework that starts from pluralistic values and explicitly recognizes the artificial fact-value divide that characterizes many such discussions in the policy literature. Other scholars in the policy literature agree with the usefulness of Norton’s framework for a range of areas with regard to sustainability at various scales. In terms of environmental ethics broadly, ethicists distinguish non-consequential (duty-based or deontological), consequential (for example, utilitarian) and virtue based moral systems (Newton, 2003). Baumgartner et al’s analysis of community progress and opportunities regarding tsetse control and sustainable rural development in Ethiopia recognizes the usefulness of Norton’s view that “several divergent moral theories, which do not even agree on the determination of environmental ethics issues, can nevertheless work together as part of a single moral enterprise even though their respective commitment in practice is based on very different theoretical considerations” (Afeissa, 2008; Baumgartner & Tikubet, 2012, p. 187). Rivera-Ferre et al argue that resolving the issue that agriculture on a global scale

may no longer be able to supply the world's demand for food requires acknowledging the intersubjective nature of knowledge, studied by various philosophical schools, and explicitly incorporating it into analyses of complex socio-ecological systems in the context of power relations in the decision-making process among the various stakeholders involved (Rivera-Ferre et al., 2013).

Norton's incorporation of pluralism underscores his stance that "what actually matters as regards the environment, is not so much taking principled stances, but rather developing rational aids to decision-making, so that the various actors can agree on what should be done and develop the concrete policy measures which need to be implemented" (Afeissa, 2008, pp. 73–78). Helpfully, Norton's framework also provides a process by which such decisions may be arrived at in an equitable manner as the successful definition of sustainability, according to Norton, is one that is arrived at via an equitable process that incorporates the voice of all stakeholders. Norton's schematic definition of sustainability, which provides some general groupings of values – "variables to be specified in more detail by the community through its local processes," thereby offers a prospective layout towards identifying what defines sustainable living for a particular community (Norton, 2005, p.359). In that regard, Rivera-Ferre et al emphasize that Norton's development of pragmatism is promising as it "may translate small policy changes into substantial steps forward at different spatial scales, even if seen globally in a different way and the leading principles/values of different groups defer" as it would "enable policy makers to

overcome the limitations of philosophical relativism and refrain from a denial of philosophical realism”; however, “[p]ragmatism should not lead to disregarding principles underlying ecological and social processes in decision making” (Rivera-Ferre et al., 2013, pp. 3858–3875). Similarly, Saner and Bordt “develop a new set of criteria for the evaluation of earth measurement frameworks” based on Norton’s approach to environmental ethics to “improve universal acceptance and uptake of complex earth measurement frameworks” (Saner & Bordt, 2016, pp. 74–81).

Norton begins his advocacy for pragmatic approach at value pluralism and subsequently advocates an experimental approach to environmental values, identifying the object of evaluation as possible development paths or scenarios that the relevant community could approach via picking appropriate policies. Norton is broad in his conception of how this will be implemented in that he assumes “a full-fledged evaluation of policy alternatives will be embedded in an organized process of adaptive ecosystem management and that this process will include some appropriate form of input from community members and groups, such as a stakeholders or a citizens advisory committee...various ‘voices’ from the community will advocate policies on values they hold dear” (Norton, 2005, p. 293). Norton identifies the ideal case as specific proposals identifying relevant indicators that can be utilized to track stated environmental goals; defining an indicator as “a measurable index of change in valued states of a system” (Norton, 2005, p.294). This implies that the indicator should be tied to the state of the system, a state that may

change with communities' choices about development paths. Norton's framework envisions participants in a public process who push for the safeguarding of values important to them by identifying and advocating a set of indicators most aligned with their preferred values as well as pushing for targets that maintain or attain stipulated criteria for those indicators. In addition, it is not problematic if there are coalitions supporting a diverse set of values behind a single indicator as this represents an opportunity to "form win-win strategies directed at achieving goals stated in terms of robust indicators with broad based support" (Norton, 2005, p. 294)

Norton envisages a management process that includes two main factors: "(1) a multidisciplinary public discussion of goals, supported by a policy evaluation effort that is comprehensive, integrative and multidisciplinary; and (2) a lively tradition of mission-oriented science" (Norton, 2005, p.294-295) Norton examines the potential of the evaluation process following from the management process, arguing for broadening "the scope of inquiry beyond static preferences" and establishing what he calls hypothetical constructs to evaluating policies via an ambulation comprising a "dynamic, iterative process in which deliberation, social learning, and accommodation are expected to occur" (Norton, 2005, p.298) . The concept of hypothetical constructs allows the deliberators to move away from aggregation and place more emphasis on trends and two types of hypothetical constructs: the ideal-outcome construct, defined as the policy that would affect the "outcome...if the

adaptive and deliberative process was ideal” and an ideal process construct of the form that “of a public, adaptive process fulfills conditions 1,2, 3,...n., then the eventual outcome of that policy process will be considered the ideal policy for that community” (Norton, 2005, p.298). Cognizant of the integrative role of various social sciences in this process, Norton emphasizes that “[s]ince pragmatic philosophy claims no special access to a realm beyond experience, philosophers also find their role within this process as they concentrate on developing language capable of communicating and integrating knowledge from the various disciplines” (Norton, 2005, p.302)

Bryan Norton provides a “constructivist, community based’ framework for conceptualizing sustainability that incorporates the dual feedback of science and normative values via advocating for a process that remedies the manner in which present linguistic resources inhibit communal, multidisciplinary public deliberation regarding objectives for the environment and relevant policy” (Norton, 2005, p.302). Norton’s conceptualization of sustainability and related indicators thereby arises from an iterative process of shared consensus from stakeholder discourse.

A founding basis for shared consensus regarding a broad vision of sustainability is the level of participation of various types of stakeholders to arrive at consensus. If some stakeholders are not able to participate in spaces that allow for them to deliberate conceptions of sustainability, the resulting notion of sustainability would not account for a vision contributed to by all stakeholders, having the procedural

and recognition implications for justice discussed in the prior section. In terms of the actual procedure to engage all stakeholders, a starting point is to clarify the normative reason for stakeholders to engage. useful One option is to conceive sustainability as a fundamental component of people's wellbeing and start from the perspective that people ought to be free to achieve wellbeing, which is the foundation of the capability approach, a normative framework that is grounded on people's access to being able to function in a way that enables them to achieve wellbeing.

The capability approach is founded on the normative perspective that people ought to have the freedom to pursue and achieve wellbeing. The concept of wellbeing from the point of view of the capability approach is conceived as constructed on the capabilities and functioning of an entity, including that of a single individual.

Whereas the notion of capabilities captures the rights of an entity in theory, functioning refers to the practical ability of an entity to manifest or execute their capabilities. The variables that allow an entity to transform capabilities into functionings are termed conversion factors and capture personal, environmental and sociopolitical elements of the relevant entity's context. The concepts of capabilities and functionings are meant to capture disparate personal and contextual elements that lead to diversity of human needs. The capability approach has generated a variety of capability theories. The capability approach allows for at least two forms of value pluralism, which is the foundation of Norton's framework.

First, it allows for pluralism in terms of principles, i.e. principles other than capabilities and functionings matter, and second, the multidimensional nature of the capability approach allows for the notion that capabilities and functionings are valuable ends in themselves rather than only valuable as means to a specific principle or goal (Nussbaum, 2009; Robeyns, 2016).

There are alternate reasonings for stakeholders to engage: access to resources, or utility-based reasons. However, these do not capture the “beings and doings”, also known as the functioning aspect inherent in the capability approach. The resource-based reasoning focuses on resources to achieve improved development outcomes. For example, increased income and ownership of assets like property in theory could enable people to achieve greater amounts of some normative objective, such as wellbeing or happiness (Robeyns, 2011). However, specific people or classes of people have very different functionings (doings) in their day-to-day lives, and practical considerations may in fact hinder access to a resource even though the resource is, in theory, made available to them. A similar problem exists with the utility-based approach, but in this case the issue is with the “beings” aspect. The utility-based reasoning is happiness focused; however, the happiness approach is unable to measure mental adaptation in terms of comparison with a reference group (Robeyns, 2011). The better the situation of a reference group, the less happy the comparer is going to feel even if their own situation improves. This makes it problematic to compare wellbeing across groups. One way a capability approach

provides a framework that addresses both of the above issues is by incorporating agency (Crocker & Roebyns, 2010).

Agency in the capability approach

Agency is valuable for a number of reasons: intrinsically as a normative preference, instrumentally as a means to various virtuous outcomes, constructively in that an individual has the freedom to examine, decide and shape their own values, thereby constructing their reality (Crocker & Roebyns, 2010). Agency can be broken down into four parts: self-determination, reason-orientation and deliberation, action and impact on the world (Crocker & Roebyns, 2010). Self-determination refers to the individual (or agent) doing the action that results in achieving what the individual wants. Reason orientation and deliberation refer to the individual's freedom to make rational decisions founded on personal preferences. Action refers to achievement due to agency in that the outcome an individual agent contends with is a result of direct or indirect action on the part of the agent only, rather than others. Impact on the world refers to the notion that the greater the impact of the individual's actions on the world, the more the level of agency that can be attributed to this individual.

In order to understand the role of agency in a capability approach, it is useful to differentiate agency from wellbeing. Sen argues that wellbeing is a key component for individuals to thrive, individuals can and ought to be free to have values other

than wellbeing. Sen captured the space of individual thriving by defining four elements of human flourishing along four dimensions, as shown in table 10 below:

	Wellbeing	Agency
Freedom	Wellbeing freedom: freedom to achieve approaches to living that an individual has reason to value (also called capabilities)	Agency freedom: individual freedom to seek goals that affect more than the individual that an individual has reason to value
Achievement	Wellbeing achievements: actually living in the ways that an individual has reason to value (also called functionings)	Agency achievement: accomplishing goals with influence beyond the individual that an individual has reason to value

Table 10: Distinguishing Wellbeing and Agency along the dimensions of Freedom and Achievement (adapted from Hart & Brando, 2018)

Sen's conception of agency allows for the recognition that individual freedoms and responsibilities are not strictly limited by self-interest; rather, that an individual can have reason to value freedoms and responsibilities that are other oriented (Crocker, 2008b). Sen lays out explicitly normative analysis to explain why human agency is a notion that individuals have reason to value, want freedom to leverage and achieve in their daily lives, as well as in their social institutions, spawning other scholars to develop agency-oriented capability approaches (Crocker, 2008b).

In short, Sen's conception of agency includes that (a) a person can exercise agency in regard to their values, (b) agency must include overall effective power in addition to direct control, (c) agency must allow for the advancement of wellbeing as well as

non-wellbeing related goals, (d) understanding agency necessitates analysis of how the agent values their goals and (e) the responsibility of the agent for a given context must be included into the agent's assessment of their agency (Alkire, 2008a). Measures of agency therefore also should include an agent's autonomy, effective power and ability to commit to goals beyond wellbeing. Autonomy refers to whether the agent is able to act with respect to their own values whether or not another person thinks the agent has reason to value what they do (Alkire, 2008a). Effective power refers to an agent's perception of their resources and capabilities to affect a certain course of events beyond just the roles in which they have decision making power (Alkire, 2008a). Commitment to goals beyond wellbeing refers to whether the agent can commit to goals beyond agency goals that relate to "oneself, one's family or community, or other with whom one has sympathy, or the political unit of which one is part" (Alkire, 2008a, p.16).

Deliberative democracy is one form of the capability approach, a theoretical framework positing the claims that "the freedom to achieve wellbeing is of primary moral importance" and that "wellbeing should be understood in terms of people's capabilities and functionings" (Robeyns, 2011). Specific capability theories include Crocker's capability theory of deliberative democracy, which extends the capability approach by including the elements of agency and participation as inputs to development ethics. Crocker, following Sen, specifies that agency has two dimensions: agency achievements and freedom for those achievements. Agency

freedom is the freedom of a person to decide what he/she wants to achieve. Social arrangements can affect agency achievements and agency freedoms.

The participation of smallholders: a scale to assess engagement

I will use Crocker's theory of deliberative participation in local initiatives to assess the voice of smallholders in the RSPO.

Crocker's theory of deliberative participation develops from an assessment of Denis Goulet's approach for 'nonelite participation in development decisionmaking' (Goulet, 2008, p. 165). Briefly, Goulet's approach can be summarized as: "The basic idea is that persons and groups should make their own decisions, at least about the most fundamental matters, rather than having others – government officials, development planners, development ethicists, community leaders – make decisions for them or in their stead. Authentic development occurs when groups at whatever level become subjects who deliberate, decide and act in the world rather than being either victims of circumstance or objects of someone else's decisions, the tools of someone else's designs" (Crocker, 2008, p. 326).

Specifically, non-elite participation entails examining "decision making about and control over resources and institutions"; "[p]roductive activity is not participatory unless the producer has a role in freely and intentionally shaping that activity" (Crocker, 2008, p.327). Next, identifying that "participation" in fact encompasses a number of different phenomena, Goulet categorizes the different types of

participation based on “normative role, originating agent, scale and ‘point of entry’ in a group’s decision-making process” (Crocker, 2008; p. 327). In addition, Goulet organizes the diverse categories of citizen participation based on the exact point at which non-elites contribute to the group’s decision-making process: “(1) initial diagnosis of the problem; (2) listing of possible solutions; (3) selecting one course of action; (4) preparing for implementation; (5) evaluating and self-correcting during implementation; and (6) considering the merits of further action” (Crocker, 2008, p.328).

Crocker makes some important observations of Goulet’s theory and builds on these to form an improved theory of participation. First, the more citizens are involved in the later, or more “upstream” stages of the decision-making process, the “more fully people express their agency and the better the likely consequences with respect to social justice” (Crocker, 2008, p. 329). Next, unlike what Goulet claims, the entry stage of the decision-making process does not absolutely determine the quality of participation; Crocker notes that “with respect to each of these times of entry, with the possible exception of the last one, various ways or modes of participation exist—some are more active, deliberative and influential than others” (Crocker, 2008, p.329). Crocker distinguishes three critical areas via which Goulet’s ideas can be enhanced: (1) classification of participatory arrangements; (2) improve Goulet’s typology to comprise the causes and barriers to the various types of participation or at least explore these; finally, and crucially, (3) supplement Goulet’s typology by

differentiating “how a group’s non-elite members participate, especially in the group’s decision making”(Crocker, 2008, p.329). Following from these observations, Crocker characterized a spectrum of modes of participation in group decision making, classified from thinner to thicker; these are summarized in table 11.

Type of Decision Making	Characterized by:
Nominal participation	Members do not attend group meetings—either because they are unable to or feel unwelcome. Some stakeholders are members, others are not. Weakest form of participation.
Passive participation	Stakeholders are group members and attend meetings where decisions are made by groups or officials, but their capacity is limited to passively receiving decisions already made. “The elite tells the non-elite what the elite is going to do or has done, and non-elite persons participate...by listening and, at best, asking questions or making comments” (Crocker, 2008, p.330).
Consultative participation	Non-elites provide information and their opinions (as input/preferences/proposals) to the elite. The non-elite do not deliberate amongst themselves or make decisions. Decisions are the prerogative of the elite, and while they may consider the information and opinions of the non-elite, they have no requirement or compulsion to do so.
Petitionary participation	Non-elites petition (formally request by right and at least heard if not heeded by duty or mandate) elites or authorities to reach decisions or perform certain activities, generally to resolve grievances. As consultative participation, petitionary participation is frequently employed in traditional decision-making.

Participatory participation	Elites define the objectives, and primary avenues to these ends, and non-elites implement these. Non-elites' decision making is limited to strategic mechanisms to attain elite aspirations at best. While "non-elites do more than listen, comment and express...they also make and enact decisions...the overall plan and marching orders" belong to the elite (Crocker, 2008, p.330.).
Bargaining	Non-elites bargain with elites based on the extent of their individual or collective bargaining power. The bargaining entities are more antagonists than allies and self-interest primarily if not solely motivates each party. Non-elite say in the ultimate outcome is contingent on what the non-elites are willing to concede in exchange for concessions from the other side; the greater the power differential between the non-elites and the elites, the more contracted the non-elites' influence on the outcome. Often, an elite may accept a current loss for a greater anticipated gain. Associations with and help from actors external to the process and higher up likely increase the bargaining power of non-elites.
Deliberative participation	"Non-elites (sometimes among themselves and sometimes with elites) deliberate together, sifting proposals and reasons to forge agreements on policies at least a majority can accept" (Crocker, 2008, p.330).

Table 11: Spectrum for intensity of participation (Adapted from Crocker, 2008, p.

330)

Crocker notes that the various types of participation are liable to vary with respect to their results; critical to the agency-oriented capability approach is the degree to

which non-elites are likely, via varying categories of participation, to effect a progressive change in the world (Crocker, 2008a). Goulet does not “discuss the dynamics of the process leading to a normatively compelling consensus”; Crocker remedies this gap by offering a theory and examples of practice of deliberative democracy, as well as responses to major criticisms of deliberative democracy (Crocker, 2008, p.331).

The deliberative democracy interpretation of the capability approach is a way to mobilize agency to operationalize the ideal process construct of Norton’s framework. Norton’s framework for sustainability emphasizes that a goal cannot be pre-decided, rather it is consensually arrived at by choosing from hypothetical scenarios and subject to revision and review as needed, so there is uncertainty in terms of what could be brought to the table to be negotiated. The ideal process construct of Norton’s framework allows for a procedure characterized by being able to contest and deliberate each other’s values and negotiate to an outcome that is perceived as legitimate. At its core, agency allows for the uncertainty inherent in an adaptive management framework for sustainability. This is because it is agency that allows stakeholders the freedom to explore, formulate and decide their own values, as well as navigate their narrative in a way that is not limited to just their self-interest as such a choice is considered valid because of individual agency.

Limits to the RSPO SLA approach

While the RSPO captures some level of smallholder wellbeing in its sustainable livelihoods approach to engaging smallholders, this approach necessarily limits smallholder freedom to decide what they want in terms of sustainability. The SLA (sustainable livelihoods approach) is based on the concept of capabilities and aims to integrate two specific insights from the literature on development – that institutions affect economic development outcomes and that processes, especially participatory process matters for development goals to be attained sustainably and equitably. SLAs recognize the complexity in how individuals make an income and “build on people’s assets or capitals, their vulnerabilities and coping strategies and seek to embed this within larger policies, institutions and practices” (Patnaik & Prasad, 2014, p. 355). SLA type approaches developed to counter top-down development approaches by theoretically building on human agency. Central characteristics of SLA type approaches include “people-centeredness, responsive and participatory processes, and operational guidelines that are multi-level, based on partnerships that are sustainable and dynamic” (Patnaik & Prasad, 2014, p. 355).

However, implementing the SLA in practice is challenging, partly because of issues with how participation for non-elite stakeholders (those conceived as underdeveloped). This is because the SLA is vulnerable to a top-down approach and hacking by elites despite being designed as a response to mitigate the negative

impacts of top- down development. Specifically, SLAs have been criticized for their lack of clarity on how to manage power relations as well as how to assess the level of voice individuals have at various levels and the extent to which individuals have actually been able to impact policies and their implementation. Some of this can be attributed to a misconception that participation is a panacea for equity and voice issues. First, the rhetoric of participation conceals the authority of funders and multinational agencies; second, an emphasis on participatory methods frequently conceals the mechanisms that maintain or aggravate local power differentials, and third, the dominance of participatory methods detracts from other methods that might be more effective for a specific context (Christens & Speer, 2006). Such a strategy reduces equity and therefore energy justice, and for this particular case, it is the concept of structural equity, which includes all stakeholders having equal capacity to participate.

The structural aspect of equity is foundational, as it affects access to information and the ability to shape and navigate narratives to make informed votes and comprehend the burdens of risk and benefits. One of the main issues with SLA is its limited ability to address the issue of agenda-setting and decision making by experts and outsiders to local context, effectively maintaining top-down goal and vision setting. This is because participation can actually be supportive of central planning as “many international agencies and funders justify participatory processes by noting the efficiency and productivity by which participatory methods advance the

goals” of large organization by reducing “transaction costs” (Christens & Speer, 2006, p. 1). In doing so, unquestioned implementation of participatory processes may actually detract from larger goals such as empowerment. A proposed remedy to the mentioned issues with participation is a recognition that “participants’ agency in development projects, instead of being viewed as distinct from other acts, is situated within a wider array of actions taken by these individuals to gain control and self- determination” and the necessity of a central decision making body that is responsive to all categories of stakeholders (Christens & Speer, 2006, p. 1). A core concept that would enable a broadening of the RSPO’s vision and strategy for greater smallholder inclusion for decision-making and therefore legitimacy is a concept of smallholder agency. Specifically, for agency, it would be useful to understand the level of autonomy possessed by smallholders in that they are able to formulate and exercise choice free from overt or covert coercion because they can comprehend their context and have the freedom for self-determination and consent free of manipulation. In order to evaluate whether independent smallholders have the agency and the ability exercise it, it would be useful to understand how the RSPO includes and perceives independent smallholders, as this would shape the direction of their policy and the remedies they provide for problems and contexts specific to smallholders.

The RSPO employs a sustainable livelihoods approach to including, and arguably, perceiving independent smallholders. The RSPO’s independent smallholder strategy

is structured via three envisioned areas of impact: prosperity, including productivity and efficiency goals for a competitive sustainable palm oil market; people, including sustainable livelihoods, mitigating poverty and upholding land, community and labor rights and planet, including conservation and enhancement efforts for ecosystems. In terms of addressing its view of independent smallholders themselves, the RSPO does so by using the language of inclusion but executing it in terms of smallholder livelihood. Specifically, for smallholder livelihood, income and outcomes leading to greater income (e.g. increased yields) are defined and clearly stated, whereas processes or means to execute agency are referred to, but neither as visible nor as clearly laid out.

When talking about the inclusion of smallholders into the RSPO system, the independent smallholder standard states that the RSPO envisions “equal opportunity exists for smallholders to enter the RSPO system through a standard that is tailored to their needs and reduces unnecessary burdens to certification” (RSPO, 2019, p. 2). The RSPO clearly views independent smallholders as needing incentives to participate in certification; however, smallholder roles in defining the RSPOs vision of sustainability are more ambiguous. The RSPO’s independent smallholder strategy expands on its view of smallholders through the language it uses to describe the envisioned results of its sustainable livelihood approach on smallholders. As a result of improvements in livelihoods of smallholders, the RSPO predicts that they “will have access to tools and training that respond to their

specific needs and have higher yields as a result of improved capacity for farming practices and agronomy” (RSPO, 2019, p. 2). The described results are specific in terms of improved yields but less clear on components of the specific needs of smallholders. Specifically, for the case of independent smallholders, their input is relayed by group managers and middlemen who are effectively gatekeepers, and it is unclear how much freedom independent smallholders themselves perceive as having to navigate the vision they are working towards.

While the RSPO’s approach does attempt to give agency to smallholders, it still ultimately is a top-down “dictate” given to the smallholders without much input from them. This is because the SLA itself lacks clarity on how to manage power relations and is vulnerable to hijacking by the elites, which in turn results in a top-down system where the smallholders become marginalized. The RSPO fails to mitigate this because it focuses on smallholder livelihood without clearly defining or addressing how smallholder agency will work in practice – in other words, it assumes that the smallholder’s priority will be income, detracting from smallholders the chance or power to define their own priorities. As SLAs are capital/ resource-based approaches that place livelihood at their foundation, the outcome space is necessarily restricted to self-interest in terms of livelihood as the role and space for individual values, specifically for those of marginalized people is less clear. SLAs leverage livelihood strategies to reach livelihood outcomes – In this way, the RSPO’s approach restricts the end outcome of the process and the process itself is

vulnerable to hijacking by those with more power to the detriment of marginalized stakeholders.

A consensus advantage of the capability approach is that it allows for an open-ended vision of what comprises the evaluative space and its resultant adaptability to specific contexts (Agee & Crocker, 2013). The capability approach prioritizes a “focus on human ends”, is based on respecting “people’s ability to pursue and realize the goals that he or she values”, “recognizes diversity of human needs and priorities” and “complementarities between the various capabilities for the same person” as well as the “dependence” of various capabilities of an individual “on the characteristics of others and on the environment where people live”, and finally, the “role played by moral considerations and ethical principles, and its central concern with justice, in the form of either bringing each person above a given threshold for each capability, or assuring equal opportunities to all in the capability space” (Alkire, 2016, p. 10). While the SLA based framework of the RSPO includes some aspects of the wellbeing priority of the capability approach, it is unclear how much wellbeing outside of income focused livelihood is a priority as well as how agency and voice for marginalized stakeholders like independent smallholders is actualizable. The SLA within the RSPO prioritizes economic measures of wellbeing like income and market inclusion-based incentives.

Capability theorists and practitioners have identified wellbeing indicators more appropriate to non-income considerations of wellbeing, including the role of agency.

Recommendations for an appropriate indicator for wellbeing include that it be “understandable and easy to describe”, “confirm to ‘common sense’ notions of wellbeing”, “be able to target the deprived, track changes, and guide policy”, “be technically solid”, “be operationally viable” and be “easily replicable” (Alkire, 2016, p. 17). Table 12 shows various ways by which researchers typically select dimensions for measuring wellbeing, the contexts in which using those means could be useful and problems with using a particular way.

Method	Details of method	Context in which using that method could be useful	Problems	Examples
Using existent data	Data that have characteristics relevant to the issues in the study	to be used in tandem with a second method (if used alone, use for a technical evaluation only without practical recommendations)	ignores the question of values	
Form assumptions from a specific theory	Assumptions based on researcher beliefs regarding what individuals ought to value based on sources chosen by the researcher, it is recommended to subject these to public critique	when the researcher is confident about the assumptions due to experience with context or from a theory known to be applicable and is able to describe these transparently such that the public, including those who are marginalized could offer contestations or enhancement	Researcher assumptions (1) may not be relevant or true, and possibly could be harmful (2) lead to prolonged incorrect assumptions and undesirable outcomes (3) may be the result of ideological declaration rather than reasoned	Human Development Index (HDI) was formed on assumptions of what was valuable to people across cultural contexts

			deliberation from public inquiry.	
Use an existing list created via consensus	select a set of dimensions that has been agreed upon by public consensus or critical public discussion, to generate data comparable across space and time	When a consensus instrument generated and vetted by regular public debate exists; when comparable data are needed	May conceal conflict, may be intransigent, may have excluded marginalized individuals or stakeholders from consensus	MDGs, the Sphere project
Obtain dimensions from an ongoing deliberative participatory process	arrive at a list of dimensions from an ongoing deliberative procedure where participants elucidate dimensions important to them and establish a set of dimensions that indicate their views via communicating their reasons and enhancing their arguments	when participation (a) is able to be rich and includes a safe and reflective space for debate on value issues and (b) can include all stakeholders without being too compromised by power differences	may be usurped by elite participants, discussions may be trivial or disingenuous due to trust issues amongst participants, may be costly and hard to repeat; not likely to be viable on a large scale; hard to implement in contexts that include possibility of violent conflict or high levels of power imbalances amongst participants	Participatory poverty assessments at various levels
Suggest dimensions on the basis	evaluate data on people's beliefs,	when data on the values of marginalized	data collection may not include the appropriate	World Values Survey

of empirical studies on people's values and/or behaviors	behaviors or values to generate dimensions characteristic of their values	people are available	population, individuals cannot raise issues of disagreement as they are treated as entities to be studied	
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Table 12: Methods by which researchers select dimensions of wellbeing (adapted

from Alkire, 2008)

Scholars agree that regardless of method, the set of indicators generated ought to be subject to public critique and ongoing deliberation (Alkire, 2008). In addition, scholars who propose criteria for identifying indicators argue that the formulation of these be explicit, i.e. it ought to be clear why it is said that people value something, and what is the reason for the valuation, and that ideal values should not be left out – rather, they should be included and their practical execution be arrived via deliberation (Alkire, 2008; Robeyns, 2005). In theory, the RSPO's vision of sustainability and the language it uses would imply it agrees with the importance of generation of non-income or profit based indicators, and that it agrees that these should be generated with strong elements of participation as well as consensus, it is unclear how this is included in its plans, and how it plans to assess whether this is occurring in practice.

While the RSPO uses the language of inclusion in both its SLA based plan for smallholders as well as in its broader approach, it is unclear what it means by inclusion specifically in terms of smallholders as well as more broadly. The

sustainable livelihoods approach is one aspect of the RSPO's broader vision of oil palm sustainability, captured in the RSPO's theory of change. The RSPO theory of change is its framework to improve its monitoring and evaluation system "to better articulate, manage and measure progress" towards the RSPO vision to "transform markets to make sustainable palm oil the norm" as well as "provide insights into its effectiveness, and assess its long term impact" (Roundtable on Sustainable Palm Oil, 2017, p.1). The theory of change is driven by RSPO guiding principles and leverages its roles and a variety of strategies to effect short- and longer-term outputs towards long term outcomes. The sustainable livelihoods approach for independent smallholders is one of three impact goal areas derived from the RSPO theory of change. The theory of change clearly mentions the need for procedures to assess effectiveness; however, these are unclear when it comes to smallholder inclusion and agency.

The RSPO's theory of change identifies its goal with respect to smallholders as "the inclusion of more smallholders in the system to produce sustainably while earning a sustainable livelihood from palm oil" (Roundtable on Sustainable Palm Oil, 2017, p. 21). In terms of general approaches to achieve its goal, the RSPO envisions (a) organizing groups for smallholders to aggregate for "efficient delivery of training, inputs, financing, implementation of P&C and certification" (b) taking a step-by-step approach to certification including calibrating the P&C and supporting tools, in addition to more suitable ways to validate compliance and (c) "specific demand pull,

tools and incentives for smallholders, including financing and risk management” (Roundtable on Sustainable Palm Oil, 2017, p. 20). However, the RSPO does not define what the inclusion of more smallholders means in practice, nor does it propose any clear definition of what it considers to be a sustainable livelihood from palm oil.

The RSPO’s theory of change includes various elements for smallholder participation. Agency and voice are specific envisioned long-term outcomes of the RSPO theory of change. The envisioned agency and voice outcome in the RSPO theory of change is that “all rights holders (e.g. workers, communities, women, migrants, indigenous people, vulnerable populations etc.) can activate, access, and claim their rights through their engagement in palm oil production and trade” (Roundtable on Sustainable Palm Oil, 2017, p.1). In addition, the process of change the RSPO outlines includes the elements of engagement and multi-stakeholder participation and processes. Specifically, for smallholders, the RSPO identifies a current issue as historic emphasis on large growers in countries like Indonesia and Malaysia, where large scale plantations are predominant. To remedy the problem the RSPO recognizes that “more customization is needed for smallholders to be able to participate and benefit from RSPO P&C adoption and access to the market” (Roundtable on Sustainable Palm Oil, 2017, p. 21). However, it is not clear what more customization entails, nor the role of smallholder agency or inclusiveness in this customization.

The RSPO makes several main assumptions to delineate the context necessary for its proposed approaches to work. For smallholders it assumes the “willingness of smallholders to organize, participate and engage” (Roundtable on Sustainable Palm Oil, 2017, p. 21). In terms of context, the RSPO assumes “government policies and regulation to support smallholder inclusion” (Roundtable on Sustainable Palm Oil, 2017, p. 21). Other assumptions include “training and financing the upgrading of smallholders to participate in formal value chains”, “tools strategies and BMPs right-sized for smallholders”, “a verification/certification system that is appropriate for smallholders but rigorous enough for the market” (Roundtable on Sustainable Palm Oil, 2017, p. 21). However, the drivers of smallholders being willing to engage and how they would engage is not clear, calling into question the role of smallholder agency in terms of their envisioned participation. Further, barriers to access for smallholder participation and agency are not identified.

Regarding envisioned outputs concerning smallholder participation, the RSPO mentions “increased numbers of organized independent smallholders” and an “improved enabling environment for smallholders” (Roundtable on Sustainable Palm Oil, 2017, p. 21). It is unclear what is implied by improved enabling environment for smallholders in terms of participation. As to improved means for smallholders, the RSPO envisions “increased knowledge and capacity” in terms of “principles and criteria, business administration, pricing etc.” in addition to “effective production and management systems” and effected best management practices” (Roundtable

on Sustainable Palm Oil, 2017, p. 21). The RSPO also envisages intermediate and long-term outcomes as a result of its approaches. While the intermediate outcomes do not directly reference voice and agency, they do mention maintaining human rights, including the free, prior and informed consent (FPIC) principle as well as strengthened support from markets and actors. However, what constitutes strengthened support from the market and actors is not clarified, and the envisioned outcome of such support is also not mentioned.

Linkages to long-term outcomes intended by the RSPO explicitly include agency and voice including “professionalization” and “negotiation power” (Roundtable on Sustainable Palm Oil, 2017, p. 22). Other envisaged linkages include a “level playing field”, clarified to be a situation where “all actors are treated fairly by an objective certification system or other verification methods and via effective grievance processes and remedy” (Roundtable on Sustainable Palm Oil, 2017, p. 22). However, neither a process nor a vision for smallholder agency is clearly identified, so it is unclear how this would be addressed and what recourse smallholders would have.

Another key area where the RSPO non-explicitly addresses agency and voice in its theory of change is jurisdictional approaches. In terms of key approaches to achieve the goal of resilient and healthy landscape with a variety of beneficial societal impacts, the RSPO recognizes that it can take “leadership in establishing a holistic and inclusive management process with a shared vision and goals” (Roundtable on Sustainable Palm Oil, 2017, p. 23). However, what constitutes an inclusive

management process is not described, nor is there a clear path to how the RSPO plans to create such a process. In addition, how the RSPO plans to manifest shared vision and goals is not discussed.

The RSPOs key assumptions regarding its key approaches to jurisdictional processes regarding its vision of “catalyzing a platform for collective impact” include “diverse stakeholders willing to come together around common objectives with a view to the long-term”, a non-RSPO “lead actor (backbone organization) to convene and push the concept of reality” with that entity having the “perception and acceptance by multi-stakeholders as legitimate” alongside “capacity [and] capability of the government to engage and provide a fair and transparent platform” as well as “transparent and spatially explicitly inventory of natural, human, physical, social and financial assets” (Roundtable on Sustainable Palm Oil, 2017, p. 23). Within these assumptions, it is unclear how marginalized stakeholders such as smallholders would fit into this dialogue and what provisions are made for this, given the lack of clarity on a vision for the lead actor.

The envisioned outputs of the RSPO’s jurisdictional approach include “mobilized growers and actors” as well as the establishment of “national/regional platforms and dialogues – for negotiation of goals and creating a shared vision and management plan” and “smallholder participation – inclusion of smallholders in the process” (Roundtable on Sustainable Palm Oil, 2017, p. 23). The RSPO envisions its long term jurisdictional approach as directly linked to agency and voice, including an

“inclusive multi-stakeholder platform”, “smallholder participation” and “inclusive access to benefits” including “equitable opportunities, safeguarding social and community interests” (Roundtable on Sustainable Palm Oil, 2017, p. 24). The RSPO predicts an improved “participatory approach for smallholders” by bolstering “producer organizations to participate and to address landscape level impact areas in the holistic land use management plan” as well as “legality” (Roundtable on Sustainable Palm Oil, 2017, p. 24). However, there is no definition or criteria for what equitable opportunities entail nor a process for arriving at one. In addition, inclusive benefits seem to refer to financial benefits in the absence of detail on non-income wellbeing or agency benefits.

In addition, the RSPO builds its theory of change on supporting elements that are founding principles that anchor the day-to-day functioning of the RSPO that frame its vision of voice and agency. Primarily, the element of trust incorporates the notion of inclusiveness such that “all types of growers, businesses, supply chain actors, production systems, communities, geographies, NGOs, local authorities etc. are welcome to be part of the RSPOs vision and missions” and that the “system is intended to benefit all palm oil stakeholders and supply chains that are willing to transform and participate in the sustainability journey” (Roundtable on Sustainable Palm Oil, 2017, p. 32). While the RSPO identifies the element of trust as central to this process, it is unclear what the context for this trust is and how it will be developed is ambiguous.

Why perceptions of agency matter

Perceptions of participation and agency constitute an important, if not central element to stakeholders actually participating and exercising agency. For example, Hakelius and Hansson's large survey of farmers found that members' attitudes to agricultural cooperatives are significantly explained by the perceived agency and related problems (Hakelius & Hansson, 2016). Significant implications of this research include that "understanding members' perceptions of agency problems" is a key to "how their attitudes to the governance systems of agricultural cooperatives are formed" (Hakelius & Hansson, 2016, p. 27). Further, in terms of the relationship between marginalized and elite, studies show the futility of economic rewards in mitigating opportunistic behavior, the potential of high levels of monitoring to weaken "farmer autonomy, entrepreneurial vocation and mutual trust and commitment, thereby...breeding opportunism" and that socialization drives trust between members when it is clearly perceived enough across all members as credible in contexts where social embeddedness in terms of amicable relationships are close but not too close (Hernández-Espallardo et al., 2021, p. 14).

In addition, studies have shown that a perception of having agency has a critical role in driving designations of responsibility (Haggard & Tsakiris, 2009). Researchers have recognized that a sense of responsibility linked to perception of agency is key for forming social cohesion as this allows for holding individuals accountable for their actions, and therefore being a necessary driver for change (Frith, 2014). Agency is

closely tied to an agent being able to act, therefore presupposing that the actor has “intent, belief, and desire” in terms of an internal state of intentionality and can overcome external constraints and exercise autonomy in terms of external context (Morris et al., 2001, p. 170). Understanding that individuals perceive and exercise agency in a social context implies they make judgements about their relative agency. In contexts where some actors obviously have more power than others both in terms of resources and leverage over narratives, comparing stakeholders’ perceptions not only about their own agency but also that of others would offer real insights into the social fabric context of both forming impressions of agency and exercising it.

Why comparing perceptions of agency would be useful

There are several reasons as to why comparing perceptions of agency would be useful. First, it would allow for a clear analysis of the RSPO’s processes and specifically would highlight any issues with power imbalances. Stakeholder participation is expected to reduce the impact of powerful interests over marginalized actors (Elgert, 2012; Fung, 2003; Sabel & Zeitlin, 2011) – however, as noted, the SLA is vulnerable to being hijacked by the participating elites, using the rhetoric of participation as a shield to hide power inequalities. This in turn reduces equity and energy justice. Identifying the differences in how elites think farmers should participate versus how smallholders themselves think they should participate, and then comparing that to actual RSPO policies, is useful evidence to

assess whether a top-down approach in terms of elite stakeholders' perspective is over-represented in actual practice and allow the issues to be addressed and mitigated.

A further step could be to establish which elites have the most influence, and what implications that might have for smallholders. As noted previously, agency and participation are critical for effective policy implementation, and thus comparing perceptions of agency could help enhance efficiency on that front. This will also have the effect of providing insights into what could establish a common language among the stakeholders, as defined by Norton. Once the perceptions of agency are compared and differences/similarities are highlighted, it will give all participating parties a clearer image of what the others define as "participation", allowing for a more unified front when pursuing effective policy and implementation. The study of perception is fundamentally important because it is tied to smallholder agency, specifically as defined by Crocker & Robeyns. If smallholders do not perceive that they have self-determination, they in effect lack agency. Expressing agency is critical in Crocker's model, as greater agency is tied better outcomes with regard to social justice. In short, if the RSPO is sincere in its efforts to pursue policies and actions that are intended to benefit the most people and parties, then an accurate understanding of the perceptions of agency is essential.

Framework- why equity, engagement, agency and participation measure inclusion

Inclusion, per Norton's broader framework of sustainability, is founded on stakeholders with diverse values communicating with each other using common language. Communication amongst stakeholders involves them being able to participate in forums where communication regarding sustainability occurs, and Crocker's framework provides a spectrum of thin to thick participation modes that enable us to assess whether marginalized stakeholders are at a similar place on the spectrum as compared to elite stakeholders. Assessing stakeholders' capacity to engage provides a means to evaluate structural equity, per McDermott's framework. Capacity to engage can itself be assessed by assessing stakeholder agency grounded in a capability approach as this allows for including the notion that non-self-interested values are valuable in and of themselves. In such a setting, perceptions and specifically, perceptions of agency can provide valuable insight into the pragmatic execution of inclusion on the ground. Inclusion and legitimacy defined as equitable inclusion as proposed by the RSPO therefore can be evaluated in the perceptions of the space of structural equity, agency and level of participation of elite vs. marginalized stakeholders. Inclusion towards defining a shared vision of sustainability can be assessed in terms of stakeholders having common language to communicate with each other to arrive at iterative consensus.

The framework in the above discussion leads to the following questions:

Equity

Main question: How do independent smallholders and elite stakeholders perceive the capacity of independent smallholders to participate?

- i. Do independent smallholders perceive they have equal capacity to participate as elites?
- ii. Do elite stakeholders perceive that independent smallholders have equal capacity to participate as them?

Agency

Main question: How do independent smallholders and elites perceive the various components of agency for independent smallholders?

- i. Do independent smallholders perceive they have the same ability for self-determination as compared to schemed smallholders in relation to elites?
- ii. Do independent smallholders have the same access to reason-orientation and deliberation as compared to elites?
- iii. Do independent smallholders perceive they have the same capacity for action as elites?
- iv. Do independent smallholders perceive they have the same impact on the world than elites?

From the perspective of elites:

- i. Do elite stakeholders in the RSPO perceive that they have the same ability for self-determination than independent smallholders?
- ii. Do elite stakeholders perceive they have the same access to reason-orientation and deliberation as compared to independent smallholders?
- iii. Do elite stakeholders perceive they have more capacity for action than independent smallholders?
- iv. Do elite stakeholders perceive they have the impact on the world than elites?

From the perspective of independent smallholders regarding the situation:

- i. Do independent smallholders perceive they have the same autonomy as compared to elites?
- ii. Do independent smallholders perceive they have the same effective power as compared to elites?
- iii. Do independent smallholders perceive they the same ability to commit to goals beyond wellbeing as compared to elites?

From the perspective of independent smallholders regarding their role:

- i. Do independent smallholders perceive their role is to have the same autonomy as compared to elites?
- ii. Do independent smallholders perceive their role is to have the same effective power as compared to elites?

- iii. Do independent smallholders perceive their role is to have the same ability to commit to goals beyond wellbeing as compared to elites?

From the perspective of elites regarding the situation:

- i. Do elite stakeholders in the RSPO perceive they have the same autonomy as compared to independent smallholders
- ii. Do elite stakeholders in the RSPO perceive they have the same effective power as compared to independent smallholders?
- iii. Do elite stakeholders in the RSPO perceive they have the same ability to commit to goals beyond wellbeing as compared to independent smallholders?

From the perspective of elites regarding their role:

- i. Elite stakeholders in the RSPO perceive their role is to have the same autonomy as compared to independent smallholders?
- ii. Elite stakeholders in the RSPO perceive their role is to have the same effective power as compared to independent smallholders?
- iii. Elite stakeholders in the RSPO perceive their role to have the same ability to commit to goals beyond wellbeing as compared to independent smallholders?

Scale of participation

Main question: How do independent smallholders and elites perceive the various independent smallholders' participation?

- i. Do independent smallholders perceive themselves the same thickness of participation as elites?
- ii. Do elites perceive themselves as having the same thickness of participation as independent smallholders?

Norton's framework

Main question: How do independent smallholders and elites perceive independent smallholders in terms of the various components of Norton's framework for pragmatically arriving at a vision of sustainability?

- i. Do independent smallholders perceive they have common language to communicate with elite stakeholders?
- ii. Do elite stakeholders perceive they have common language to communicate with independent smallholders?
- iii. Do independent smallholders perceive they can communicate their diverse values regarding sustainability in platforms with elites?
- iv. Do elites perceive they can communicate their diverse values regarding sustainability in platforms with independent smallholders?
- v. Do elites perceive that independent smallholders can communicate their diverse values regarding sustainability in platforms with them?
- vi. Do independent smallholders perceive they have platforms to arrive at consensus with elites regarding their values about sustainability?
- vii. Do elites perceive they have platforms to arrive at consensus with independent smallholders regarding their values about sustainability?

- viii. Do elites perceive independent smallholders have platforms to arrive at consensus with elites regarding independent smallholders' values about sustainability?

The questions generated above are analyzed in subsequent chapters via extensive interviews with independent smallholder oil palm producers and elite stakeholders in the RSPO in Thailand.

Chapter 5: Testing the framework: independent smallholders' perceptions

Introduction

This study seeks to explore the inclusion of independent smallholders via smallholder perceptions of their equity in the RSPO. It will provide evidence on the perceptions that independent smallholders have towards the benefits they receive by speaking about their views vs. listening to elite/top-down instructions. It will also elucidate whether farmers view their engagement as speaking up individually or as participation in a shared vision. While prior studies have shed light on smallholder attitudes that lead to their adoption of RSPO practices, there is a dearth of studies examining how independent smallholders view their role in the RSPO, and whether such smallholders view their participation through a lens of equity. Such studies are needed as the RSPO founds the legitimacy of its certification process on the basis of equitable participation of various types of stakeholders, including oil palm producers. Independent smallholders as a stakeholder group are particularly marginalized as their inclusion in the RSPO is based on them forming groups that are supervised top-down, mainly via instructions on how to grow oil palm.

Based on the framework introduced in chapter 5, the study focuses on the equity, agency and “thickness” of farmer participation in terms of their access and participation in meetings with elite stakeholders in terms of the perception of smallholders themselves. The overall goal will be to gather evidence to see if independent smallholders have a common language to communicate with elites

regarding their broader vision of sustainability and whether the spaces of participation allow for a plurality of values, per Norton's framework. Smallholder perceptions are key form of evidence as significant research has established that stakeholder perceptions are a key determinant of their attitudes to governance mechanisms. The study will assess whether smallholders have the opportunity to express values that are unrelated to income-based livelihoods, i.e. broader visions of what sustainability ought to entail, and whether they perceive they have access and agency to engage with elite stakeholders to debate these values and reach consensus. In doing so, the study will also provide insights for procedural justice, including the inclusion and representation of producer knowledge in knowledge formation and decision-making, as well as recognition justice, in the sense of producers not being limited by the political and cultural dominance of elite stakeholders.

Extensive interviews with independent oil palm smallholders in Thailand provide the basis for evidence on the ground regarding several hypotheses generated at the end of chapter 4 via the framework discussed there. IRB Approval for these interviews was granted and can be found in the appendix. For the equity part of the framework, the assessment will observe whether independent smallholders perceive they have equal capacity to participate as elites. For the agency part of the framework, the assessed hypotheses include whether independent smallholders perceive they have similar levels of self-determination, reason-orientation, capacity

for action, impact on the world, autonomy, effective power and ability to commit to goals beyond wellbeing as compared to elites. For the scale of participation, the study will assess whether independent smallholder perceive themselves as having thinner modes of participation as compared to elites. In terms of the overall goal stated prior, the study will assess whether independent smallholders perceive they have common language to communicate with elite stakeholders, whether independent smallholders perceive they can communicate their various values regarding sustainability to smallholders, whether independent smallholders perceive they have access to and the ability to participate in platforms to arrive at consensus with elites regarding their values about sustainability.

The process of collecting and analyzing data involves asking smallholders questions that allow them to discuss their perceptions on a range of issues. In terms of power relations between independent smallholders and elite stakeholders, the questions asked allow for smallholders to state their perceptions of their expertise, ability to identify problems, access to spaces for participation, level of participation, collaboration with elite stakeholders, decision-making ability, challenges faced in oil palm sustainability, power differences, ability to evaluate policies and volunteerism. In terms of how smallholders perceive their equity, inclusion and agency in the RSPO, the questions ask about smallholder perceptions regarding segregation and bias in expressing smallholder views as compared to elites, their views on sustainability, their ability to access and participate in public engagement, inclusion,

the nature of their links within the RSPO and the type of connection facilitation that is available to them and that they engage in. The questions asked also include smallholder perception of their involvement locally and broadly, in decision-making processes, in inclusion or voice representation processes, evaluation processes, and their ability to influence policies.

The contribution to the literature of this study is, first, a study on independent smallholder perceptions on their ability participate and shape their narrative for goals other than income and personal wellbeing. Second, this study contributes by focusing specifically on the perspective of independent smallholders, who are recognized as marginalized but not studied as often as schemed smallholders. Third, this study considers the Thai context, where independent smallholders are the primary type of producers of oil palm in contrast to other major global oil palm producer countries like Indonesia and Malaysia, where schemed smallholders and large-scale plantations are the norm. Fourth, this study has an explicitly normative focus in that it includes the normative perspective of smallholders in terms of their vision of sustainability, and considers whether and how it is included in the RSPO. Finally, this study offers evidence on the influence of perceived agency on smallholder ability and willingness to interact within the RSPO, thereby providing insight into manifestation of the recognized link between internal motivations, autonomy and behavior. From a policy context, the insights gleaned from this study facilitate an understanding of why the intent of the RSPO to include independent

smallholders may be problematic in practice, compromising the legitimacy of its sustainability standard.

This chapter will be structured as follows. The first following section will discuss the methods used to gather the data, relevant issues and limitations. The next section will discuss the data itself and related issues. The third section will explain the classification schematic used in the context of the coding approach applied to the interviews. Results and concluding remarks follow.

Context

Thailand was chosen as the location to conduct this study as it provides a rich source of data, having the highest number of independent smallholders in oil palm producing countries across Asia, as well as globally. A set of 80 interviews were conducted across a total of six different provinces in Thailand: Chumphon, Chonburi, Krabi, Surat Thani, Trang and Trat. These provinces were chosen because their locations were the most relevant to this study in terms of the potential data available. The provinces are located in eastern and southern Thailand, and these regions correspond to the areas that grow the most oil palm in the country. As oil palm farming is predominantly conducted by smallholder, specifically independent smallholder farmers in Thailand, these regions have the highest concentration of independent smallholders, making them ideal locations to examine smallholder involvement in conservation efforts as well as the actual power and impact they may

have. Chumphon, Chonburi and Trat are eastern provinces, whereas Krabi, Surat Thani and Trang are located toward the southern region of Thailand.

The interviewees included RSPO-certified, RSPO-trained and non-RSPO smallholders. Comparison of RSPO-certified smallholders, smallholders with some RSPO training and non-RSPO smallholders would have the following advantages. First, it would provide insights into the actual effect the RSPO has on smallholder perceptions of agency. Using non-RSPO smallholders as a baseline, it is possible to analyze the impact involvement with the RSPO has on smallholder perceptions of agency, equity, and their perceived position in power relations. By also analyzing the RSPO-trained, but not certified, smallholders, it is possible to gain insights into the additional impact of RSPO certification. A second benefit of analyzing these diverse groups of smallholders is an understanding of the perception of the RSPO itself, as well as the effectiveness of the RSPO's self-promotion. By interviewing smallholders who are not affiliated with the RSPO, it is possible to gain insights into the reasons why they are not affiliated, whether that is by conscious choice or simple lack of information. By interviewing those with training but no certification, it is possible to gain further insights to the perception of RSPO and its message.

Questions probing why some smallholders get the training but not the certification can highlight potential problems with the RSPO and can shed light on potential strengths and weaknesses in how the RSPO itself approaches smallholders. This information in turn could add credence to, or undermine, the RSPO's claims of

legitimacy as they are based on equitable participation. A third benefit of comparison is analysis of a common language – in essence, the interview process responds to the question of whether the RSPO promotes a common language among participating independent smallholders. If there is a notable consistency in the terminology used to refer to concepts and issues among RSPO-participating smallholders, then there may be evidence that the RSPO training facilitates a shared language. By analyzing those trained but not certified, the impact of certification (and presumed regular participation in the RSPO) will also be highlighted. On the other hand, if there is no clear difference between the language of RSPO certified smallholders versus non-RSPO smallholders, improvements to the training process and various aspects of the RSPOs approach could facilitate inclusion.

Data from the six regions in the study can also be reasonably assumed be representative to the rest of Thailand as well, due to the characteristics of the provinces discussed above. The provinces included have a long history of oil-palm cultivation, so smallholders there are more likely to be able to speak about trends over time, as well as their perceived benefits of joining the RSPO. Provinces with many independent smallholders are more representative as the space for collective discussion and trends in oil palm cultivation is more pronounced. All interviews were conducted on site with the aim of interviewing a single smallholder at a time and the waiting area was checked frequently to ensure smallholders interviewed were not familiar with the interview questions prior to the interview itself.

Participant Recruitment: Snowball Sampling

Participants were recruited via snowball sampling of smallholders that met characteristics relevant to the study. Exponential non-discriminative snowball sampling is appropriate for this study as the first recruited subject provides multiple referrals. Each of these referrals provides further data and knowledge for even more referrals and this process is iterated until there are a sufficient number of subjects. This method led to 96 referred subjects, with 80 being actually interviewed due to weather (flooding) and funding limitations.

The snowball sampling procedure was implemented as follows. The author attended a palm oil conference in Chonburi, Thailand, in 2019. Several representatives, including those from oil palm growers, attended this conference. The author spoke with an oil palm expert linked to the RSPO, who then referred her to a contact in Krabi that worked with certifying oil palm farmers to RSPO standards. In addition, the author met another oil palm farmer linked to a smallholder organization, who referred her to oil palm producers in the Chonburi area. Over the course of the interviews in Chonburi and Krabi, the author gained further contacts for the remaining regions (Surat Thani, Trat, Trang and Chumphon) in the study. The referrals included those to oil palm producers that were RSPO certified, those who had some RSPO training but not yet certified, those not in the RSPO but had heard about it, and those who had not interacted with the RSPO.

Snowball sampling is useful to find respondents within a specific community as well as for developing trust between the researcher and respondents. In addition, exponential non-discriminative snowball sampling typically leads to a more efficient process for identifying respondents, as the number of referrals builds quickly and is spread widely. However, there are limits to this procedure. Limitations of snowball sampling include a potentially homogenous sample as snowball sampling is non-probabilistic and interviewees are selected due to their involvement with a certain network or phenomenon (Browne, 2005). Homogeneity of the group may compromise the extent of the insights that can be gleaned from the interviews. To counteract this, the author specifically asked respondents for referrals to a variety of independent smallholder oil palm growers in terms of income, land area, education, as well as location contexts.

Limitations of exponential non-discriminative snowball sampling include ending up with respondent characteristics that are not a fit for the research. This was addressed by including the comments from a purposive sample of experts such as farmers belonging to large scale country or state level farming organizations as well as specifically checking the referrals for them being independent smallholder oil palm smallholders. The main goal of a purposive sample is to glean the characteristics of a study sample that can reasonably be assumed to reflect the overall relevant population. It was through the diversity of such “expert” producer referrals that the author understood the main regions of oil palm independent

smallholder growers beyond state agriculture statistics, as well as the variety of growing cultures that are prevalent in Thailand. A third limitation is potential lack of co-operation of referrals – this was addressed by having a wide variety of referral sources as well as explaining the purpose of the research and related anonymity prior to conducting the interviews.

Approach and Interview Methodology

The methodological approach employed is a grounded theory approach with phenomenological elements. Grounded theory addresses the question of how the social process of independent smallholder inclusion occurs within the context of the RSPO in Thailand. Relevant characteristics of the sample for this type of question include independent smallholders with inclusion experiences under a variety of conditions. Semi-structured interviews are a common method for grounded theory work where the goal is to use concepts grounded in data to generate theory from the range of respondent experiences. Interview strategy for grounded theory research also involves independent smallholders describing their experience, with the interviewer prompting for clarity and additional detail. Broad coding strategies include interpretation and presumption focused coding with individual sorting (Adu, 2019). Relevant coding methods include open, axial and selective coding to explore concepts across various dimensions and subsume concepts into core categories that fit into a synthesized framework (Starks & Brown Trinidad, 2007). An advantage of the grounded theory approach is that it allows for making observations and

analyzing data from interviews for identification of patterns and to account for “unexpected” observations on the field (Burnham et al., 2015).

Phenomenology is used across social science as a qualitative data analysis strategy reveals insights about the lived experience of respondents. For the purposes of this study, the author was interested in the lived experience of independent smallholder oil palm growers in terms of inclusion within the RSPO. Data collection and observation for phenomenology frequently include semi-structured interviews where the respondent describes their lived experience with the interviewer prompting for details and clarity (Starks & Brown Trinidad, 2007). The goal in terms of results is a thematic breakdown of the structure of participants’ lived experience. Coding strategy for these methods include description, interpretation and presumption focused coding with individual based sorting to cluster individual codes under labels relevant to the research question (Adu, 2019). While description-based coding provides information on the what, when, where and who aspects of the research question, interpretation-based coding provides information on the meaning (why, how) parts and presumption focused coding identifies the claims or conclusions being made. Coding methods for this goal involve recognizing descriptions of smallholders’ perception of the nature of independent smallholder inclusion in the RSPO, clustering these into diverse categories which taken together describe the core thread and the structure of smallholders’ perception of their experience with inclusion.

Semi-structured interviews have a number of characteristics that are helpful for this research, including: flexible structure, iterative nature, flexibility to be conducted with individual or groups of participants, eliciting information from key respondents who can provide insight into the topic, revealing respondent perspectives and allowing for in depth exploration of participant experiences (DeJonckheere & Vaughn, 2019). The interview questions were designed to reveal the vision held by independent smallholders regarding sustainability, as well as their perceptions of it being included in the RSPO in terms of agency in relation to elites, associated challenges and risks, their broad knowledge about potential conflicts with oil palm farming, opinions about biofuel policies in Thailand, experiences with smallholder associations, farming practices and related changes, socioeconomic information, social and professional networks, and association with volunteer opportunities. The interview questions were designed to be part of a semi-structured interview, so the questions themselves were designed as opening points in a conversation with the respondents, with a few pre-written prompts that were expanded and refined as interviews progressed and more information was brought to light.

The questions themselves were piloted on two independent smallholders – one who was certified and another who was trained, before being used more widely, and the probes were refined from the piloting. A translator facilitated the conduction and note-taking process of these interviews. The translator was trained before the interviews started on appropriate protocol – providing information about the study,

introducing the consent form and capturing the exact meaning of the questions as well as translating rather than interpreting interviewee responses (Raworth et al., 2012). All in-person interviews were conducted in a private room, or a private area of the room, with the author and the translator. Recommended steps for conducting interviews, such as questioning as a participant rather than an interviewer, active listening, and appropriate probing techniques were followed both by the author and the translator (DeJonckheere & Vaughn, 2019). The interviewee was given the consent form to review privately (with the translator) and sign before the interview take occurred. A short debrief with the translator was held after each interview as well as a longer debrief after interviews in each location to review any issues as well as note probes. Interviews were then coded. A total of 5 interviews were dropped from the 80 conducted due to three respondents not being able to complete the interview due to time constraints and two where it proved challenging to establish rapport. Three of the dropped interviews were in Trat, and two in Krabi. Table 13 shows the breakdown of respondents by province.

Place	RSPO certified	Non-RSPO	Some RSPO Training	Total
Krabi (2 dropped)	13		3	16
Trang	3	10		13
Trat (3 dropped)		8		8
Chonburi	1	5	6	12

Surat Thani	3	9	1	13
Chumphon	4	4	5	13
Total =75	24	36	15	75

Table 13: Interviewees by province

Interview data was analyzed manually using deductive and inductive coding as appropriate to the methodological approach (Saldaña, 2021; Schreier & Flick, 2018). The interviews were first coded for priori themes from the framework and relevant hypotheses from chapter 4, including themes that relate to the equity, agency and “thickness” of farmer participation in terms of their access and participation in meetings with elite stakeholders in terms of the perception of smallholders themselves. Data was coded in a variety of relevant ways – descriptive, which includes data where the respondents were describing a certain process or procedure, their concepts for key themes, and their values – personal or otherwise – related to sustainability; evaluation, in which respondents applied judgment to a particular process, phenomenon or institution; causal, where respondents identified conditions that led to outcomes; and relationship based, where relationships between types of stakeholders were mentioned (Saldaña, 2021). Next, the interviews were coded for emergent themes using a grounded theory approach including themes regarding smallholder perception of their inclusion in the abstract and on the ground under a variety of conditions. Subsequently, the author looked for counter examples for major themes focusing on any incongruent or conflicting

data to assess the validity of the conclusions. The coding effort also included attention to the intensity of perception in addition to the frequency with which the idea was mentioned by independent smallholders. A summary of emergent codes from coding is listed in the table below. A detailed discussion of results follows.

Characteristics	Emergent Codes RSPO-exposed	Codes for non-RSPO exposed	Themes
Biodiversity aware	- Actions to preserve biodiversity - Actions to reduce loss of biodiversity - Areas where biodiversity is relevant - Health concerns - Family or community- based reasons for being aware of biodiversity preservation	- Actions to preserve biodiversity - Actions to reduce loss of biodiversity - Health concerns - Deforestation - specific reasons for biodiversity loss - Education-based reasons for biodiversity preservation	Environmental Awareness

	- Education-based reasons for being aware about biodiversity preservation - Government policy-based reasons for preservation - Training-based reasons for being aware of biodiversity preservation - Values based reasons for supporting biodiversity preservation - Perceived feasibility of implementing actions to preserve biodiversity or reduce biodiversity loss specifically regarding oil palm	- Government policy-based reasons for preservation - Values based reasons for supporting biodiversity preservation	
Feel responsible to environment	- Family values based reasons - Health based reasons	- Health based reasons	Thoughts/Concerns beyond Livelihood/income

	- Religion based reasons - Community based reasons - GAP and RSPO training based reasons	- Religion based reasons - Community based reasons - GAP training-based reasons	
Environmental view changed post training	- Forming a view on why the environment merited concern- income based, value based, health based - Gaining knowledge - Understanding RSPPPO standards - Understanding execution of ideas - Understanding good agricultural practices	- Forming a view on why the environment merited concern- policy based, value based, health based - Understanding GAP practices	Impact of Training

Environmental Concerns in Suggestions to Government and Price/Livelihood Only Concerns	- Price concerns - Income concerns - Power differential concerns - Policies concerning oil palm for income purposes - Health based environment concerns	- Price concerns - Income concerns - Policies concerning oil palm for income purposes - Health based environment concerns	View of power as smallholder View of impact of individual
Attended a large-scale non- training meeting	- Perceptions of lack of access due to lack of knowledge, time, or other resources required to access - Learning as the sole reason to be present	- Perceptions of lack of access due to time concerns - Learning as the sole reason to be present	Importance of Training Perceived benefits of Training
Proposed something in a meeting	- Lack of clarity regarding the purpose of attending a non-training meeting	- Lack of clarity regarding the purpose of attending a non-training meeting	Views on difference of roles for smallholders/elites

	- Unclear on how issues were proposed - Unclear on the types of appropriate issues to propose - Uncertainty regarding how comments would be processed - Uncertainty regarding outcome once issues were proposed, price and income concerns - Lack of confidence in the amount of knowledge possessed - Lack of confidence in the language/ terminology to address issues - Necessity for more education and information	- Unclear on how issues were proposed - Unclear on the types of appropriate issues to propose - Uncertainty regarding how comments would be processed - Uncertainty regarding outcome once issues were proposed, price and income concerns - Lack of confidence in the amount of knowledge possessed	Power imbalances between smallholders and elites
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	about new technologies for farmers - Necessity for farmers to be more open-minded about engaging beyond listening.	- Lack of confidence in the language/terminology to address issues	
Solicited for input on policy	- Input for ease of implementation of RSPO practices - Ease of implementation of other beneficial agricultural practices	-Ease of implementation of other beneficial agricultural practices	View of power as smallholder View of impact of individual
Conversed with elites outside of meeting	- Communication by text - Informal communication - Price related communication - Cost related communication - Communication related to crop quality	- Communication by text - Informal communication - Price related communication	Views on difference of roles for smallholders/elites Availability of Elites for Discussion

		- Cost related communication - Communication related to crop quality	
Perception of influence as farmer	- Lack of power for individual independent smallholders - Greater power in groups - Concentration of power among middlemen and government elites - Issues addressed depending on elite interests - Elected officials as a way to represent farmer interests	- Lack of power for individual independent smallholders - Greater power in groups - Concentration of power among middlemen and government elites - Issues addressed depending on elite interests	View of power as smallholder View of impact of individual Perceived Results after giving Feedback

		- Elected officials as a way to represent farmer interests	
Individual or Collective Effort for Policy Change	- The relative ease of bringing up issues via group rather than as individual and discouragement at the difficulty of change	- The relative ease of bringing up issues via group rather than as individual and discouragement at the difficulty of change	View of power as smallholder View of impact of individual
Lack of Access	- Time - Logistical - Knowledge - Budgetary constraints	- Time - Logistical - Knowledge - Budgetary constraints	Benefits vs. Cost of Participation

Table 14: Emergent Codes

Results

1a. Profile of smallholder interviewees

Age

In terms of age, most independent smallholders were in the 50-60 age group, and the range of those interviewed was between 35-79. Chonburi had the highest proportion of independent smallholders in the 35-39 age group, which was the youngest age group interviewed. The 50-54 age group was the most frequent, whereas the 70-74 and 40-44 age groups were among the least frequent. No smallholders in the 35-39 age group were interviewed in Chumphon, while the most frequently interviewed age group for the same region was in the 50-54 range, with the 60-64 age range being the second most frequently interviewed age group. Krabi, where the most interviews were conducted, had interviewees most frequently in the 40-44 and 55-59 age groups as well as the greatest number of interviewees in the 75-79 age group of all six provinces. Independent smallholder interviewees in Surat Thani were most frequently in the 55-59 age group. Trang had the highest number of interviewees in the 55-59 age group overall as well as within the Trang province. The most frequently occurring age group in Trat was the 60-64 age group, and the bulk of interviewees in this age group were interviewed in Trat and Chumphon.

Length of time as a farmer and as an oil palm farmer

Most smallholders had been farmers for 21-25 years, with 16-20 years being the next most common range. The range of all of those interviewed was between 0-60 years, with 7 smallholders not providing an answer to the question and therefore being categorized as unassigned. Chonburi, Chumphon and Trat follow similar distributions, with most of their smallholder population concentrated in the range of 6-25 years of experience with a few notable outliers in Chonburi. Krabi showed the most variation of experience amongst its smallholders, distributed in a wide range from 11 years to 50 years. Trang also had a wide distribution of smallholder experience and also held a majority of smallholders in the range of 30-60 years of experience.

Most frequently, interviewed independent smallholders fell within the range of 6-10 years of experience as an oil palm farmer, followed by 11-15 years. Most of Chonburi's smallholders were concentrated in the 0-20-year range, with outliers in the 31-40-year range. Chumphon's distribution had a majority of the farmers in the 26-30-year range, with only a small amount in the 6-10-year range, unlike the other provinces. Krabi had a majority of smallholders in the 6-10-year range with a fairly even amount distributed among the 11-40-year range. Interviewed independent smallholders in Surat Thani were also concentrated in the 6-10-year range, but with a notable outlier in the 46-50-year range. Respondents in Trang similarly had a majority of smallholders in the 6-10-year range but the remaining smallholders are

fairly evenly distributed in a wide range between 11-30 years of experience. Trat has the most focused distribution, with all of its smallholders within the 6-15-year range.

Level of Education

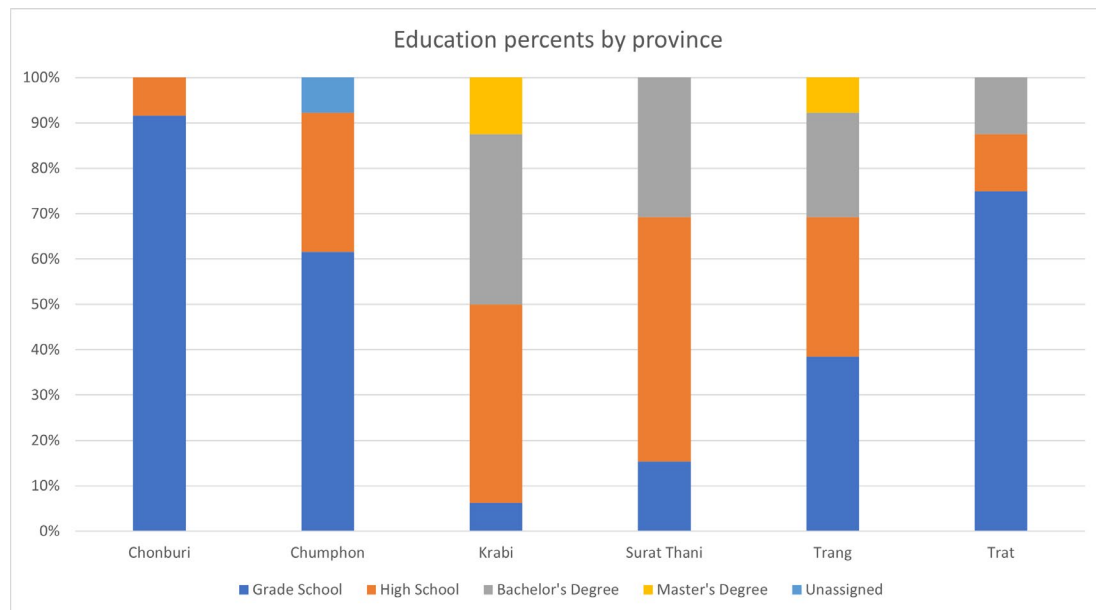


Figure 7: Interviewed independent smallholder education levels by province

As illustrated above, the majority of interviewed independent smallholders had a grade school level of education, followed by a high school level. One interviewee did not answer the question and was categorized as unassigned. Krabi and Trang were the only provinces in which smallholders interviewed were distributed across grade school, high school, bachelor's and master's levels of education. In Chonburi, Chumphon, Trang and Trat, the majority of interviewed independent smallholders had a grade school level education. In Krabi and Surat Thani, the majority of

respondents had a high school level of education. Krabi followed by Surat Thani had the highest percent of respondents with an education past high school.

Number of children and whether children will go into oil palm farming

Most interviewed independent smallholders indicated they had 2 children, followed by 3, with some independent smallholders (primarily in Chonburi) choosing to not answer the question. Respondents from Chonburi most frequently chose to not answer, and those who did were divided equally between having 2 and 3 children. Interviewed independent smallholders in Chumphon also mostly have 2-3 children, with an outlier reporting 1 child and two being classified as Not Applicable. Krabi and Trang both had fairly wide distributions in the answers provided, with some respondents (outlier responses) from Krabi having upwards of 8 children and Trang having upwards of 7. The distribution of interviewed independent smallholders in Surat Thani primarily falls in the range of 1-3 children, with a majority having 2. A majority of smallholders from Trat also reported having 2 children, with a few outliers reporting having 1, 4, and 5 children.

A majority of interviewed independent smallholders answered that at least some of their children were going to become/had already become oil palm farmers, with the remainder indicating either that their children would not go into oil palm farming or that they were still unsure about their children's path, with few respondents overall choosing to not answer the question, primarily in Chonburi. Chumphon and Trat both showed a fairly even divide between those who answered yes and no, whereas

the vast majority of smallholders in both Krabi and Surat Thani answered yes. Trang had the largest number of smallholders answer that they were unsure, with the remainder mostly answering yes.

Land Title

In terms of land titles, the majority of those interviewed possessed a land title, and in those who possessed a land title, the majority inherited their land title.

Chumphon was the province with the highest percentage of interviewees who did not possess a land title, whereas there were no interviewees without land titles in Krabi, as illustrated below.

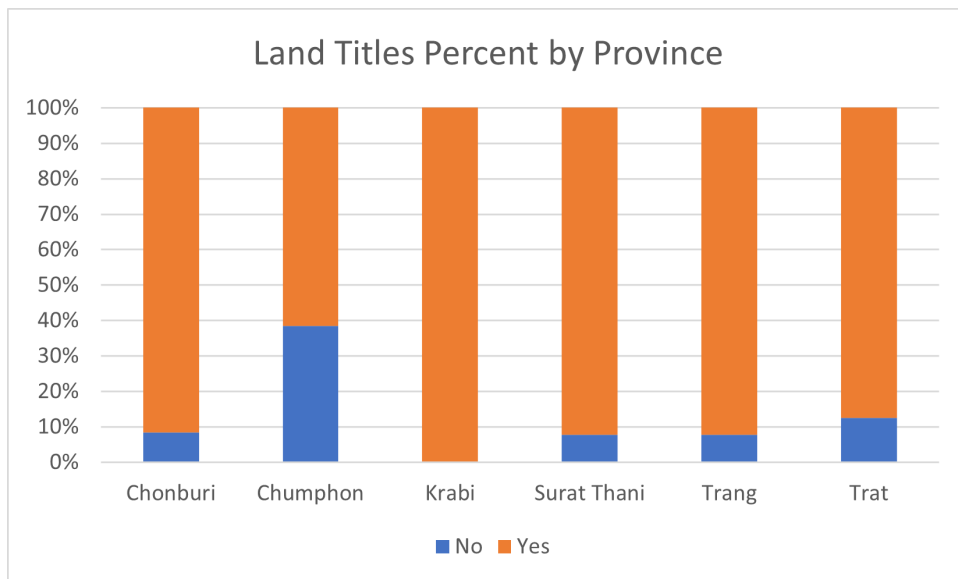


Figure 8: Interviewed independent smallholders' land titles by province

Volunteer

This question was asked to assess whether interviewed independent smallholders gave their time and effort voluntarily, to gain insight into their perception of whether non-income or individual livelihood focused activities comprised a portion of their regular activities. Just over 41% of overall interviewees indicated that some form of volunteer work comprised a part of their regular activities whereas the rest did not. In terms of provinces, as illustrated in Figure 9 below, none of the interviewed independent smallholders in Chonburi indicated that they volunteered, whereas Surat Thani followed by Chumphon were the provinces where the greatest percentage of interviewees indicated that they did volunteer.

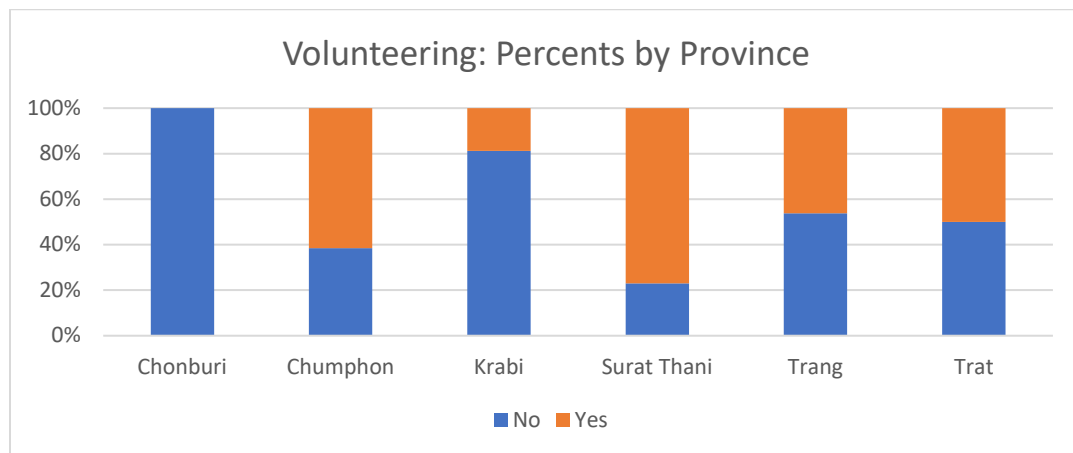


Figure 9: Interviewed independent smallholder volunteering by province

1b. Characteristics relating to perceptions of the environment

Biodiversity aware

This question asked interviewed independent smallholders if they were aware of the concept of biodiversity as related to the environment. It was expected that RSPO trained or certified smallholders would answer in the affirmative as the training process for certification involves making smallholders aware of the concept of biodiversity. Most interviewees answered in the affirmative, i.e. they perceived themselves as aware of the concept of biodiversity. Of those who answered in the affirmative, the majority of independent smallholders were aware of this concept either because of the initiatives of the Late King Bhumibol Adulyadej or due to conversations or training with elites from the Department of Agriculture Extension (DOAE). The minority of those who answered in the affirmative first became aware of this concept in training for RSPO certification. In terms of provinces, Surat Thani followed by Trang had the highest percentage of respondents that were unsure about whether they knew this concept even after the interviewer offered additional prompts to gauge their knowledge about the concept. Surat Thani followed by Trat had the greatest percentage of interviewees who perceived no awareness of the concept, as illustrated below.

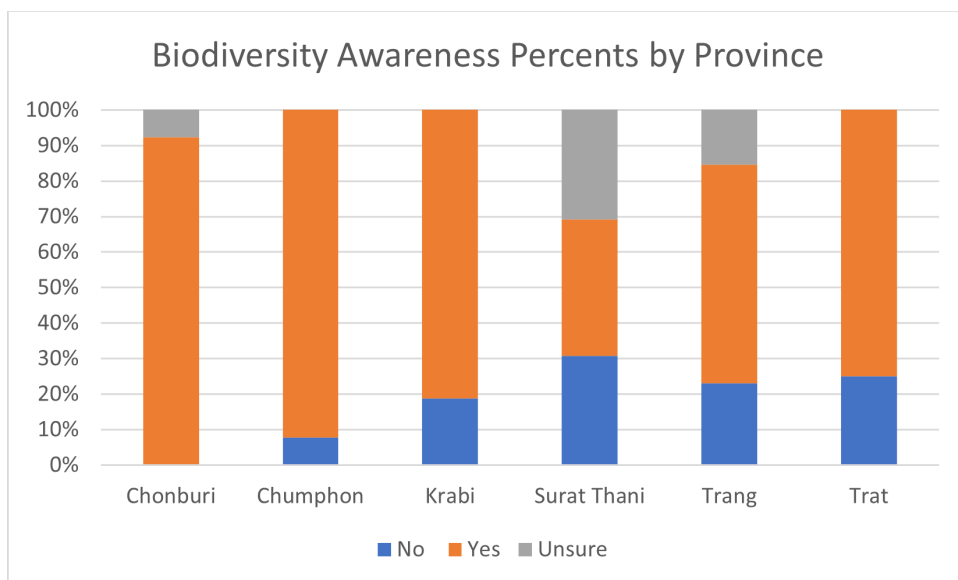


Figure 10: Interviewed independent smallholders' biodiversity awareness by province

In terms of results by whether interviewed independent smallholders were affiliated with the RSPO or not, the majority of certified and trained interviewees were aware of the concept of biodiversity, which is expected, as it is in theory part of their training, as illustrated in Figure 11 below.

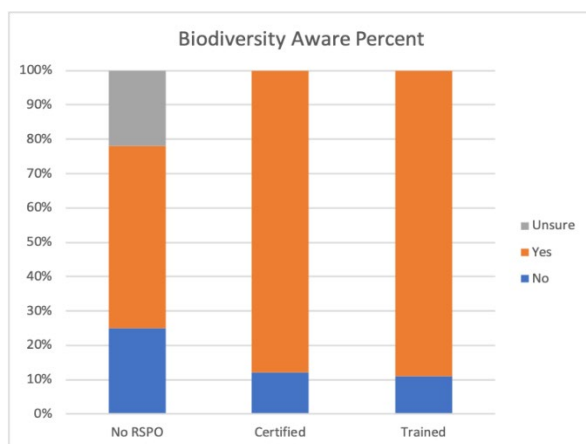


Figure 11: Interviewed independent smallholders’ biodiversity awareness by exposure to the RSPO

Emergent code clusters for smallholders’ biodiversity awareness included actions to preserve biodiversity, actions to reduce loss of biodiversity, areas where biodiversity is relevant (for example, forest vs. plantations), health concerns, family or community- based reasons for being aware of biodiversity preservation, education- based reasons for being aware about biodiversity preservation, government policy based reasons for preservation, training-based reasons for being aware of biodiversity preservation, values based reasons for supporting biodiversity preservation, and perceived feasibility of implementing actions to preserve biodiversity or reduce biodiversity loss specifically regarding oil palm.

All interviewed farmers in Krabi were either RSPO certified or trained, and for some of the respondents, resulted in a richer response to whether they were biodiversity aware. For example, one RSPO certified independent smallholder mentioned:

“Yes, I have learned that I should not hunt and eat the animals in the forest; I also learned I can get a similarly good crop with less chemicals, I have stopped using chemicals to kill pests, use natural predators instead—as a result, the worms in the soil are improving, and this is good for crop cultivation and yield because the soil is healthier.”

Another respondent who was trained but not certified mentioned: *“I support it as it is it is the policy of the old king. I use birds to get rid of pests rather than chemicals, but do not co-plant as it is no longer possible with grown oil palm.”*

A number of interviewed independent smallholders discussed their perceived feasibility of co-planting in the context of oil palm plantation and a common refrain was that co-planting was only possible in the early stages of growing oil palm.

Categories emergent from the coding process included intrinsic vs. extrinsic reasons for supporting biodiversity preservation and perceptions of feasibility and necessity of taking actions to preserve biodiversity.

Feel responsible to environment

This question was intended to assess whether interviewed independent smallholders perceive themselves as responsible for the environment. As shown in the figure below, the majority (just over 54%) of those interviewed perceived

themselves as feeling responsible to the environment, followed by those who perceived themselves as unsure (about 35%).

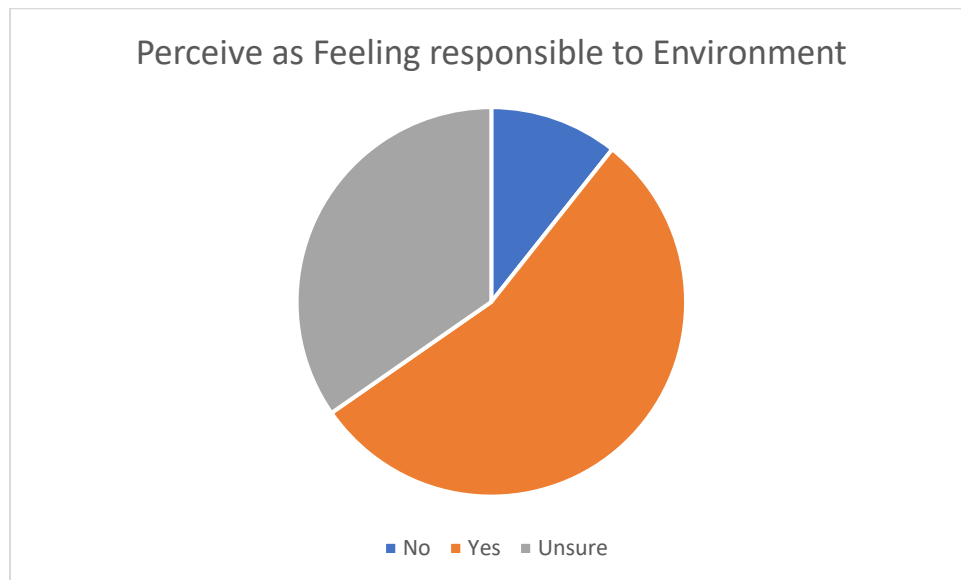


Figure 12: Interviewed independent smallholders' perceptions about responsibility to the environment

In terms of provinces, as illustrated in the figure below, Trang and Trat had the greatest percentage of interviewees answering in the affirmative, whereas Chumphon followed by Chonburi were the provinces with the highest percentage of interviewed independent smallholders who perceived themselves as unsure if they felt responsible to the environment. Krabi followed by Chonburi were the provinces with the most percentage of interviewees who perceived themselves as not feeling responsible to the environment.

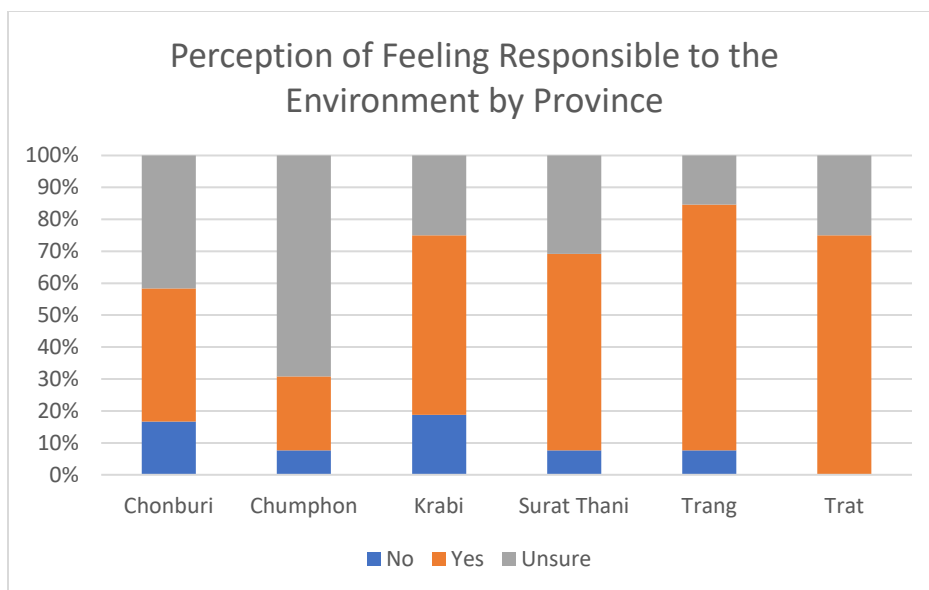


Figure 13: Interviewed independent smallholders’ perceptions about responsibility to the environment by province

In terms of results by whether interviewed independent smallholders were affiliated with the RSPO or not, the majority of interviewees who were certified said that they perceived themselves as being responsible for the environment, whereas a minority of those trained said so, which is also expected, as parts of RSPO certification and training raise are related to environmental goals.

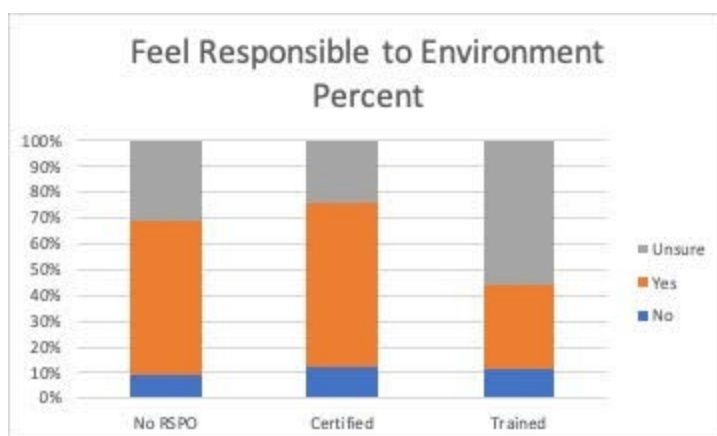


Figure 14: Interviewed independent smallholders’ perceptions about responsibility to the environment by exposure to the RSPO

Emergent code clusters for this issue include family values based reasons, health based reasons, religion based reasons, community based reasons and training based reasons.

For example, one RSPO certified interviewed independent smallholder said: *“I’ve developed my views on responsibility to the environment based on sustainability workshops by government (OAE) representatives and talks by my village leader- these trainings impressed on me the importance of reducing chemical usage and trying to use organic fertilizer some of the time. Prior to training, I had some thoughts that I ought to be preserving nature, not due to religion, but from myself.”*

Another RSPO certified interviewed independent smallholder mentioned: *“Prior to the RSPO, I have environment knowledge mainly through government training at the*

district (amphoe) level, for example, avoid chemicals, cut grass instead of using chemicals, avoid excess trash, and avoid use of chemicals near water sources.”

Another respondent who was trained but not certified mentioned: *“Yes, for a long time, I have thought that toxic chemical usage in farming should be avoided. This is particularly important to me as I am also involved with the leadership of a local school and thinks less chemical usage is better for families and children. I think we should save the environment on the principle of ‘do no harm’. In terms of actions, I used used to use a natural insect repeller to get rid of pests rather than use chemicals.”*

Categories emergent from the coding process include intrinsic vs. extrinsic reasons for feeling responsible towards the environment.

Environmental view changed post training

This question was intended to assess whether interviewees perceived their views on the environment changed post RSPO or government training. The majority of interviewees indicated that if they were trained, their views changed post-training. A minority of interviewees were unsure if their views changed post training. In terms of provinces, as illustrated in the figure below, Chumphon had the greatest percentage of interviewees whose views changed post training, followed by Krabi. Krabi was also the province with the highest percentage of respondents who were unsure if their views changed post-training, which was a notable result as Krabi was

also the only province where every interviewee was either trained or completely certified. Surat Thani, followed by Chonburi were the provinces with the greatest percent of interviewees who perceived their views as being unchanged post training.

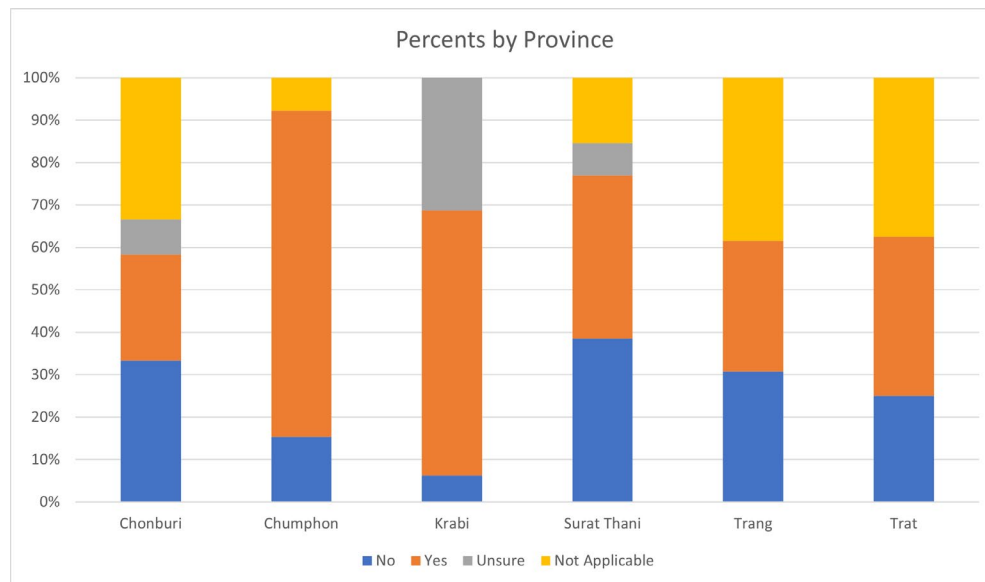


Figure 15: Change in views post-training by province

In terms of whether environmental views changed post-training, RSPO-certified interviewees were the group with the majority of interviewees perceiving their views as having changed post training. For example, one RSPO-certified independent smallholder illustrated how his views had changed post- training: *“I had heard about biodiversity before the RSPO and understood it to mean that I had to preserve all natural resources around him in their original form from an environmentally focused class at university. After training with the RSPO, I learned how to execute this idea better, learn the difference between forest area and normal land when it comes to biodiversity, learn to both preserve animals on land and check the fish population in*

the water, understand that plant and animal life are symbiotic (depend on one another), and how to apply principles of conservation specifically to farming.”

Emergent code clusters from the coding process include forming a view on why the environment merited concern- income based, value based, health based; gaining knowledge, understanding RSPPO standards, understanding execution of ideas and understanding good agricultural practices.

Environmental Concerns include Sustainability

This question was asked to assess whether independent smallholders’ perceived environmental concerns included sustainability related concerns to differentiate between smallholders who felt responsible to the environment for health related reasons stemming from pollution, which was a frequently cited issue. To do so, prompts related to sustainability were introduced as part of the question such as the ability of this generation to meet their resource needs without compromising the needs of future generations. Two-thirds of those interviewed indicated that their perceived environmental concerns in fact did not include sustainability concerns, with the rest of those interviewed indicating that their environmental concerns did include sustainability concerns.

In terms of provinces, as illustrated below, the greatest percentage of affirmative responses were in Krabi, followed by Surat Thani and Trang. The highest percentage of negative responses were in Chumphon, where none of the interviewed

independent smallholders indicated their perceived environmental concerns included sustainability concerns, followed by Trat and Chonburi.

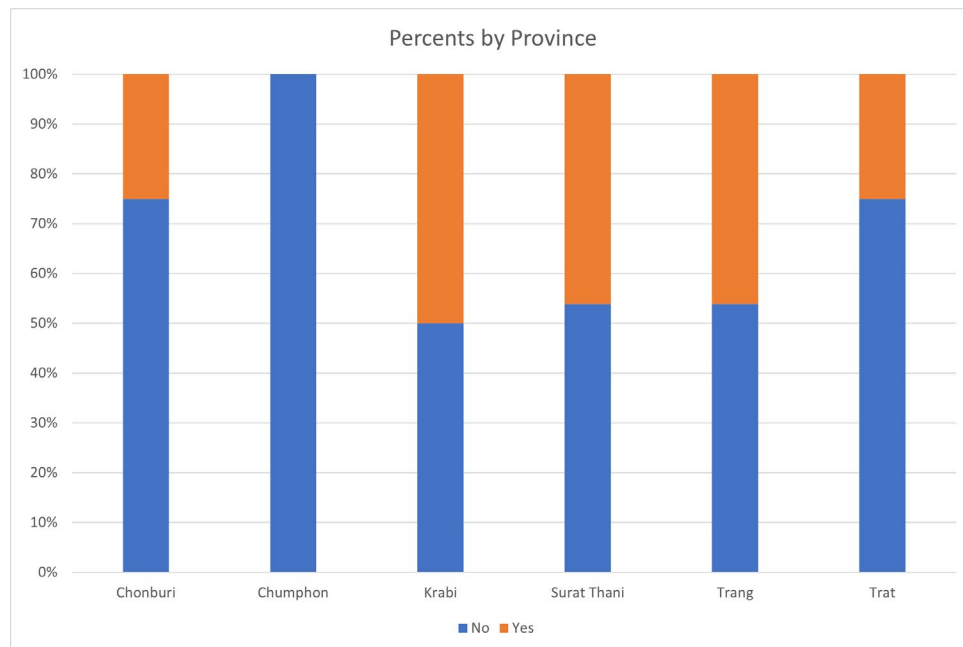


Figure 16: Interviewee characterization of their environmental concerns including sustainability by province

In terms of whether those who responded that they did feel responsible to the environment, RSPO-certified independent smallholders much more frequently mentioned sustainability concerns with respect to the environment (45% of relevant interviewees) than did those who were trained. Interestingly, independent smallholders who were not exposed to the RSPO but had undergone some form of training by a government agricultural office, such as in GAP (good agricultural practices), also much more frequently mentioned sustainability concerns (38% of

relevant interviewees) than independent smallholders who had undergone RSPO training but were not yet certified (11% of relevant interviewees).

Environmental Concerns in Suggestions to Government and Price/Livelihood Only Concerns

Interviewed independent smallholders were asked if their suggestions to the government included environmental concerns. This question was asked to probe into smallholders' perceived priority of environmental concerns as an issue concerning smallholders. Of those interviewed, only one respondent in Trat indicated any environmental concerns in suggestions to the government and this too, was from a health perspective.

Interviewed independent smallholders were further classified in terms of whether they only mentioned price or livelihoods concerns when asked for suggestions for the government. Of those who did have suggestions for the government, over 77% had only price or livelihood concerns.

In terms of provinces, as illustrated below, independent smallholders interviewed in Chumphon perceived themselves as only having price or livelihood concerns, whereas those in Trang had the greatest percentage of non-price/ livelihood concerns.

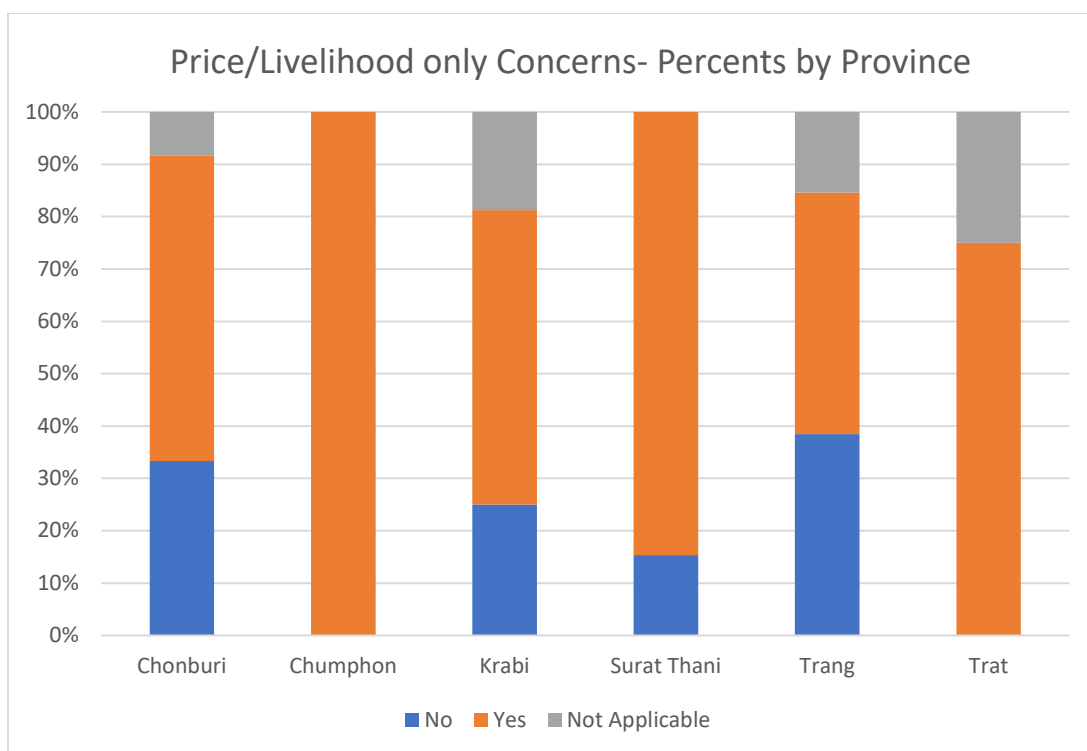


Figure 17: Interviewed independent smallholders who mentioned price only concerns by province

In terms of RSPO certified vs. not certified but trained interviewed independent smallholders, most interviewees who were trained but not certified mentioned price-only concerns (78%) whereas certified interviewees mentioned price-only concerns 64% of the time.

In terms of whether environmental concerns were included in interviewed independent smallholders' suggestions to the government, a RSPO certified respondent mentioned: *"The price of inputs is too high compared to the price I*

receive for the outputs; I would want to receive more money for my oil palm and be able to purchase cheaper fertilizer.”

Another respondent who was trained but not certified mentioned: *“The government needs to do something to improve price, it is hard to keep growing with a low price, I sell via a middleman who is still pretty powerful.”*

Emergent code clusters from the coding process include: price concerns, income concerns, power differential concerns, policies regarding oil palm concerns for income purposes and health-based environment concerns.

1c. Characteristics related to interacting with elites, perceptions of participation and influence

Attended a large-scale non-training meeting

This question was formulated to assess whether independent smallholders attended a meeting involving government, smallholder or RSPO elites that was over 20 people, and whose explicit purpose was a discussion of policies rather than training. Independent smallholders were asked about the largest meeting they attended for that purpose in addition to whether they attended one. Results by province are summarized in Figure 18.

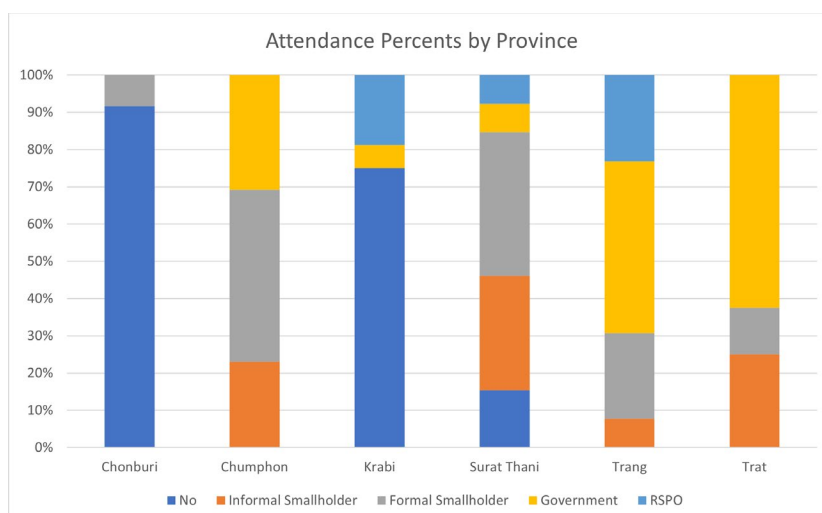


Figure 18: Interviewed independent smallholders who attended a large-scale non-training meeting by province

In terms of the total independent smallholders interviewed, thirty percent of them did not attend any such meeting. Of those who did attend such a meeting, the majority attended a formal smallholder association meeting, i.e. explicitly organized by a smallholder association at the district or province level, or an informal smallholder meeting, organized by smallholder associates informally at the village level. Of those who attended meetings, the minority attended RSPO organized meetings that were not for training purposes. In terms of provinces, the majority of interviewees at Chonburi and Krabi did not attend any such meetings, while Surat Thani and Trang were the only provinces where interviewees were distributed across all meeting types. Krabi and Trang were the provinces with the most frequent attendance at non-training RSPO meets, including international meets in Malaysia and Indonesia. In terms of attending a non-training meeting, none of the

interviewees who are RSPO trained but not certified attended a RSPO training meeting, and those that did attend a non-training meeting (39%) primarily attended smallholder association meetings. Of the interviewees who were RSPO certified, 56% percent attended non-training meetings, primarily smallholder association meetings, with a few attending RSPO meetings. Those interviewees who were not exposed to the RSPO most frequently attended larger non-training meetings with government representatives (primarily from the Office of Agricultural Extension) and smallholder association meetings.

In terms of RSPO-certified interviewed independent smallholders, most respondents had attended smallholder meetings rather than RSPO ones, and most had not heard of large-scale meetings that were not for training purposes. One RSPO certified interviewed independent smallholder said: *“I attended an amphoe level smallholder meeting. I did not propose anything, only listened, as I did not think there is any chance to propose and I think I am only here to learn, so there is not a point to propose....”*

Emergent code clusters from the coding process include perceptions of lack of access due to lack of knowledge, time, or other resources required to access as well as learning as the sole reason to be present.

Proposed something in a meeting

This question was intended to assess if interviewed independent smallholders had ever proposed anything to elites in a meeting – it could be as simple as a suggestion for improving implementation of a policy to a larger scale initiative like amending a policy or proposing a policy itself. The majority of those interviewed (over 70%) had not proposed anything in a formal or informal meeting with an elite present. In terms of provinces, Chumphon followed by Chonburi were the provinces with the greatest percentage of interviewed independent smallholders who had never proposed anything in any meeting with at least one elite present, whereas Trang and Trat were the provinces with the highest percentage of interviewees who had proposed something in a meeting with an elite present.

In terms of the type of elite present at the meeting, no independent smallholder from Krabi (where all interviewed independent smallholders had attended some type of meeting – training or non-training, with an elite present) had proposed anything in a meeting. Only one independent smallholder in those interviewed had proposed anything in a meet with an elite from the RSPO present, and was located in the province of Surat Thani.

In terms of RSPO-certified interviewed independent smallholders, one interviewed RSPO-certified independent smallholder said: *“The largest such meeting I have attended is a local smallholder meeting, but I do not attend often, so I do not think I am knowledgeable or know enough terminology to propose, instead, I share informal*

thoughts with my father or friends regarding inventing more uses for oil palm so can sell more."

Another RSPO-certified independent smallholder mentioned: *"I attended the district level smallholder association meet and listened to an expert from the mill; I haven't spoken as I don't think it will be taken seriously, one needs to be an expert to speak, so I listen only."*

Those who did propose something in a meeting frequently brought up income or cost concerns. One interviewed RSPO-certified independent smallholder said: *"In a local smallholder association meeting, I brought up the issue of price received for oil palm, they try to escalate concerns to a higher level as me and many of my friends don't have another way to make income, they did not get a response yet."*

Another mentioned: *"I have sometimes proposed to reduce fertilizer cost; I proposed as part of a big group rather than by myself as I was not sure whether I would succeed at proposing correctly by myself."*

Rarely, interviewed RSPO-certified independent smallholders addressed non-price issues. One such respondent mentioned: *"Yes, I proposed in a formal smallholder meeting- we should have a mindset to cultivate more education and get more information on new technologies that can help farmers."*

Another interviewed independent smallholder who had some training for RSPO certification but was not yet certified mentioned: *"I have not proposed anything so*

far as I would need to see an example of how to present properly to feel comfortable to take initiative. I think smallholders can only have power in groups, as then it is easy to collect experiences and give specific points or feedback, but farmers do also need to change and be more open minded to engage."

Emergent code clusters include lack of clarity regarding the purpose of attending a non-training meeting, lack of clarity on how issues were proposed, lack of clarity on the types of appropriate issues to propose, uncertainty regarding how comments would be processed, uncertainty regarding outcome once issues were proposed, price and income concerns, lack of confidence in the amount of knowledge possessed, lack of confidence in the language/ terminology to address issues, necessity for more education and information about new technologies for farmers, and necessity for farmers to be more open-minded about engaging beyond listening.

Solicited for input on policy

This question was meant to assess whether interviewed independent smallholders were solicited for their input on any type of policy at any time. Over 94% of interviewed independent smallholders were not solicited for input on any type of policy at any time. The majority of those who had ever been solicited for any input on policy at any time were present in Trang, followed by Surat Thani and Trat.

In terms of whether interviewed independent smallholders perceived that they were solicited for input on policy, none of the smallholders who were RSPO trained, as

well as none of those not exposed to RSPO, indicated that they were solicited for input on any policy, whereas 17% of those who were RSPO certified indicated that were solicited for input on some type of policy.

In terms of RSPO-certified interviewed independent smallholders, one interviewed RSPO certified independent smallholder said: *“As the lead, I have been asked for my views on the ease of implementation of soil practices.”*

Emergent code clusters included input for ease of implementation of RSPO practices and ease of implementation of other beneficial agricultural practices.

Conversed with elites outside of meeting

This question intended to assess whether independent smallholders communicated with elites outside of meetings, i.e. whether they perceived that they were able to approach elites outside of training or being invited to a meeting. To assess this, the interviewer offered prompts such as whether they spoke in person to such elites, whether the contact was in the context of a meeting or not, whether the interviewee would be comfortable approaching the elite in question more than once, etc. Results are shown in Figure 19. Just over half of the interviewees (52%) said they had no communication with elites, whereas the rest said that they did. In terms of provinces, none of the interviewees in Chumphon said that they conversed with elites outside of a meeting. Trang followed by Krabi were provinces with the

greatest proportion independent smallholders that conversed with elites outside of a meeting.

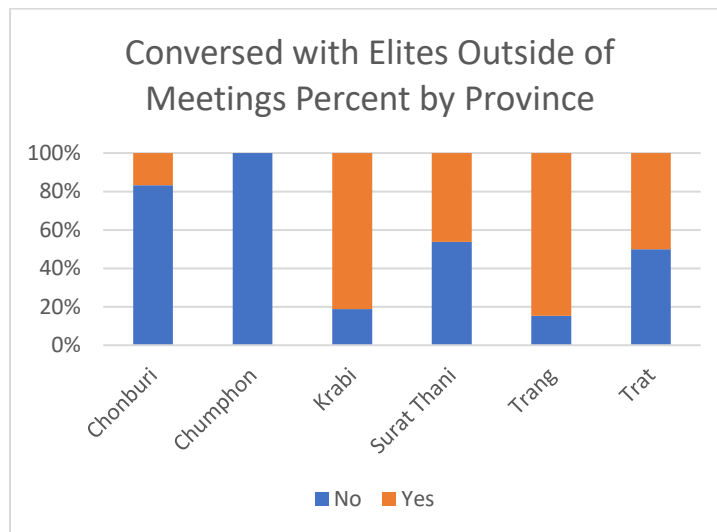


Figure 19: Interviewed independent smallholders who conversed with elites outside of meetings by province

5% of those who were trained but not certified indicated that they conversed with elites outside of a meeting, compared to 68% of those who were certified and 55% of those who had no exposure to the RSPO. In terms of RSPO certified interviewed independent smallholders, one interviewed RSPO certified independent smallholder said: *“I converse informally with middlemen regarding the quality of my crop and the price offered, as well as any other issues as necessary via text.”*

Another interviewed RSPO certified independent smallholder mentioned: *“I have communicated with my fellow group of farmers, the village committee, mills, and*

government officers outside of meetings, mostly informally, and mostly regarding either the price of fertilizer or the price offered for the crop.”

In terms of RSPO trained but not certified interviewed independent smallholder farmers, one mentioned: *“I have communicated with the RSPO trainer and village committee regarding the training we have received, primarily informally by LINE”* (a texting application).

Emergent code clusters include communication by text, informal communication, price related communication, cost related communication, and communication related to crop quality.

Perception of influence as farmer

This question was asked to assess whether interviewed independent smallholders perceived themselves as having influence in any part of the policy process – whether in terms of conception, initiation, execution or offering amendments – essentially any other role besides asking for clarification. The majority of interviewees (92%) indicated that they did not perceive themselves as having any influence in this regard, many specifically citing their perception of a lack of power. Lack of influence, cited as lack of power, was most frequent in Surat Thani. In terms of provinces, as illustrated in the following figure, none of the interviewees from Chumphon, Krabi and Trang perceived themselves as having influence. Of the

remaining provinces, the greatest percentage of respondents who answered in the affirmative were from Chonburi, followed by Surat Thani and Trat.

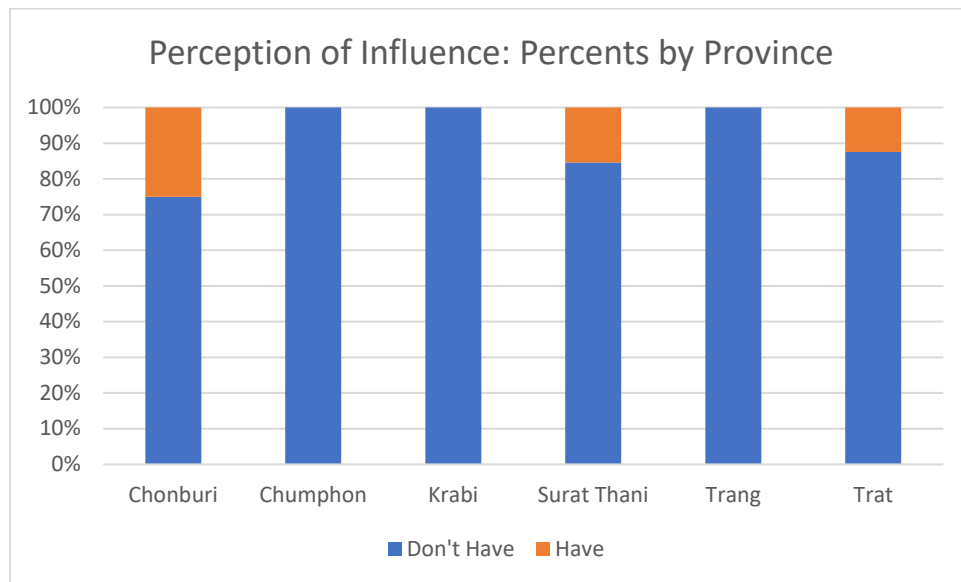


Figure 20: Interviewed independent smallholders' perception of influence by province

In terms of exposure to the RSPO, 94% of interviewed independent smallholders who were trained but not certified did not perceive themselves as having influence, whereas 98% of those certified indicated the same, as compared to 87% of those who had no exposure to the RSPO at all.

In terms of RSPO-certified interviewed independent smallholders, one interviewed RSPO-certified independent smallholder said: *"I think between individual farmers or collectively farmers having power, individuals have very less; collectively- they have some, through a smallholder association to buy cheap fertilizer for example; the*

government has considerably more power; mills have most power- government cannot control mills in terms of what price mills pay farmers for our crude oil as the government cannot do anything more than give price assurance, which also only is for one or two months of the year.”

Another interviewed independent smallholder who was certified mentioned:

“Individual farmers have no real power and can rarely have the knowledge and confidence to bring up their issues, it is easier in a small group, but it is still the middlemen and government who has the most power.”

Another smallholder who finished the certification requirements but hasn't yet been certified said: *“I don't think farmers have any negotiating power so proposing something and moving forward with it is difficult. Even though some farmers may have opportunities to speak, a lot of it is surface level talk as those in power don't actually listen. When elected representatives from the district attend meetings on farmers' behalf, the things they bring up also depend on their interests and who supports them, so my advice to farmers is to not give up and elect representatives that represent your interests.”*

Another interviewed independent smallholder who was also trained but not certified said: *“I think only the government has any real power, the RSPO group has some, farmers like me are only really there to listen.”*

Emergent code clusters include lack of power for individual independent smallholders, greater power in groups, concentration of power among middlemen and government elites, issues addressed depending on elite interests, elected officials as a way to represent farmer interests.

Individual or Collective Effort for Policy Change

This code addressed whether the interviewed smallholder perceived that the possibility of individual or collective effort for policy change was possible, not possible, or explicitly not worth the effort, given the majority of interviewees cited discontent with some form of policy. The majority of interviewed independent smallholders answered in the negative, followed by affirmative, and then that such an initiative was not worth the effort. In terms of provinces, Trat was the province with the highest percentage of interviewees (50%) who indicated an affirmative answer, whereas all interviewees in Chumphon indicated that they perceived that such an initiative was not feasible.

In terms of exposure to the RSPO, all interviewed independent smallholders who were trained but not certified did not perceive individual or collective effort for policy change as possible, as compared to 72% of those who were certified and 53% of those who did not have any exposure to the RSPO. 2% of those who were exposed to the RSPO explicitly indicated that they perceived individual or collective efforts for policy change as not worth it, as compared to 13% for those who had no exposure to the RSPO. In terms of those respondents who perceived it feasible for

individual or collective effort to result in policy change, 26% of those who were RSPO certified indicated that they did, as compared to 34% of those who were not exposed to the RSPO at all.

An interviewed independent smallholder who was RSPO certified mentioned:

“Bringing up issues within and through a group in meetings with government officials or RSPO trainers is possible but difficult. It is not guaranteed that we will have time, or they will listen.”

One interviewed independent smallholder that was trained but not certified mentioned: *“I feel discouraged as it is not easy, by an individual, it is next to impossible- need a group, many things are not up to the farmer”*

Emergent code clusters for this include the relative ease of bringing up issues via group rather than as individual and discouragement at the difficulty of change.

Lack of Influence

This code addressed whether interviewees specifically framed their perception of influence in terms of lack or scarcity rather than a simple negative. Words such as “lacking influence”, “less influence than” were considered as indicating scarcity as opposed to a simple “no”. Over 93% of interviewees framed their perception of influence in terms of lack or scarcity rather than a simple negative. In terms of provinces, all of the interviewed independent smallholders in Chonburi, Trat and Trang framed their perception of influence in lack or scarcity terms.

In terms of using language indicating lack of influence, 97% of those who were trained but not certified, 92% of those certified and 95% of those not certified perceived themselves as having a lack of influence.

Lack of Access

This code addressed whether the interviewed independent smallholder specifically cited lack of access to non-training meetings during the interview. The majority of interviewed independent smallholders (over 78%) cited as lack of access to non-training meetings during the interview. In terms of provinces, all of the interviewed independent smallholders in Chumphon or Krabi cited a lack of access to non-training meetings during the interview, whereas Trat followed by Trang was the province with the highest percentage of interviewees not citing a lack of access to non-training meetings during the interview.

One RSPO trained smallholder mentioned: *“I am aware of some meetings via a LINE group of fellow farmer friends, some of them mention when there is a big province level meet, where there are normally 100-200 other farmers- sometimes I am able to go. But, I have no direct friends from Malaysia or Indonesia and couldn’t go, which is where the biggest meetings happen anyway. However, my friend does have friends from Indonesia and Malaysia and knows more about these meetings. The smallholder farmers don’t go to these, only the President of the smallholder association normally sometimes goes.”*

A certified RSPO smallholder mentioned: *“I can never go, as have budget and travel limitations (can only afford to leave for a short time and travel registration is difficult as don’t know how).”*

Emergent codes from this area include time, logistical, knowledge and budgetary constraints to access.

Hopes and Dreams

This question addressed whether interviewed independent smallholders perceived themselves as having hopes and dreams for the future. Over 77% of interviewees indicated that they did not perceive themselves as having hopes and dreams in the future, and of those that indicated in the negative, 65% perceived that having hopes and dreams for the future was pointless or futile. Krabi was the province with the greatest percentage (50%) of interviewees who indicated the affirmative, i.e. they did have hopes and dreams in the future, followed by Surat Thani, whereas Trat followed by Trang were the provinces with the highest percentage of interviewees who indicated that they perceived having hopes and dreams as pointless.

In terms of whether independent smallholders were exposed to the RSPO, 56% of those who were trained but not certified perceived no point in having hopes and dreams for the future and 39% perceived themselves as without hopes and dreams for the future whereas 39% of those who were certified perceived no point in having hopes and dreams for the future whereas 19% perceived themselves as not having

hopes and dreams for the future. Of the interviewed respondents who were not exposed to the RSPO, 42% perceived no point in having hopes and dreams for the future whereas 25% did not have hopes and dreams for the future.

	Exposed to RSPO	Not exposed to RSPO
Biodiversity aware (yes)	34	19
Feel responsible towards the environment (yes)	18	21
Environmental concerns include sustainability (yes)	13	14
Price only concerns (yes)	26	32
Attended a large-scale non- training meeting (yes)	20	33
Proposed something in a meeting (yes)	4	0
Conversed with elites outside of meeting	17	20

Perception of influence as a farmer (yes)	2	4
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Table 15: Key findings from smallholder interviews

The table above summarizes some of the key results from these interviews. While the majority of interviewed independent smallholders were aware of biodiversity issues, stated they felt responsible towards the environment and mentioned sustainability as one of their concerns related to the environment, had conversed with elites out of a meeting and had attended a large scale non-training meeting, the minority of those interviewed perceived they would raise concerns other than price to elites, had proposed any initiative in a meeting or perceived they had any influence as a farmer. These results indicate the gap between independent smallholder values and their type and extent of participation, even with access to elites.

Location specific results

Chonburi

The challenges expressed by the independent smallholders of Chonburi can be broadly divided into 4 categories: The price they receive for their crops is too low, the cost of maintaining a farm (such as fertilizer and labor) is too high, access to water is limited, and independent smallholders do not receive enough education.

A vast majority expressed concerns for their livelihood, either saying the price they received was too low or the costs of their farm was too high. Several also mentioned access to water being their concern, while a minority expressed a desire to receive more education.

All interviewed independent smallholders had heard about the biodiversity policy, but only a minority expressed any concrete views about it. One farmer mentioned he tries to implement the policy but faces challenges as co-planting with oil palm is difficult, while another mentioned he learned about the policy himself and expressed interest in further learnings.

Almost all independent smallholders had heard about the biodiesel policy and supported it, with only one farmer not having heard of it at all. Some farmers specifically stated that they support the policy because they felt it would help increase the use of palm oil.

None of the farmers expressed any hopes and dreams beyond what they had discussed in the interviews.

Many independent smallholders wanted the government to help with the price they received for their palm oil. This included suggestions such as stopping illegal imports, providing better price warrants, keeping the price more stable, creating a palm oil standard for Thailand, and expanding the market to the EU. Some farmers also mentioned they wanted better access to water sources for their farms. Several

farmers expressed a desire for the government to provide better educational opportunities for farmers to help them increase their yields and also to do so in a healthy and profitable way.

While there were no specific comments regarding farmer agency and power, one farmer did mention that he feels farmers needed support to form groups in order to increase their negotiating power, while another farmer wanted better education to be able to understand the issues being discussed better.

Chumphon

All farmers in Chumphon expressed that the greatest issue they faced as farmers was either the price of palm oil, the costs of operations, or a combination thereof. Farmers mentioned the price being too low and too unstable, but also mentioned that the price they get depended entirely on the mill they sold the oil to. Cost-wise, many farmers mentioned the cost of chemical fertilizer to be a major concern, followed by labor costs. Not being able to recoup their costs from the profits of selling the palm oil was a common concern among all the farmers.

All farmers expressed at least some degree of awareness of the biodiversity policy – farmers involved with the RSPO specifically mentioned using birds for pest control instead of chemicals. Several farmers involved with the RSPO also mentioned that co-planting was difficult to implement as an oil palm farmer.

All farmers expressed support of the biodiesel policy. A reason mentioned by most farmers was a belief that this would increase the price of oil palm. Several RSPO-involved farmers also mentioned that they support the policy because oil palm is a clean energy source and can be used to help the environment.

Almost all farmers did not have any specific hopes and dreams beyond what was discussed. One farmer, involved with the RSPO, mentioned his hope that the RSPO would become more effective, as following the requirements set would lead to a better price for his crops.

Advice to the government centered around improving or stabilizing the price farmers received for palm oil. Several farmers requested better price assurances, and for these price assurances to be honored. One farmer requested that it be made easier to obtain land titles, while another requested a credit policy for palm oil.

Many farmers mentioned they felt they had no negotiating power, whether as individuals or as a group. Several RSPO-involved farmers in particular felt there was no point in mentioning things in meetings as they would either not be taken seriously or nothing would get done. Several mentioned that the government and the mills held the power, while one specifically mentioned that he felt only experts would be taken seriously in the meetings.

Krabi

Many farmers expressed a desire for the government to improve the lives of farmers through various means, such as providing a better price for palm oil, reducing the cost of fertilizer, following through on promises, and helping them form lobbying groups. One farmer also commented that the government knows that there is a hierarchy within farmers in terms of access to resources and asked that the government improve the imbalance. Another farmer asked for more access to knowledge and education.

Regarding participation and agency, many farmers said they did not attend meetings. While many did not give clear reasons, one common thread among those who did was that they did not have the time or resources to travel and attend these meetings. Another farmer said he was not comfortable speaking up in big meetings, while a few others said it is beneficial for farmers to form groups – in fact one farmer said he joined the RSPO to be part of a group. One farmer suggested that the RSPO and the government should help farmers form lobbying groups to increase the power they had.

While several farmers had not heard of the term biodiversity, there were many who had and who took steps to improve it on their farms. A common theme among RSPO certified farmers was a clearer understanding of the concept of biodiversity, with several farmers discussing ways to protect local animals, prevent soil pollution, and how this would help them improve their yields. One farmer in particular said he was

not aware of the concept of biodiversity until after joining the RSPO and going through training.

Surat Thani

The farmers of Surat Thani most prominently listed price and cost as being challenges for farmers. Specifically, many mentioned that the price was too low or did not match their costs and also that the cost of fertilizer was too high. Other comments included concerns about lack of rain, lack of training and knowledge about exporting, and government policies not helping the farmers. An RSPO-involved farmer also commented that growing RSPO-compatible crops might not be worth the effort as the returns were too low.

Many farmers had not heard of the biodiversity policy, or only had a vague understanding of it. RSPO-involved farmers consistently expressed awareness of the policy, however. Several of these commented on the importance of animal diversity while others said they were co-planting. However, a few said they either couldn't co-plant or that co-planting was causing challenges for their farm.

Almost all farmers expressed support for the biodiesel policy, predominantly because they believed it would help farmers by improving the price of biodiesel. Some farmers expressed skepticism of the government's motivation though. One farmer was only peripherally aware of the policy and had no specific opinion.

While a fair number of farmers expressed having no particular hopes beyond what was discussed, a significant number also expressed hopes for a better livelihood through improved oil palm prices. RSPO-involved farmers in particular hoped Thailand could learn from Indonesia and Malaysia.

Many farmers suggested that the government cut fertilizer prices, followed by improving the price of palm oil and improve farmer income. Other suggestions included reducing imports of palm oil, curbing the power of mills and middlemen, and to have consistency on agricultural policy. RSPO-involved farmers also mentioned that the government should learn from Indonesia and Malaysia.

Of the farmers who had commented in meetings, all expressed frustration that their comments seem to be getting nowhere. Many mentioned that they heard no news about any potential changes or updates regarding their comments.

Trang

A majority of farmers in Trang mentioned as a challenge that the price of palm oil was not high enough to cover their costs, and cost management was another concern for many. Many farmers mentioned chemical fertilizer as being a significant cost. RSPO-certified farmers also emphasized a lack of knowledge about efficient oil-palm farming as a concern.

Most farmers of this region had not heard of the concept of biodiversity, or were unsure of the policy and what it meant. A few farmers had heard of it without

providing much comment on it, while one farmer involved with the RSPO voiced support for the policy while also saying he could not co-plant as oil palm does not support co-planting.

Many farmers voiced full support for the biodiesel policy, while a smaller number said they had not heard about it or were unsure of what it was about. One farmer said he had heard of it, but was skeptical about whether the government was sincere.

A vast majority of the farmers said they had no hopes and dreams beyond what they had already mentioned in the interviews. A few farmers expressed hopes for a more stable price for palm oil, and better organization of government policies for oil palm.

Many farmers voiced a desire for the government to better monitor the price of oil palm, and also to stabilize it at an acceptable rate. Help with cutting production costs, particularly by reducing fertilizer price, was another request. Many farmers also requested better education in order to better understand farming as well as the market they operated in. Some farmers also said the government needed better organization and consistency regarding its oil palm policies.

Several farmers said they felt farmers had any power – one mentioned he hesitated to speak up unless as part of a large group, while another said that he felt anyone understood the issues farmers brought up when they did speak. One farmer also

mentioned that many farmers had no experience negotiating what crops to grow or what price they should get.

Trat

Many farmers of this region did not provide answers for some of the questions in the interviews. Additionally, none of the farmers were involved with the RSPO in any significant way.

Of those who did answer, all said that palm oil price was insufficient to meet the costs of production and that this was a major challenge. One farmer also elaborated that fertilizer was too expensive.

Most farmers said they were either not aware of the concept of biodiversity, were only vaguely aware, or didn't have any opinion on it. One farmer was aware but said he did not think it could apply to oil palm farming.

Most farmers voiced support for the biodiesel policy, with several stating that this was because it would help increase prices. Several farmers had no specific thoughts on the policy and expressed neutrality.

Many farmers did not answer the question about hopes and dreams at all – those that did said they had no specific hopes or dreams beyond what had been discussed in the interview.

Several farmers asked that the government follow through on the price assurances for oil palms, while a similar number requested the government find more ways to help increase oil palm price and reduce price volatility. One of these farmers said he felt the price assurances didn't make much difference as the mills were able to drive down overall prices and the differential payment would be insubstantial.

Most farmers did not comment on farmer power or agency. However, a few did mention they felt that individual farmers had very little power, and that nothing seemed to happen when they suggested things in meetings.

Themes according to framework

Equity

Do independent smallholders perceive they have equal capacity to participate as elites?

This part of the framework was meant to assess whether independent smallholders broadly perceive themselves as having the same capacity as elites to participate in the context of sustainability discussions regarding certification. Relevant parts of the semi-structured interviews conducted include smallholder views regarding attending large-scale non-training meetings, proposing issues in meetings, perception individual or collective efforts for policy change, smallholder suggestions to the government and whether these go beyond income/livelihood.

RSPO-exposed independent smallholders frequently cited learning as the sole reason to be present, as well as perceptions of a lack of access due to knowledge, time or other resources. In addition, RSPO-exposed independent smallholders were frequently unclear on the types of appropriate issues to propose and expressed lack of confidence in the language or terminology to bring up and address issues in terms of proposing issues in meetings relative to elites. In terms of concerns, RSPO-exposed smallholders were concerned about the power differential between middlemen and mills and themselves as well as primarily price and income concerns. Other than price and income concerns, RSPO-exposed smallholders infrequently expressed health concerns, related pesticide use. RSPO-exposed smallholders also expressed their perception that bringing up issues in environments where elites were present was likely ineffective if brought up by an individual smallholder, and more effective when brought up by a group whereas this did not matter for elites.

In summary, the perception of RSPO-exposed independent smallholders is that they do not have equal capacity to participate as elites. Regarding the difference between RSPO-exposed and non-RSPO-exposed smallholders, RSPO-exposed smallholders explicitly cited power differential concerns when speaking about making suggestions to the government. RSPO-exposed smallholders also identified resources other than time as reasons for lack of access to large-scale non-training meetings, including RSPO meetings. Further, RSPO-exposed smallholders explicitly identified the need

for more education for farmers and a mindset change to be able to engage past listening when it came to interacting with any and all types of elites.

Agency

Independent smallholders perceive they have less ability for self-determination as compared to schemed smallholders in relation to elites.

- v. Do independent smallholders have less access to reason-orientation and deliberation as compared to elites?

To recall, reason orientation and deliberation refer to the individual's freedom to make rational decisions founded on personal preferences. In the context of values surrounding sustainability, the gap between the independent smallholders' expression regarding whether they feel responsible towards the environment and the suggestions they make in meetings or the issues they think are salient in the context of growing oil palm are noteworthy. RSPO exposed independent smallholders stated family, health, religion and community value-based reasons in addition to good agricultural practice and RSPO training based reasons; however in terms of suggestions to elites and the concerns they wanted to bring up, price and income related concerns dominated, with some mention of health concerns, even as independent smallholders acknowledged that post-RSPO training, their view of their reasons to be responsible to the environment, including sustainability considerations, was solidified in

terms of value, income, and health concerns. In summary, the gap between smallholders acknowledging their preferences to the environment and their concerns which are price and income dominated suggests they have to prioritize income or livelihood concerns over their broader range of expressed preferences, including environmental and sustainability concerns.

- vi. Do independent smallholders perceive they have less capacity for action than elites?

Capacity for action refers to achievement due to agency in that the outcome an individual agent contends with is a result of direct or indirect action on the part of the agent only, rather than others. In this regard, RSPO exposed independent smallholder attitudes to proposing something in a meeting, their perception of influence as a farmer as well as their perceptions of individual vs. collective efforts for policy change are useful. In terms of making a proposal in a meeting with elites, RSPO exposed smallholders expressed a perception of lack of confidence regarding the in the amount of broad knowledge, education and language capacity they possessed in comparison with elites, as well as mindset limitations. RSPO exposed independent smallholders also expressed their perception of a lack of power as compared to elite stakeholders, cited greater power and relative ease of proposing their ideas in groups, and the relative concentration of power among

middlemen and government elites, indicating support for the notion that individual smallholders do perceive themselves as having less capacity for action than elite stakeholders for a variety of reasons.

- vii. Do independent smallholders perceive they have less impact on the world than elites?

To recall, impact on the world refers to the notion that the greater the impact of the individual's actions on the world, the more the level of agency that can be attributed to this individual. In the case of RSPO exposed independent smallholders, they explicitly expressed a perception of lack of confidence regarding how their comments would be processed as well as the limitations of their input to the ease of implementation of RSPO and other practices rather than the formulation of these practices. In addition, RSPO-exposed smallholders perceived an identified power differential between themselves and elite members, as well as their discouragement at the difficulty of change from independent and group efforts on the part of smallholders.

From the perspective of independent smallholders regarding the situation:

Independent smallholder perception of their role is distinct from their perception of their current agency, as perceptions regarding role would indicate if independent smallholders perceive that their agency ought to change or stay the same.

- iv. Do independent smallholders perceive they have less autonomy as compared to elites?

To recall, autonomy refers to whether independent smallholders are able to take action on the basis of what they value independent of expectations of ability, expectations regarding what they ought to value or whether they have reason to value what they do. For the case of RSPO exposed smallholders, they expressed that they valued conserving the environment, notions of sustainability and biodiversity; however, their perception of the actions available to them were in the context of elite defined RSPO standards for certification or government agency defined good agricultural practices. Some RSPO exposed independent smallholders did identify independently looking for sustainability practices based on their values via television or media, or via informal conversations with friends. However, their perception of the scope of their actions is that it is limited within the context of the RSPO itself.

- iv. Do independent smallholders have perceive their role is to have less autonomy as compared to elites?

Comments of RSPO exposed independent smallholders noted their perception of learning as the sole reason to be present in a non-training meeting, the necessity of education for farmers to have more education and information to be able to engage as well as their role of executing implementation of the standard. These comments suggest that RSPO

exposed independent smallholders both perceive their role as largely participatory and feel constrained in their efforts to expand their role. Interviewed RSPO exposed independent smallholders mentioned their role as participatory more frequently than perceptions of limitations to expanding their role.

- v. Do independent smallholders perceive they have less effective power as compared to elites?

Effective power indicates the power of an individual or a group to realize chosen outcomes. Effective power is distinct from control in that effective power also includes the choice to “not” choose something- so the freedom to navigate narratives on a personal and collective level. In this regard, RSPO exposed smallholders expressed perceptions of limitations in terms of their role in the RSPO and its meetings as primarily confined to learning and executing decisions already made, and a lack of confidence and knowledge regarding making and proposing their choices. RSPO exposed independent smallholders’ perceptions remained regardless of whether they were speaking in the context of an individual smallholder or a group, although RSPO exposed independent smallholders did comment on their perception of envisioning and proposing issues as a group as easier than on an individual level. Moreover, RSPO exposed independent smallholders did express a

narrative regarding their perceptions of environment and sustainability issues, but not within the structure of the RSPO.

- i. Do Independent smallholders perceive their role is to have less effective power as compared to elites?

RSPO exposed independent smallholders commented on their perception of having less power and did not directly comment on their perception of the power they 'ought' to have. However, their frustrations with bringing up issues and participation, as well as sporadic participation efforts and subsequent discouragement could indicate that they perceive themselves as needing more power than they do currently possess, independent of the power of elites.
- vi. Do independent smallholders perceive they have less ability to commit to goals beyond wellbeing as compared to elites?

Committing to goals beyond wellbeing refers to independent smallholders' ability to envision, commit to and execute goals that are 'other' rather than self-wellbeing oriented. Such goals include broad sustainability goals, supporting a cause, etc. In this area, RSPO exposed independent smallholders expressed preferences regarding their values on sustainability and other environmental concerns, but expressed action or perceived potential for action related to themselves, primarily price and income concerns. The other related wellbeing goals expressed were health goals, as some interviewed RSPO exposed smallholders brought up

health of family members, but this arguable still was a community related to self, rather than a broad 'other' community, for example on a regional, national or global scale.

- i. Do Independent smallholders perceive their role to have less ability to commit to goals beyond wellbeing as compared to elites?

Interviewed RSPO exposed independent smallholder comments regarding their perceptions of their responsibilities towards the environment but prioritized price and income concerns in their perceptions of issues needing to be addressed. This gap suggests that independent smallholders do perceive themselves as having a role of committing to 'other'-related wellbeing goals but with an unclear path and livelihood/income restrictions towards doing so.

Scale of participation

- iii. Do independent smallholders perceive themselves as having thinner modes of participation than elites?

This part of the framework was meant to assess independent smallholders' perception of the "thickness" of their participation, based on the scale identified in chapter 5. The scale classifies various broad descriptions of participation from thinner modes such as nominal, passive, consultative and petitionary to thicker modes like participatory, bargaining and deliberative. RSPO-exposed independent smallholders characterized their participation by: a) constraints to meeting access

including time, logistical, knowledge and budget-based, b) constraints to speaking access due to perception of their role as largely participatory and execution based, lack of specialist knowledge and education, lack of procedural knowledge and perceived constraints to outcome or knowledge about an outcome regarding an issue they brought forth, as well as that their informal communication with elite members is primarily related to price and cost concerns. In addition, of the few RSPO-exposed interviewed independent smallholders who were solicited for input, the solicitation was regarding the ease of implementation of RSPO policies already set in place by the elite or agricultural practices introduced by the local government. Further, independent smallholders perceived their ability to bring up issues as low, specifically for independent smallholders vs. acting in a group.

Although interviewed independent smallholders did perceive acting in a group as easier, their role at most was limited to bringing up issues for elite consideration. Therefore, independent smallholder perception of their participation was mainly centered around nominal, passive and consultative participation. The perceptions that fit into the nominal participation category in the spectrum identified in chapter 5 include those where RSPO exposed independent smallholders perceived themselves as unable to attend group meetings due to constraints across a range of resources, including time, money, knowledge and other resources. The perceptions that fit into the passive category include those where smallholders perceive their

roles as limited to listening and learning, as well as executing standards already agreed to by elites. Finally, perceptions that fit into the consultative category include that independent smallholders provide input or opinions either only as solicited by elites or if freely, in contexts where elites make decisions and do not have a compulsion to process independent smallholder views. A subset of interviewed RSPO-exposed independent smallholders mentioned their perception of a lack of a clear process as well as lack of knowledge about an outcome as barriers to presenting their views. In summary, RSPO-exposed interviewed independent smallholders broadly placed themselves on the thinner part of the spectrum of participation.

Chapter 6: Testing the framework: elite stakeholder perceptions and comparison of the perceptions of elites and independent smallholders

This study seeks to explore the perceptions of elites towards the inclusion of independent smallholders in the RSPO. The evidence this study will provide comprises the perceptions of elite stakeholders as to how they frame and view the role of independent smallholders in the RSPO and in general, as well as elite perceptions of the benefits independent smallholders gain by listening to instructions or descriptions versus participating via among other ways, asking questions or clarifications, proposing amendments to executing policy initiatives, proposing amendments to policies themselves or proposing entirely new policies. The study will attempt to provide insights as to whether elite stakeholders view smallholder access to training and non-training meetings and listening to instructions as comprising independent smallholder inclusion and participation and provide an assessment of where interviewed elites would place smallholder inclusion broadly and participation on the scale defined in Chapter 4. In addition, the study will attempt to place differences in elite perceptions of the inclusion and role of independent smallholders against elite perceptions to participate, including profit or resource related and knowledge related reasons, and provide insights into elite perceptions of underlying power relations between independent smallholders and elites.

In addition, this chapter will provide comments on the differences between elites' and independent smallholders' perceptions of the power relations between each other. The chapter will highlight whether the aforementioned differences vary between RSPO-certified, trained and non-RSPO smallholders, and also whether they diverge by the category the elite represents. The chapter will use the gleaned insights to provide overall implications of where farmers are placed on the participation spectrum identified in chapter 4, as well as results on where independent smallholder farmers are perceived to be as to various elements of the framework identified in chapter 4. Specifically, this chapter will provide comments on whether there are differences in where on the spectrum of participation identified in chapter 5 between where elites perceive independent smallholders ought to participate and where independent smallholders themselves think they ought to participate, separated out by RSPO trained, certified and non-RSPO trained independent smallholders and by the category the elite member represents. Finally, the chapter will provide comments on how the insights of elite perception and differences between elite and independent smallholder perception compare against implications from RSPO policies regarding independent smallholder inclusion in the context of the framework identified in chapter 5, including contextual case-specific considerations, and the implications for an application of Norton's framework, as discussed in chapter 4.

Extensive interviews with elite stakeholders in Thailand provide the basis for evidence on the ground regarding several hypotheses generated at the end of chapter 4 via the framework discussed there. IRB approval for these interviews was granted and can be found in the appendix. In terms of structural equity, the study will provide insights on whether elite stakeholders perceive independent smallholders have equal capacity to participate as them. Next, the study will provide elite stakeholder perspectives on various aspects of agency of independent smallholders, including ability for self-determination, access to reason-orientation and deliberation, capacity for action, impact on the world, autonomy, effective power and ability to commit to goals beyond wellbeing. The study will also provide comments on elite stakeholders' views regarding their perception of their roles as compared to elite perception of independent smallholder roles in the context of various aspects of agency. This study will also provide insights on where elites perceive themselves on the scale of participation identified in chapter 4 as compared to independent smallholders. Finally, the study will provide comments on whether elites regarding whether elites perceive they can communicate with a common language to smallholders and whether they perceive those smallholders have a common language to communicate with them, and whether communication regarding shared values and arriving at consensus is perceived as feasible in a similar vein.

Next, this chapter will present a synthesis of the results from chapter 5 (the perceptions of independent smallholders) and elite perceptions. This part of the analysis will provide comments on the differences in perceived power relations between independent smallholders and elites, including whether they vary by whether the independent smallholders are RSPO certified or trained but not certified as well as by the category the elite represents. This section will next provide comments on the overall implications of where independent smallholders are perceived to be on the spectrum, including where on the spectrum elites perceive independent smallholders should participate in comparison to where independent smallholders themselves think they should participate, and whether there are differences in RSPO-exposed and non-exposed independent smallholders as well as by the category the elite represents. The section will finish with comments on how the insights in the section so far compare against implications of smallholder inclusion from RSPO policies, including Thailand specific considerations, as well as the overall implications of the insights from this section to the feasibility of common languages, spaces for communication of diverse values regarding sustainability and platforms for consent as indicated in the framework in Chapter 4.

This study contributes to a gap in the literature on how those who conduct and influence participatory processes (elites) for marginalized producers (independent smallholders) perceive participation and the role of marginalized producers. It contributes to the growing critique of the “seemingly uncritical promotion of a

depoliticized and technocratic version of participation” that is accepted in commodity roundtables including the RSPO (Delabre & Okereke, 2020, p. 646). Specifically, the corporatized and commodified nature of sustainability visions and the highly technocratic rule based processes for attaining sustainability are a far departure from the original motivation to incorporate participation practices in environmental management, which was to incorporate insights that are adaptive to local environmental and socio-cultural contexts and facilitate social learning (Blackstock et al., 2007; Delabre & Okereke, 2020; M. Reed, 2007; M. S. Reed, 2008). In fact, studies demonstrate that even as participation by marginalized stakeholders is improved, the entry of these stakeholders from lesser positions of power leads to minority perspectives not being expressed or heard, as well as elite capture of the benefits of participation (Cheyns, 2014; Cheyns & Riisgaard, 2014; Fung, 2003; Obidzinski et al., 2012; Ponte & Cheyns, 2013).

This chapter will begin by describing the methods used, followed by the data collection strategy and data collected on the ground, as well as the strategy for data processing. It will then present results of elite perception based on elite interviews conducted in Thailand, followed by a synthesis of elite and smallholder perceptions, and conclude with a section on overall insights.

Data and Methods

The purpose of this study is to ask whether elite participants in the RSPO and its related training processes in Thailand perceive benefits to smallholder participation,

what type of participation elite stakeholders associate with independent smallholders, and in what capacity elites perceive those smallholders ought to participate in the RSPO.

This study was conducted using the phenomenological approach as the main objective of this method is to examine respondents' perception and experience of a phenomenon and characterize themes that represent the experience of respondents, presenting findings in a theme-driven format. A phenomenological approach was preferred as the purpose of this study involved eliciting and identifying elite stakeholder perceptions about their roles and those of independent smallholders in terms of independent smallholder participation and inclusion in the RSPO, and a phenomenological study provides the basis of analysis related to respondents' lived experience (Tindall, 2009). The depth of elite stakeholders' perceptions and experiences was essential to providing insights into how and why they might perceive their own and independent smallholder participation and inclusion in the way that they do, which provided the necessary substance for the research question at hand. The findings from phenomenological research can be used to provide the context for "recognizing complex, multilayered, meaningful realities that reflect corporeal, temporal, spatial, and relational dimensions of living, and thus provide a foundation for developing and testing... interventions based on understanding of lived experience" (Willis et al., 2016, p. 1200).

Semi-structured in-depth interviews are the most frequently recommended and utilized method for phenomenological research as the purpose of such research is to elicit detailed, and rich accounts of the phenomena under consideration. Semi-structured interviews are the preferred method for conducting such research as such interviews allow the respondent and the researcher to engage in real-time dialogue and provide the flexibility for the researcher to explore in depth and address any unexpected data with prompts and further questions (Pietkiewicz & Smith, 2014). Most guides recommend preparing an interview plan in advance of the interview that include key questions and related prompts. One preliminary interview was conducted with the translator to gain insights into the process of conducting such an interview, as well as to develop appropriate prompts. A debrief with the translator following this interview clarified useful prompts as well as the process of conducting the interview so that detailed notes could be taken.

Interviews were conducted in person or online in late 2019. Interviewees were contacted initially via contacts gathered at an oil palm conference the author attended in Thailand. Interviews were primarily conducted on-site or at the interviewers' work office. Interviewees were recruited via a mix of snowball and purposive sampling, as appropriate for qualitative research. Purposive sampling was relevant for this study as it involves the researcher determining a sample most relevant to the purpose of their research by using their judgement. Purposive sampling is frequently used in situations where the research necessitates detailed

information and insights from a wide range of experts, using appropriate criteria and reasons for inclusion. Maximum variation purposive sampling, as was used for this research, is frequently used to capture a wide variety of perspectives to gain comprehensive insight into the research question as well as facilitate with unearthing common themes across the sample.

Most of the elites selected had to represent at least one of the non-producer categories of stakeholders in the RSPO: oil palm processors or traders, consumer goods manufacturers, banks and investors, environmental NGOs, developmental NGOs or retailers, or belonging to a government agency in Thailand that works with the RSPO and had to be directly involved either in the certification process or have attended RSPO meetings where they had significant incentives to direct independent smallholders. In addition, elites from the producer category were as they are not mainstream independent smallholders, but wealthier or more powerful independent smallholders who occupied governance positions in farmer organizations such as provincial farmer councils. Although these elites did have farmer experience, their resources in terms of connections to elites, power and financial resources were significantly greater than those of the average independent smallholder. One such elite was interviewed from each province. Snowball sampling was also appropriate for the study as it is likely that relevant elites knew other elites that interacted with the RSPO. All interviewees were asked for credentials prior to being invited for an interview, and these were checked using databases of the

organization at which they were employed, as well as with the referee (in case they were recommended). To capture the richness of the data, phenomenological methods are suited to a small number of participants, with the recommended number of participants typically ranging between 3 and 23 (Tindall, 2009). As summarized below, a total of 19 interviews were conducted, each interview being about an hour long, with most interviewees being very generous with their time and offering to stay and answer any follow-up questions.

Category	Number
RSPO governance	2
Corporations interacting with independent smallholders and the RSPO	2
Office of Agricultural Extension	1
Middlemen	5
RSPO training conductors	3
Elites in farmer organizations	6
Total	19

Table 16: Elite interviewees by stakeholder category

In-depth semi structured Interviews were conducted one-on-one in English and Thai when the respondent only spoke Thai. Semi-structured interviews are appropriate for this research because they are a cost-effective way of gathering a significant amount of data in limited time, they allow the researcher to gather the perceptions

of the individuals interviewed and interpret these, and the flexible nature of such interviews gives space to the researcher to trail emerging themes and be guided by the respondent regarding how they construct perceive a certain phenomenon, allowing the researcher to uncover new insights. A translator was present for all interviews that were conducted in Thai. For interviews conducted in Thai, the author met with the translator in advance of the interview to prepare the introduction to the research, as well prepare for any clarification questions the interviewer might have. Each interview was conducted in strict confidence and interviewee names removed for complete anonymity. All interviewees were presented with a consent form prior to the interview, as well as information pertaining to the research, and any questions the interviewee might have. Any potentially identifiable information was removed or anonymized. Handwritten notes were used to record the content of the interviews, pausing the record the respondent's response verbatim as appropriate. The notes were supplemented by researcher and translator debriefs as appropriate.

Data were analyzed inductively first by developing a set of descriptive comments on the contents of the interview, reflecting in how the content was presented as well as the nature of the content itself, developing conceptual themes that reflected common and divergent threads in the content, classifying the themes under the framework and hypotheses developed in Chapter 4, and finally developing a

narrative account supported by statements of the participants. Both description and interpretation focused codes were used to capture the contents of the interviews.

General Themes

First, all elite stakeholders broadly talked about independent smallholders in terms of independent smallholders being persuaded to get RSPO trained, or complying with RSPO requirements. Middlemen stakeholders frequently discussed the quality of oil palm produced, whether independent smallholders complied with RSPO practices, and the benefits of compliance on income due to higher quality oil palm and better success with yield due to better planting and harvesting procedures. Corporate elites similarly emphasized the income benefits of RSPO training, especially in terms of demand for RSPO certified palm oil.

Government elites echoed this sentiment, citing synergies between GAP (good agricultural practice) standards and RSPO trainings, as well as the opportunities for smallholders to track their progress via records, as well as improved understanding during government trainings subsequent to independent smallholder exposure to RSPO training. Elites in farmer organizations emphasized the farming knowledge aspect of independent smallholders attending RSPO trainings and getting RSPO certified. RSPO training conductors emphasized the group aspect of independent smallholder training, as well as the necessity of independent smallholders to comply with requirements. Finally, elites in RSPO governance mentioned the work that went

into developing the RSPO standards, and how independent smallholders are helped by joining the RSPO to get trained and certified.

Second, elite stakeholders emphasized the process of participation of smallholders as attending smallholder trainings and learning by experience, with the guidance of trainers as well as sharing ideas with others in their group. The elites emphasized the benefits of these training sessions in order to persuade and educate smallholders in terms of the standards, as well as the sessions minimizing the work required for certification for oil palm smallholders. For example, the middlemen stakeholders interviewed mentioned the reduction of problems of conflict over oil palm quality and said the independent smallholders were clearer about the quality of the oil palm they produced following these sessions. Corporate elites emphasized the structure for understanding the RSPO and its requirements that these sessions provided, as well as the benefits of independent smallholders developing a network of those connected with the RSPO standards in case they faced any difficulties understanding or complying with the standard.

Government elites cited similar reasoning as the corporate elites, with the added note that attending these trainings allowed independent smallholders to form a network with each other. Elites in farmer organizations cited the sentiments of the corporate and the government elites, as well as adding that a group setting promoted more responsibility to adhere to the RSPO standards and commitment to finishing the training among independent smallholders. RSPO training conductors

added the ease of meeting with the independent smallholder groups that the training format provided, as well as noting any modifications or improvements to executing the standards as relevant to context, as well as the ability to demonstrate groups of independent smallholders who had successfully formed a group and completed the training to get certified to those independent smallholders who were in the initial stages of the process. Finally, RSPO elites mentioned the appropriateness of this format for independent smallholders in that this allowed them to practice what sustainability meant and the resources required.

Third, elite stakeholders emphasized leading smallholders through a certification process that was complex, with a number of complicated bureaucratic requirements that were a result of complex interactions and simplifying these was recognized as challenging, uncertain and time-consuming. Here the elites emphasized the importance of making the process as accessible as possible for the smallholders, particularly focusing on the necessity of leadership by those who knew the bureaucracy well. Middlemen cited the efficiency of a supervised certification process in enabling independent smallholders to achieving certification. Corporate elites noted the varying nature of national policy, the role of the RSPO in providing a consistent standard for higher quality oil palm where independent smallholders had resources and help to understand and achieve that standard. Government elites referred to the help that independent smallholders got from their trainers more generally. RSPO training conductors mentioned that complicated knowledge and

bureaucratic requirements could be perceived by independent smallholders as a barrier to getting certified, and thereby reduce their potential for improved yields that were competitive on the market. Finally, RSPO elites noted that adapting the broad RSPO principles and criteria to national contexts was a challenging enough endeavor with a number of factors outside the control of RSPO elites, but independent smallholders achieving the standard with resources for help made the standard much more accessible.

Fourth, elite stakeholders emphasized the role of smallholders supporting each other as they went through the RSPO training and certification process. The elites noted that independent smallholders communicated via apps such as Line, for example, or participating in smallholder meetings in each province. Elites noted that such communication could be useful in facilitating independent smallholder cohesion in the group they were part of for certification and provide motivation to keep with the requirements of the RSPO training, as well as provide an avenue for smallholders to discuss any issues among themselves before bringing them up, aiding a more unified voice. Middlemen and corporate elites had little to say on this issue.

RSPO trainer elites as well as elites in farmer organizations noted the benefits of community and that having a forum for informal communication could help smallholders with questions as they went about practicing the practices from the RSPO training as well as provide them a space to bring up any issues they were

“shy” to bring up in person. Elites in farmer organizations also noted that independent smallholders communicating among themselves allowed them to discuss resource constraints, such as the price of fertilizer and brainstorm ways to mitigate or overcome such constraints. RSPO training elites noted that smallholders communicating with one another allowed them to identify adaptive measures appropriate to context such as leveraging local predators for pest control that helped satisfy certain RSPO requirements. Finally, RSPO elites noted that independent smallholders communicating with one another allowed them to share the benefits of RSPO certification, and thereby support and keep one another motivated.

Fifth, the majority of elite stakeholders emphasized their own limitations in terms of influence. They highlighted that they were bound by socio-economic policies and norms as they had to work while taking into account the effects of price regulations, imports, competing products, and so on, as well as monitoring broader international markets for export opportunities. Other identified constraints include weather and climate impacting harvests. Middlemen noted that they were subject to overarching government policies as well as those of the mills that they supplied to. Corporate elites also mentioned the overall national policy climate as well as policies specifically related to oil palm and oil palm corporations, as well as role and scope limitations.

Government elites noted the variability of policy and their limitations related to their role and Ministry scope, as well as economic concerns. RSPO trainer elites noted that their role was to train independent smallholders in the standards already set by the RSPO and that while they had avenues for feedback, they had little say in the outcome. Elites in farmer organizations mentioned that while they could be receptive to farmer concerns and encourage independent smallholders to discuss and potentially bring up these concerns in relevant avenues, with the RSPO specifically, their influence was indirect. RSPO governance elites noted that they did have consultation policies to account for feedback, but did not specifically answer to the access of independent smallholders. The majority of elite stakeholders emphasized government policy and other structural limitations to their role. They emphasized that they could not directly influence government policy, and that they also had to work within many of the same restrictions as the smallholders. They strongly pointed out that they were not at an advantage in this regard, but rather were working with the smallholders to create a mutually beneficial situation. All interviewed elites noted the large influence of domestic and international supply, demand and price as constraints to their influence, as well as the attitudes and prevailing norms of consumers of oil palm.

Finally, elite stakeholders highlighted the benefits to independent smallholders in terms of increased income and knowledge. This focused on what elites considered to be meaningful benefits for the farmers; these included higher standards of living,

improvement in yields, a more efficient work process, and so on. Increased knowledge was also perceived as a way for smallholders to have more meaningful participation in the various meetings they attended. Middlemen cited the more regular supply of higher quality oil palm in addition to higher yields that would fetch independent smallholders greater income. Middlemen also cited a reduction in waste of resources such as fertilizer that could yield cost benefits to farmers. Corporate elites cited the benefit of independent smallholders better understanding market trends so that they could make growing decisions to maximize income.

Elites from farmer organizations noted the cross benefits of RSPO training, as smallholders who had participated in RSPO training or been RSPO certified could share knowledge they developed that was not directly linked to RSPO requirements with friends whether or not these friends had been exposed to the RSPO, and potentially lead to yield improvements, and a better understanding of why independent smallholders benefit from better understanding market trends. RSPO trainers and government elites noted that RSPO exposed independent smallholders could potentially experience better standards of living, and have knowledge in addition to the broader good agricultural practices (GAP) frequently disseminated in government trainings, as well as be better aware of international trends. Finally, RSPO governance elites noted that improved living, increased efficiency of work benefits and increased income were large benefits that afforded oil palm

independent smallholders more sustainable livelihoods due to the reduction in uncertainty.

Results from framework

This part of the framework was supposed to assess the perception of RSPO elites (trainers and governance) of various aspects of the framework as they relate to independent smallholders, as well as the elites' own role.

Equity

This part of the framework was supposed to examine whether elites perceive smallholders as having the same capacity to participate as them in the context of sustainability discussions regarding certification. It was also supposed to assess what elites perceived their role to be regarding sustainability discussions. Elites seem to perceive their role to be that of the decision-maker, priority-setters and instructors, within the contextual constraints. While they do seem to want smallholders to participate, the language used consistently indicated that the smallholders are expected to participate within the framework established by the elites. The elites perceive themselves as setting or executing sustainability goals and training, and expect that smallholders will see the benefit of following the vision of sustainability laid out to them via the education and income incentives provided or highlighted by elites. While there is some degree of effort to persuade smallholders by emphasizing the material benefits they will receive, overall elites perceive that the smallholders will be on the same page as the elites in terms of goals and priorities.

In terms of elites' perception of smallholder roles, elites perceive smallholder roles to be executing the training and knowledge from training. Elites perceive smallholder roles in terms of communication as smallholders primarily communicating within themselves and asking elites for guidance or bringing up complaints as needed rather than setting priorities. In particular, RSPO training and governance elites mentioned their role in setting policies that benefitted smallholders as well as training them to meet the pre-established standards more effectively and efficiently. When elites across the board did comment on smallholders voicing their opinions, it was in the context of how better to meet the standards or priorities set by the elites or difficulties with implementing them in local contexts rather than views or opinions about the standards themselves. Overall, elites were more focused on increased smallholder participation and providing a reliable mechanism for smallholders to have improved income and access to oil palm markets in the context of sustainable livelihoods for independent smallholders.

Agency

In terms of agency, this part of the framework was supposed to assess whether elite stakeholders perceived their ability for self-determination, reason-orientation and deliberation, capacity for action and impact on the world as similar to that of independent smallholders. In addition, analyzing this aspect of the framework was also to provide comments on what elite stakeholders perceive their agency ought to

be given their role vis-a-vis independent smallholder. In terms of reason orientation and deliberation, elites view smallholder interest and incentive to be income- and livelihood-based rather than more broadly normative ideals regarding sustainability. Elites view their role more broadly in terms of policy input and implementing policy, but also perceive structural and role defined limitations to their ability to decide based on personal preferences.

Elites perceive smallholders as having the capacity to bring up issues as they see fit in a meeting, but the scope of these issues is constrained to those having to do with implementing the standards for RSPO certification rather than debate the standards themselves. In addition, elites note that smallholders have knowledge constraints that elites help fill more broadly than the other way around. In terms of action, elites perceive independent smallholders to potentially have capacity for action within the scope of context-related execution of RSPO standards on occasion, but not broadly speaking. More generally, elites perceived smallholders would bring issues with RSPO standards to elites who would then mediate and potentially help action on the issue or make necessary decisions. However, elites did perceive themselves as decision makers on some aspects of policy and most aspects of policy setting in the case of the RSPO elites in RSPO governance, indicating that interviewed elites perceived themselves as having greater capacity for action than independent smallholders. In terms of impact on the world, elite stakeholders did not comment on how likely it was that smallholder comments would be processed, but did stress

that their own power and roles had limitations. Those involved in RSPO governance acknowledged their role in participating in the setting policies as well as decision making. In terms of autonomy, elites did not address what smallholders would value or whether smallholders could value in terms of RSPO standards for sustainability, rather they perceived smallholders as needing to be persuaded of the value of RSPO training and certification. Elites perceived their role as setting policies and decision making in terms of how these policies are implemented. In terms of effective power, elites indicated they had more decision-making power than independent smallholders in terms of deciding to carry an idea or request forward, or not to do so. Elites did not comment on goals beyond income and livelihood for smallholders, but broadly aligned themselves with promoting sustainability as codified by the RSPO, indicating that elites perceive themselves as in a place to consider goals beyond wellbeing, but may not expect smallholders to do so.

Scale of participation

This part of the framework used a participatory scale to assess stakeholders' perception of the "thickness" of their participation. Elites characterized their participation by: a) decision-making and arbitration roles, b) training/didactic roles, c) negotiating roles in relation to other elites as well as smallholders. Where elites did most frequently express constraint in is terms of national government rather than RSPO policy. RSPO governance elites cited more decision making and negotiating roles whereas RSPO training elites cited more training, decision making

and arbitration roles. In terms of participation, elites seem to be in the participatory participation stage as defined by Crocker – they see themselves as the decision-makers and thus their participation is priority. As can be seen through their attitude toward equity and agency, elites seem to view their role as more macro-focused than the role they perceive for independent smallholders.

Essentially, it could be said that a key common aspect of the elite perception of their role is active participation in the decision-making process, as they did not include smallholders in decision making comments past smallholders executing RSPO standards. Meetings are regularly held in central locations, which are designed to be accessible for elites in terms of location and in terms of financial and time costs, as such meetings typically depend on specific elite participation but may not be easy or practical for independent smallholders to reach. Elites characterized their perception of smallholder participation largely in terms of executing standards, learning, asking for clarification or bringing up problems for elites to consider. This would fall into the passive participation rank as defined by on the participation scale in the framework in chapter 4. Moreover, even when discussing potential change or expansion of smallholder roles, elites characterized their perception by noting that independent smallholders could be more involved in terms of bringing up concerns, reach out more to elites in case of issues and communicate more among themselves in their certification group for comments or ideas, indicating elite perception of future smallholder participation is independent smallholders doing more in terms of

their previous roles rather than expanding the scope of independent smallholder participation in terms of the depth of participation as outlined in the scale.

Norton's framework

This part of the framework was meant to assess elite perception of their ability to communicate with independent smallholders across a range of aspects. The first aspect was whether elite stakeholders perceived themselves as having a common language to communicate with independent smallholders. The next aspect to be examined was whether elite stakeholders perceive themselves as being able to communicate diverse values regarding sustainability in various platforms with independent smallholders. The third aspect to be assessed was whether elite stakeholders perceive themselves as having platforms to arrive at consensus with independent smallholders regarding independent smallholders' values about sustainability. In addition, elite perception of independent smallholder resources in terms of having a common language to communicate, being able to communicate diverse values regarding sustainability and having platforms to arrive at consensus.

When using Norton's framework to evaluate the elites, it is clear they perceive they have a common language to communicate with smallholders – indeed, it is assumed that the smallholders are speaking the same language regarding priorities and goals as the elites, and the fact that smallholders may have a different set of goals in mind does not enter the equation. In fact, it could be said that elites do not perceive smallholders as having incentives to have values regarding sustainability; rather it is

taken for granted that the smallholders will work with the elites, and that the common attitude seems to be that the goals and values regarding sustainability outlined by the elites align with those held by the smallholders themselves, and that independent smallholders will engage from an income and sustainable livelihood incentive, rather than from their values regarding sustainability. In essence, elite perception is that sustainability values need not enter into their interactions with smallholders. Elites perceive that smallholders have enough of a common language to communicate with them once they have been through the RSPO training process, in terms of having the language to frame questions and problems, but the questions and problems elites assume independent smallholders will bring up are regarding the execution of RSPO standards rather than the ideals of sustainability underlying those standards.

Similarities and differences between elite and independent smallholder perception of the aspects of the framework

In terms of equity, RSPO exposed independent smallholders and elites converge on their perceived role of the independent smallholder. Specifically, both stakeholders have the common perception of the role of the independent smallholder as learning the primary objective of independent smallholders within the RSPO. However, the reasoning behind the ascribed role was divergent. As noted previously, non-training meetings are often held in more central locations which are hard to reach by many independent smallholders, and even when they do participate many stallholders

perceive a barrier to speak up – they perceive their role is to passively listen, rather than to actively participate in the discussions being held. Many smallholders also expressed the perception that they are unsure of whether their suggestions were considered and whether practical action as a result would occur. Thus, many smallholders report feeling that there is no point in speaking up, and many only join the meetings for the sake of receiving information rather than actively impacting decision making.

In terms of agency, RSPO exposed independent smallholders and elites diverge on their perception of agency of the independent smallholder. While elites perceive smallholders as being able to bring up any concerns in a non-training meeting, smallholders themselves do not perceive themselves as being able to do so. RSPO exposed smallholders indicated that they did have values related to sustainability in addition to price, income and livelihood concerns. However, RSPO exposed smallholders expressed concern about their lack of knowledge, education and language capacity as barriers to discussing sustainability issues. Elites, on the other hand, did not expect smallholders to be motivated by concerns other than price, income and livelihood. In terms of the reason-orientation and deliberation aspect of agency, elites and independent smallholders diverged on their perception as independent smallholders perceived that they had limited leeway to make decisions based on their preferences, as the preferences that were perceived to matter were primarily price and income preferences whereas elites perceived that smallholders

only had income and price preferences, i.e. that independent smallholder preferences were constrained by incentives. In terms of capacity for action, both elites and independent smallholders perceive independent smallholders as being constrained in terms of the outcomes independent smallholders can achieve as a result of only their actions. In general, these activities are constrained to production activities; however, while smallholders perceived limitations to making proposals or bringing up points of contention to elites, elites perceived those smallholders would be able to bring these issues up. Both elites and smallholders perceived elites to be in decision making roles, although elites perceived smallholders as being able to bring up their issues in meetings individually, whereas smallholders perceived a number of limitations to being able to do so. Both elites and smallholders perceived elites as decision-makers on smallholder-initiated proposals for clarification or change. While smallholders recognized the limitations of their impact in terms of impact on the world, interviewed elites did not comment. In terms of autonomy, both elites and independent smallholders perceived independent smallholders perceived limited scope for smallholder autonomy in the context of the RSPO, as both independent smallholders and elites identified the RSPO training as the key focus for independent smallholders. In terms of effective power, both elites and independent smallholders recognized limitations to effective power for independent smallholders, in particular for decision making. Both elites and independent smallholders recognized income and livelihood as key incentives for independent smallholders; however, whereas independent smallholders recognized goals about

“other” related wellbeing, elites did not comment on their incentives or likelihood of doing so.

In terms of scale of participation, both elites and independent smallholders characterized independent smallholders as typically being at most on the passive participation part of the scale. Independent smallholders perceived the scope of their participation more broadly than elites as they sometimes perceived themselves as being on the nominal or consultative part of the scale. Elites and independent smallholders differed on their perception of the onus of who might be able to change the level of participation of independent smallholders. While elites perceived those independent smallholders could do more to bring up concerns, independent smallholders perceived a number of limitations beyond their own initiative to bringing up concerns. Both elites and independent smallholders recognized the need for more information amongst independent smallholders in order for them to take more initiative to bring up their concerns.

Smallholders perceive a number of limitations to having a common language to communicate with elites, whereas elites tend to assume independent smallholders can communicate freely with elites. In terms of communicating diverse values regarding sustainability, independent smallholders broadly could not identify spaces for communicating these values, whereas elites broadly assumed that independent smallholders held similar values for sustainability as these, negating the need for discussion. In terms of having platforms to arrive at consensus, independent

smallholders perceived a number of barriers to accessing spaces for participation, whereas elites perceived those independent smallholders would primarily engage with the RSPO in terms of livelihood and income incentives.

Conclusion

This dissertation has examined the process of roundtables including producer stakeholders in formulating what sustainability means. In the examined case of the Roundtable on Sustainable Palm Oil, there is a clear gap between the policies being set and how they are experienced on the ground, particularly for the case of producer stakeholders. This dissertation focused on independent palm oil producers. The RSPO differentiates two categories of smallholder producers: schemed and independent. While independent smallholders are not formally bound by contracts with specific mills and have fewer legal restrictions, in practice, they still face many limitations, including reduced income and social status, and limited negotiating power. This lack of power can lead to them complying with restrictions from mills or middlemen not because of formal contracts, but because of income incentives and the lack of other options. The perceptions mentioned in the stakeholder interviews conducted for elites and producer stakeholders in Thailand suggest a clear difference between the perceptions of elite and producer stakeholders in several respects.

Implications for RSPO policy

RSPO policies highlight the important role of producer stakeholders in ensuring sustainable palm oil production practices, and outlines their responsibilities in meeting the standards set by the RSPO. Producer stakeholders are defined as entities involved in the production of palm oil, including smallholder farmers and large plantation owners. RSPO policies emphasize the importance of collaboration between producer stakeholders and other key players in the palm oil supply chain, such as buyers and traders, to ensure that sustainable practices are implemented across the entire value chain. RSPO policies also outlines the specific responsibilities of producer stakeholders in areas such as land use, worker health and safety, and environmental conservation. For example, producer stakeholders are required to engage in responsible land use practices, such as avoiding the conversion of high conservation value areas and respecting the rights of indigenous communities. They are also responsible for ensuring safe working conditions for their employees and minimizing the environmental impact of their operations. Overall, RSPO policies underscore the importance of producer stakeholders in achieving sustainable palm oil production practices and highlights the specific roles and responsibilities they must undertake to meet the standards set by the RSPO.

The Roundtable on Sustainable Palm Oil (RSPO) has attempted to involve smallholders in its sustainability discussions, but it is unclear how much influence they have. Smallholders are both major producers of oil palm and dependent on its

cultivation for their livelihoods, while also being at risk of being undermined by oil palm production. In the past, the RSPO funded initiatives such as the RSPO Smallholder Support Fund and facilitated smallholder certification. Criticisms of past strategies for smallholder engagement include delays in translation and lack of involvement from representatives of indigenous peoples, farmers, and plantation workers. The RSPO's current smallholder strategy seeks to improve smallholder yields while prioritizing their livelihoods, tailoring sustainability requirements to smallholders, providing localized approaches to smallholder inclusion, and improving farmer self-sufficiency. The RSPO introduced a standard specific to independent smallholders in 2019 to allow phased entry into the RSPO.

The Roundtable on Sustainable Palm Oil (RSPO) has a plan for the inclusion of independent smallholders, but it is caretaking rather than agency-focused. The plan requires independent smallholders to form groups led by group managers, and the RSPO certification is awarded to the group as a whole after complying with certification requirements. The lack of understanding of how independent smallholders are represented in the RSPO's general assembly and board of governors remains unclear. The RSPO's smallholder strategy focuses on the incentives for smallholders to participate in RSPO certification, viewed in terms of improving their livelihoods. The RSPO sees smallholders as fundamentally incentive-focused, limiting smallholder participation in the RSPO in terms of RSPO envisioned incentives for smallholders for prosperity, whereas smallholder perspectives on

what sustainability means and their ability to actually shape policies regarding sustainability is unclear.

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The RSPO (Roundtable on Sustainable Palm Oil) captures some level of smallholder well-being in its sustainable livelihoods approach, but this approach limits

smallholder freedom to decide what they want in terms of sustainability. The RSPO views independent smallholders as needing incentives to participate in certification, but their roles in defining the RSPO's vision of sustainability are ambiguous. This dissertation proposed the concept of smallholder agency to enable a broadening of the RSPO's vision and strategy for greater smallholder inclusion for decision-making and therefore the legitimacy of the roundtable itself. The concept of agency was combined with a scale of participation for stakeholders, ranging from nominal participation to collaborative decision making. In general, from a policy perspective, RSPO policies concerning independent smallholders could clarify at what point on a participation scale the RSPO sees smallholders participating and when. In addition, RSPO policies could refer to frameworks other than the SLA approach as a mainstay for formulating reasons for smallholder participation, in particular development frameworks that include conceptions smallholder agency in determining both how they want to participate as well as in formulating a vision of sustainability.

Implications for independent smallholders

Gaps between independent smallholder and elite perception of the role of independent smallholders in the RSPO suggest that independent smallholders have a broader focus than prioritizing income as is assumed by elites and that independent smallholders do not view themselves as being able to access spaces for participation or being able participate in decision making, contrary to elites' perception. These gaps suggest a need for clarification of the types of participation

that independent smallholders can access on the ground, with a clear scale. In addition, the gap between the values smallholders expressed and their expression of these values within the RSPO suggests a need for independent smallholders themselves to clarify which values they might want to express within the RSPO, and for the RSPO to regularly have data collection efforts that identify these values. Various contextual supports could facilitate such efforts. For example, there could be fora where independent smallholders specifically express their values and vision as it relates to sustainability, and link it with their experiences growing oil palm. In addition, independent smallholders and independent smallholder groups could be included the general assembly, and the number of attendees and the type of participation be made more transparent in the meeting minutes, which are then made accessible to those that could not or did not attend.

In addition, elite perception of independent smallholders is that independent smallholders in terms of independent smallholder agency is that independent smallholders perceive themselves as freely being able to bring up concerns. In contrast, independent smallholders are unclear about whether they can bring up their concerns, where they can do so and the progression their concerns will take through the organization before they receive comments or answers. From a policy perspective, this suggests a need for clear processes of reply, with points of contact and leverage at each stage that independent smallholders can directly reach out to. These points of contact cannot be trainers for certification as the role of trainers to

specifically educate smallholders might hinder independent smallholders participating in a deliberative way unless a specific space is designed for such an interaction. Moreover, trainers and independent smallholders would have to perceive one another in a way that allows for deliberative participation, in stark contrast to the hierarchical setup of a training relationship or interaction. In addition, elite perceptions and independent smallholder perceptions of the role of the independent smallholder converge on the perception that the role of the independent smallholder is to learn across the various types of elites in the RSPO. Therefore, spaces including stakeholders across the various types of elites and a number of independent smallholders would be more conducive to the type of interaction that is more deliberative rather than nominal on the scale of participation.

Next, clarity on the goal of the interaction would be beneficial. For example, in a trainer-independent smallholder interaction, it is generally assumed that the space is for trainers to educate independent smallholders or provide clarification on their questions about how to execute growing requirements. Moreover, if the interaction is taking place in a training workshop or training space, the hierarchy between the trainer and the independent smallholder is underscored due the institutional arrangement. In a space where the point of the meeting is unclear or the meeting is too large for an individual smallholder or a small group of independent smallholders to bring up an issue even without an obvious hierarchy, smallholder perception of

their ability to participate and their actual ability to participate in a meaningful way might be limited. In a smaller group where it is clear that the goal of the meeting involves independent smallholders engaging in deliberative participation would be a small step towards a more transparently inclusive space for independent smallholders to participate. Of course, initiatives for participation cannot be limited to such efforts. If smallholder agency is increased in a true manner, that means greater involvement of smallholders in decision-making processes, including on the processes that constitute these.

Independent smallholders leveraging greater agency and involvement in the RSPO would require them to invest significant time and energy in initiatives beyond being trained in grower standards so as to fully understand the role of the RSPO, the role of the smallholder, and their joint impact on the state of sustainability. Once they become more fully involved in the decision-making process, they would be able to influence policies in such a way that better reflects their vision.

Scale

The RSPO is a multi-tiered organization, so policy implications of this research will necessarily apply across multiple scales. For instance, on a country level, the structure and work of the RSPO is shaped by documents called the “National Interpretation” of the RSPO mandate. The national interpretation of the RSPO mandate outlines some of the support and leverage points relevant to a specific national context. To translating insights regarding independent smallholder agency

and participation into the national context for the RSPO, first, explicitly including an independent smallholder vision and strategy into the national interpretation would be helpful. Including a process that is nationally viable and independently verifiable into the document would help, as would publicly accessible feedback by a representative sample of independent smallholders with consideration for location. In the case of Thailand, independent smallholders that are undergoing RSPO certification or are already RSPO certified are located across several provinces, and within the same province, in various locations. An independent smallholder vision and strategy in the national interpretation that builds off the current perception of elites and independent smallholders could provide examples of various types of participation an independent smallholder could engage in and where, and how these might be accessible to them. For example, a province level contact point for information and access help regarding major meetings could improve independent smallholder awareness of these meetings and improve initiatives to access them due to enhanced information. In addition, translation of the participation scale proposed in this research into a national operational context for the RSPO via mapping key fora for independent smallholder participation as examples would help broaden the perception of the role of independent smallholders by both elites and the smallholders themselves, and could facilitate improved actual participation.

Summary insights and directions for further research

This research broadly contributes to the academic literature by providing a case study on RSPO-certified, RSPO-trained and non- RSPO-exposed independent smallholder perceptions. Further, it is one of the few nationally focused studies of a range of RSPO elites in a context of smallholder dominant production. It is also the first study comparing perceptions of independent smallholder participation between elites and independent smallholders and the first study comparing elite perception of their role vis-à-vis the role of independent smallholders. This research provides evidence supporting examining province level policies regarding oil palm and rice production. It further demonstrates evidence supporting the need to examine frameworks different from the SLA in formulating MSI policies for stakeholder inclusion. Results from independent smallholder and elite interviews support the need to have a clear scale of participation for marginalized stakeholders as part of assessing policy outcomes in roundtables. In synthesis, this research provides large implications for how policies for inclusion in voluntary sustainability standard setting organizations' governance are conceptualized, formulated and assessed.

Several types of further research could expand and build upon the current. In the short term, comparing perceptions RSPO national vs. global governance elites across contexts would provide insights on what types of perceptions are similar or may be trends and where they differ. Longer term research could provide insights into why perceptions are similar or differ by conducting longitudinal studies and isolating

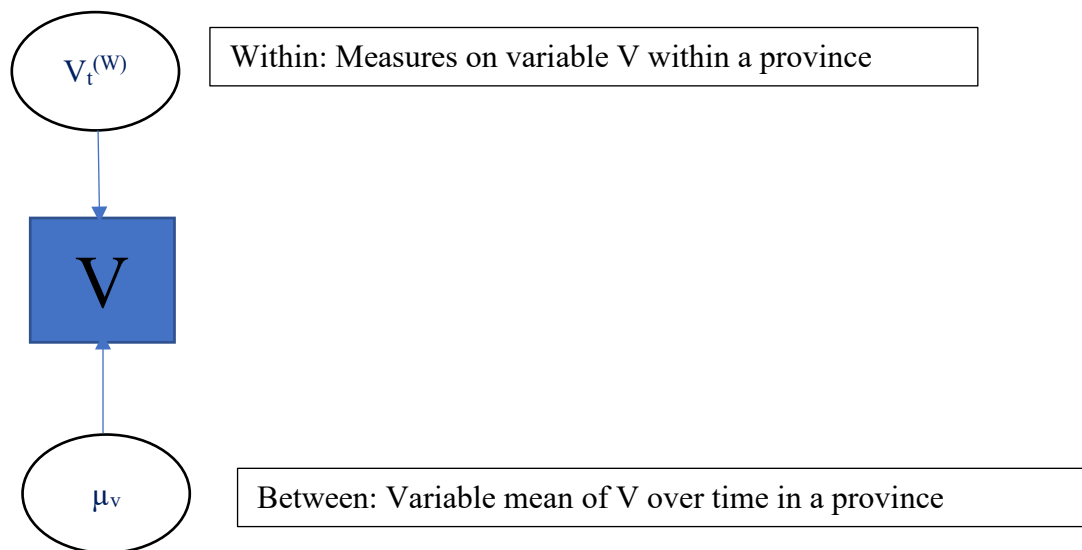
variables with significant variation across contexts, for example, via quantitative surveys or by longer term case studies. Next, while the current research has focused on the RSPO, future research could expand perceptions of independent smallholder participation by smallholders themselves and elites across multi-stakeholder initiatives that certify crops used for biofuel production or biofuels themselves, for example, initiatives such as Bonsucro or the Roundtable on Sustainable Biofuels. Finally, further research could investigate smallholder perceptions across MSIs for crops to assess perceptions of inclusion in collaborative governance regimes involving voluntary sustainability standards (VSS), including perceptions of marginalized stakeholders across VSS governance for agriculture, forestry, fisheries and mining to uncover evidence-based broad trends pertinent to stakeholder inclusion, with an aim to a more complete theory of stakeholder participation in multi-stakeholder governance structures that provide sustainability certification.

Appendices

Appendix 1: Model details

Multilevel VAR(1) Model

- (1) The model does not impose an independent and dependent variable a-priori
- (2) This model involves decomposing each included variable into a between part and a within part, as illustrated below:



- (3) Model outputs include:

- a. Temporal network: describing how a variable is predicted by all other variables in the prior time period (in this case, t-1 is the previous year)
- b. Between-subjects network: associations describe correlations between intra-province mean levels of variables in the model
- c. Contemporaneous network: how variables are linked within a unit of time (in this case, a year)

Steps in the model:

- (1) Estimate equations where each variable is regressed on lags of itself and all other included variables in the model (temporal and between-province networks)
- (2) Estimate equations where the estimated residuals of a variable at time t is regressed on lags of itself and all other variables (contemporaneous network)

Details of running the model:

- (1) Standardize: all 8 variables are converted to z scores
 - a. Index = i
 - b. Subscripts:
 - i. Province =p (76 provinces)
 - ii. Time =t (33 years)
 - iii. Variable= v (8 variables)
 - c. Superscripts
 - i. Time= (T)
 - ii. Variable= (V)
 - iii. Between province= (B)
 - iv. Contemporaneous= (C)

(2) Compute province means per variable and center observations within province:

- a. $\tilde{z}$ = within province centered variable
- b. $\bar{z}$ = within province variable mean

(3) Step 1: Generating temporal and between networks

a. General equation

$$i. Z_{v,t,p} = \beta_{0,p} + \beta_{1v,p}^{(T)} \tilde{Z}_{v,t-1,p} + \beta_{1v}^{(B)} \bar{Z}_{v,p}^{(V=i-1)} + \epsilon_{v,t,p}^{(V=v \text{ on } Z)}$$

b. Example equation

$$i. Z_{\text{riceplanted},t,p} = \beta_{0,p} + \beta_{11p}^{(T)} \tilde{Z}_{\text{riceplanted},t-1,p} + \beta_{12p}^{(T)} \tilde{Z}_{\text{riceharvested},t-1,p} + \beta_{13p}^{(T)} \tilde{Z}_{\text{riceproduced},t-1,p} + \beta_{14p}^{(T)} \tilde{Z}_{\text{riceyield},t-1,p} + \beta_{15p}^{(T)} \tilde{Z}_{\text{oilpalmplanted},t-1,p} + \beta_{16p}^{(T)} \tilde{Z}_{\text{oilpalmharvested},t-1,p} + \beta_{17p}^{(T)} \tilde{Z}_{\text{oilpalmproduced},t-1,p} + \beta_{18p}^{(T)} \tilde{Z}_{\text{oilpalmyield},t-1,p} + \beta_{12}^{(B)} \bar{Z}_{\text{riceharvested},p} + \beta_{13}^{(B)} \bar{Z}_{\text{riceyield},p} + \beta_{14}^{(B)} \bar{Z}_{\text{riceproduced},p} + \beta_{15}^{(B)} \bar{Z}_{\text{oilpalmplanted},p} + \beta_{16}^{(B)} \bar{Z}_{\text{oilpalmharvested},p} + \beta_{17}^{(B)} \bar{Z}_{\text{oilpalmyield},p} + \beta_{18}^{(B)} \bar{Z}_{\text{oilpalmproduced},p} + \epsilon_{\text{riceplanted},t,p}$$

(4) Step 2: generating contemporaneous network

a. Example equation

$$i. \hat{\epsilon}_{\text{riceplanted},t,p} = \beta_{12p}^{(C)} \hat{\epsilon}_{\text{riceharvested},t-1,p} + \beta_{13p}^{(C)} \hat{\epsilon}_{\text{riceyield},t-1,p} + \beta_{14p}^{(C)} \hat{\epsilon}_{\text{riceproduced},t-1,p} + \beta_{15p}^{(C)} \hat{\epsilon}_{\text{oilpalmplanted},t-1,p} + \beta_{16p}^{(C)} \hat{\epsilon}_{\text{oilpalmharvested},t-1,p} + \beta_{17p}^{(C)} \hat{\epsilon}_{\text{oilpalmproduced},t-1,p} + \beta_{18p}^{(C)} \hat{\epsilon}_{\text{oilpalmyield},t-1,p} + \zeta_{\text{riceplanted},t,p}$$

References:

Isvoranu, A. M., Epskamp, S., Waldorp, L., & Borsboom, D. (Eds.). (2022). *Network psychometrics with R: A guide for behavioral and social scientists*. Routledge.

Appendix 2: Network weights

Temporal

[illegible]

Between

[illegible]

Glossary

Contemporaneous

	Rice planted	Rice harvested	Rice produced	Rice yield	Oil palm planted	Oil palm harvested	Oil palm produced	Oil palm yield
Rice planted	0.00	0.83	0.22	0.14	0.00	0.00	0.00	0.00
Rice harvested	0.83	0.00	0.30	-0.33	0.00	0.00	0.00	0.00
Rice produced	0.22	0.30	0.00	0.20	0.00	0.00	0.00	0.05
Rice yield	0.14	-0.33	0.00	0.00	0.00	-0.32	0.46	0.00
Oil palm planted	0.00	0.00	0.00	0.00	0.00	0.13	0.05	0.48
Oil palm harvested	0.00	0.00	0.00	-0.32	0.13	0.00	0.60	-0.56
Oil palm produced	0.00	0.00	0.00	0.46	0.05	0.60	0.00	0.55
Oil palm yield	0.00	0.00	0.05	0.00	0.48	-0.56	0.55	0.00

Appendix 3: GGMs and VAR models

This study wanted to examine whether oil crop production impacted food crop production. To do so, it included planted, harvested land, production and yield data for rice and oil palm in Thailand within a network multi-level modeling approach, which can broadly be classified under a multi-level multi-variate VAR approach.

Structural equation modeling (SEM) approaches are frequently used for panel data where the process leading from cause to effect is complex. Typically, a SEM

approach is different from the multiple regression approach as it employs two or more equations in the model, whereas a regression approach typically has a single outcome variable with several covariates. A SEM model usually has multiple equations with a number of explanatory variables in every equation. To distinguish dependent from independent variables is not necessary in this context as an independent variable in one equation might be a dependent variable in another equation. A more useful classification is whether variables are exogenous or endogenous; whereas endogenous variables appear as dependent variables in at least one equation, exogenous variables are never dependent variables and typically can correlate with one another. Another classification is whether variables used are latent or observed. Whereas latent variables are variables of interest for which data are not available, observed variables comprise those included in an analysis for which data are available. Observed variables function as indicators for latent variables and it is possible to construct models that show how closely each indicator selected relates to the latent variable of interest controlling for measurement error in the indicators.

Vector auto-regressive (VAR) models can be used in the context of SEM when data are available in the form of a multi-variable time series. The basic structure of a VAR is that each variable is a linear function of past lags of itself and past lags of other variables. In general, for a VAR (p) model, the first p lags of each variable in the system are used as regression predictors for each variable. VAR models have several

advantages including being a systematic method for apprehending complex real-world behavior, including the intertwined dynamics of time-series data, as well as enhanced forecasting performance. VAR models are used across a number of fields as they offer a viable framework for accomplishing several modeling objectives including data description, forecasting, structural inference, and policy analysis, thereby offering the flexibility to provide insights to yes/no, how and what types of research questions (Stock & Watson, 2001) (Aptech Data Analytics Blog, 2021).

VAR models are useful because they allow for a complex system of influence, and appear in a number of forms. Vector autoregression is used in general when two or more time series influence each other, and the influence is bi-directional, i.e. the outcome and predicting variables are allowed to influence one another. The number of equations in such a model is equal to the number of time series being considered, which each variable being modeled as a function of a number of past lags of itself and the other variables in the system. There are three broad types of VAR model. The first is a reduced form model, considering each variable to be a function of its own past values and past values of all other variables considered and a serially uncorrelated error term. However, the structure of the model means that error terms will be correlated across equations in these models, implying a modeling restriction of not being able to consider the impacts of individual shocks on a system.

Next, we have recursive VAR models that comprise all components of the reduced form model with the extension that some variables are allowed to be functions of other concurrent variables, i.e. some short run relationships are imposed. By imposing these short run relationships, the recursive model allows for modelling structural shocks. A feature of these types of models is that the error terms in each equation are compiled so that they are uncorrelated with the error terms in preceding equations, as relevant contemporaneous predictors are included as predictors in each equation. The final type of VAR model is the structural VAR model. These models include theory-derived restrictions that allow for the isolation of causal relationships beyond those that can be identified with reduced form or structural models. A benefit of these types of models is that they can be used to identify the impact of individual shocks on other variables. For example, a structural VAR can include unobserved contemporaneous shocks to each variable, which are serially uncorrelated and independent of each other and derived from zero-mean white noise processes. The identified restrictions can take a number of forms as appropriate given the theory, such as sign restrictions, no long-term impacts or no short-run effects.

Criticisms of VAR models are they can be limited in their intake and representation of theory, and as each variable influences all other variables in the system, direct interpretation of the coefficients is difficult. However, VAR models are useful in several contexts: forecasting or examining the trend of a set of related variables,

testing whether one variable is useful in forecasting another, analyzing the response of one variable to a sudden but short-term change in another variable and forecast error variance decomposition, where a proportion of the forecast variance of each variable is attributed to the effect of each of the other variables. Another broad benefit of these models is that they allow for estimation of within-subject issues, circumventing the problem of inferring within-subjects dynamics from between-subjects data. When variables in the model are stationary, implying a constant parameterization, which is frequently a key assumption, such models can be estimated using OLS. The other necessary assumptions include no perfect multicollinearity, the error term has a conditional mean of zero and that large outliers are improbable. Under these conditions, OLS estimates will be consistent, can be evaluated using t-statistics and p-values, and may be used to jointly test restrictions across multiple equations. However, recent advances in the literature propose methods to estimate time varying VAR models based on splines and kernel-smoothing without regularization, by introducing a different parameterization of the VAR model at each time point (Haslbeck, Bringmann, & Waldorp, 2021). When data are structured longitudinally so that repeated measures are nested within individuals, multi-level VAR models can be used.

Multi-level VAR models are used as they separate between and within variances in group level data. One level of the model examines variation within a specific unit of analysis over time. A second level examines the variation across or between units of

analysis over time. In contrast to models that are specific to each unit of analysis, multi-level VARs accommodate all units included in a data into a single model. Advantages of multi-level models include accurate inferences, allowing for analysis of group effects, simultaneous estimation of group effects with the effects of group-level predictors and potential inference to a population of groups where sample data is used. Multi-level VAR models therefore allow for modeling both individual and aggregate dynamics. Network multi-level VAR models are network-based models, consisting of nodes and edges. Nodes can represent a variety of variables, such as the unit of analysis (e.g. country or province), or other data, such as a score on an index. The edges represent relations between the nodes as relevant, for example whether provinces are connected by a major highway or in the cases of scores on various indexes, the extent to which these scores correlate. Network multi-level VAR models use a systems approach to identifying effects as they allow for simultaneous analysis of reciprocal links between dynamic process and individual variation. To summarize, multilevel VAR models allow an autoregressive process per unit of analysis while simultaneously modeling the difference in these processes across units of analysis.

One way to affect a multi-level model is by combining a Gaussian graphical model (GGM) with a VAR model in order to obtain two network models: a contemporaneous network and a temporal network model. A GGM consists of a set of variables indicated by circles and a set of connecting lines visualizing the

relationships between the selected variables. GGMS are popularly used in the social sciences to model statistical relationships between empirically observed variables. GGMs assume that the random variables are jointly normally distributed, so the vector of random variables has a multi-variate normal distribution (Bhushan, et al., 2019). Gaussian graphical models have a number of advantages as compared to analyses that consider bivariate correlations between variables. First, GGMs are useful for datasets with many variables, where the number of bivariate correlations can be extensive, and second, GGM correlation coefficients may be interpreted as partial correlation coefficients, reducing the risk of spurious relationships (Bhushan, et al., 2019). In a GGM network, positive partial correlations are indicated by green edges whereas negative correlations are visualized with red edges, whereas no correlation is depicted by no line connecting the nodes (Epskamp, Waldorp, Möttus, & Borsboom, 2018). The GGM is therefore a network model depicting conditional associations as no association between two variables indicate that those two variables are independent after conditioning on all other variables included in the dataset, allowing modeling of conditional associations which are sometimes expected to be zero, rather than marginal associations which are rarely expected to be zero (Epskamp, Waldorp, Möttus, & Borsboom, 2018). The variance-covariance matrix of a VAR model can be inverted to obtain the contemporary effects of measures after controlling for their temporal effects, allowing for obtaining the contemporaneous network (Epskamp, Waldorp, Möttus, & Borsboom, 2018). A temporal network is formed by combining a lagged with a current variable at the

same node, linked by directed edges weighted according regression parameters obtained by performing multi-variate multiple regressions of all variables in prior time periods, where an edge linking two nodes indicated that one node predicts another or itself (in case of a self-loop) (Epskamp, Waldorp, Möttus, & Borsboom, 2018).

Multi-level statistical models are frequently used to study land use effects. While these were originally developed for use in the social sciences, they are useful for land use science as they combine correlations between various spatial levels. For example, Pan and Bilsborrow used a multilevel model to report on factors affecting land use in a sample of farm plots in 1999 nested in 59 communities along the Northern Ecuadorian Amazon, finding population pressure, labor, accessibility and proximity between land use and communities to be strong predictors of land use (Pan & Bilsborrow, 2005). Hoang et al use multi-level modeling to predict spatial patterns of paddy field productivity across field, household and village levels (Huong Thi, Anton, Vu, Nguyen, & Vanacker, 2020). Such models can be applied in their original form to account for differences in temporal levels.

For this study we have 33 years nested under 76 provinces, and the model allows for temporal, contemporaneous and between effects. Temporal effects include within province effects year on year; contemporary effects include within province effects in a given year and between effects as average inter-province effects across all years. The model is appropriate as it provides a within province snapshot, a

within province trend, as well as an overall country level snapshot for Thailand. The model was estimated with lag 1 using the mlVAR package in R, using the two-step frequentist method. The estimation procedure for this method uses sequential single-variate multi-level regression models on prior measurements, with within-unit of analysis centered lagged variables as regressors for within-subject dynamics and means of all other variables for between-subject regressors. This first step provides the temporal aspect of the dynamics. The residuals generated by these are utilized in sequential multi-level regression models where the residuals of one variable are regressed on all other variables in the same time period (Epskamp, Waldorp, Möttus, & Borsboom, 2018). The second step provides the contemporaneous aspect of the dynamics. This method scales well for up to 20 variables, so is appropriate for the data at hand (Epskamp, Waldorp, Möttus, & Borsboom, 2018). Further details regarding the model are provided in appendix 1.

Appendix 4: Network Estimation and Visualization

Network Estimation and Visualization

The R package mlVAR was used to estimate contemporaneous correlations, temporal correlations, between-province correlations and between subjects' partial correlations between the oil palm and rice variables summarized in Table 7. Contemporaneous correlations describe how two variables are related within the time period of one year, and signify associations that remain after partialling out all

other variables in the network in the same time frame (i.e. all other variables for the same year), and after partialling out temporal associations between variables. For example, a negative contemporaneous correlation between oil palm planted and rice planted embodies that within a single year, higher levels of oil palm planted simultaneously occurs with a lower level of rice planted, after controlling for all other contemporaneous and temporal relationships. Although it is not possible to establish a directed effect in this undirected network, such associations likely arise in temporal relationships. Temporal relationships signify how a variable is predicted by all other variables including itself in a prior time period, the correlations obtained are 'partial' correlations as they denote that variables are linked after controlling for all other temporal effects.

The multi-level VAR model includes intercepts for each included element, and each intercept denotes the mean level of that element across time. Each variable for each province has a mean level for each variable, and these can be used to calculate between-province correlations. For example, a negative between-provinces correlation between oil palm planted and rice planted indicated that provinces which on average have higher areas of oil palm planted also tend to have lower levels of rice planted. In the between-province partial correlations network, associations denote mean levels of variables controlling for all other variables in the network.

The R package mlVAR estimates the contemporaneous, temporal and between-province correlations in two steps. Temporal and between-province associations are estimated in the first step. For this study, this first step involves estimating eight multiple regression equations. In each equation, one of the variables in Table 7 is regressed on all other variables including itself from the prior year (t-1). For example, oil palm planted (p,t) = $b_0 + b_1 * \text{oil palm planted}(p,t-1) + b_2 * \text{rice planted}(p,t-1) + b_3 * \text{oil palm harvested}(p,t-1) + b_4 * \text{oil palm produced}(p,t-1) + b_5 * \text{oil palm yield}(p,t-1) + b_6 * \text{rice produced}(p,t-1) + b_7 * \text{rice harvested}(p,t-1) + b_8 * \text{rice yield}(p,t-1) + e$. In this equation, b_2 denotes the partial correlation between rice planted in the prior year and oil palm planted in the next year, after controlling for oil palm planted in the prior year. As the 'lmer' option in mlVAR estimates a random intercept, the output can be used to obtain an intercept for each variable in each province, i.e. the mean value of that variable across the entire time period for the data. The mlVAR package uses the province-specific means (intercepts) to estimate the between-province correlations, which are partial correlations between the province-specific means of all variables. Effectively, the model uses the differences between the fitted and original data values from the first step, i.e. the residuals to estimate partial contemporaneous associations in the second steps. The method mlVAR uses to do so is by estimating how the residuals of a specific variable are predicted by the residuals of all other variables in the same year. The effects can then be visualized and interpreted, which follows in the section below.

Kolmogorov-Smirnov tests were used to test the normality of each variable at the province level. In addition, for each variable for each province, the Kwiatkowski-Phillips-Schmidt-Shin unit root test was used to test for stationarity (Kwiatkowski, Phillips, Schmidt, & Shin, 1992). While none of the variables were distributed normally, all variables were trend and level stationary.

Network Results

Temporal

The figure below displays the obtained temporal network, which applies to a prototypical province, describing temporal dynamics within a province (year-on-year). The temporal network obtained describes how the eight rice and oil palm variables included in the model predict one another from one timeframe to the next. The annual harvested rice area weakly predicts itself, and predicts rice productivity in the following year. The annual planted rice area strongly predicts itself, the area harvested for rice, the rice produced in tons and weakly predicts oil palm yield in the following year. Rice produced in the current year strongly positively predicts itself and weakly negatively predicts oil palm yield in the following year. Oil palm yield in the current year strongly predicts itself and weakly negatively predicts oil palm productivity in the following year. Oil palm produced in the present year inversely predicts yield in the following year and positively predicts oil palm harvest in the following year, in addition to predicting itself in the following year. Oil palm harvest

in the current year positively predicts oil palm harvest in the following year, strongly positively predicts oil palm yield in the following year and weakly positively predicts oil palm planted and oil palm produced in the following year.

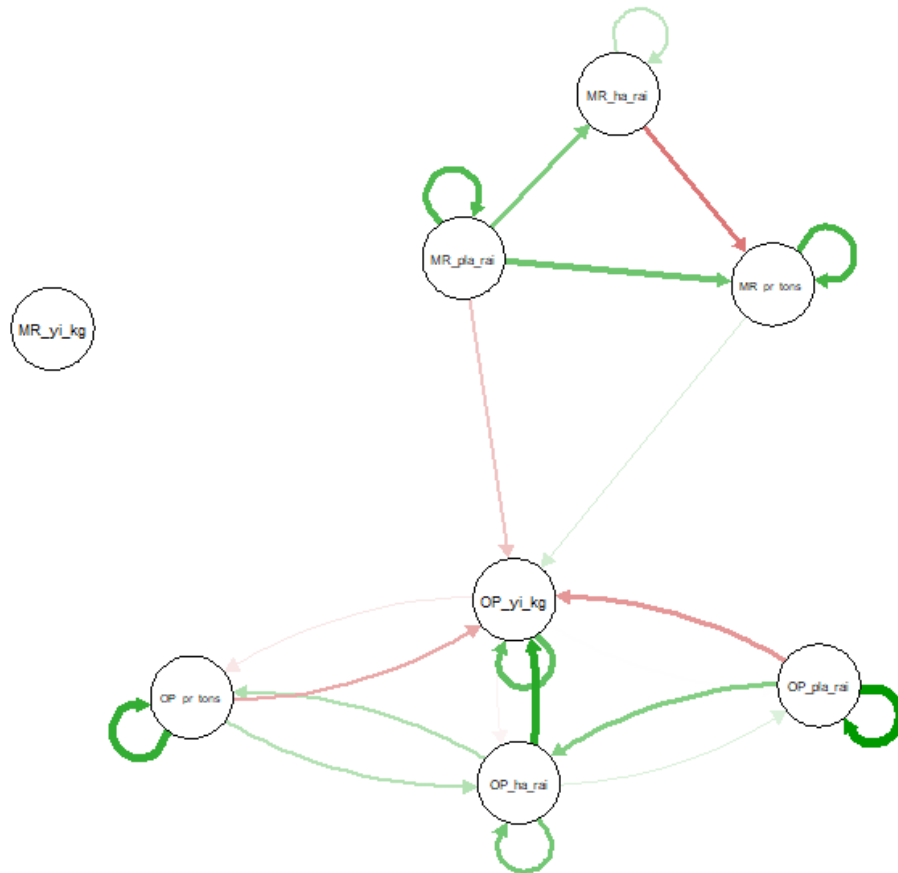


Figure: Temporal network showing significant positive and negative associations between rice and oil palm variables

Contemporary

The figure below displays the contemporary network for variables included in the model, which applies to the prototypical province, effectively providing a within province snapshot for the “average” year. This network shows how the variables in

the model are linked in a single year (single time period) after controlling for all other temporal and contemporaneous correlations. As this is a contemporary network, no arrows are used. In a given year, controlling for all other effects, oil palm planted is strongly positively associated with oil palm yield and weakly positively associated with oil palm harvested. Oil palm yield in a given year, after controlling for all other effects, is strongly positively associated with oil palm produced and strongly negatively associated with oil palm harvested in the same year. Oil palm harvested in a given year, after controlling for all other effects, is strongly positively associated with oil palm produced in the same year, moderately negatively associated with rice yield in the same year, strongly negatively associated with oil palm yield in the same year and weakly positively related with oil palm planted in the same year. Oil palm produced in a given year, after controlling for all other contemporaneous and temporal effects, is strongly positively related with oil palm yield and oil palm harvested in the same year, and weakly positively related with rice yield in the same year.

Rice yield in a given year, after controlling for all other effects, is moderately negatively associated with rice harvested and oil palm harvested each in the same year and weakly positively associated with rice planted in the same year. Rice harvested in a given year, after controlling for all other contemporaneous and temporal effects, is moderately negatively associated with rice yield in the same year, moderately positively associated with rice produced in the same year, and

strongly positively associated with rice planted in the same year. Rice planted in a given year, after controlling for all other effects, is moderately positively associated with rice produced in the same year and strongly positively associated with rice harvested in the same year. Finally, rice produced in a given year, after controlling for all other effects, is moderately positively associated with rice harvested and rice planted in the same year.

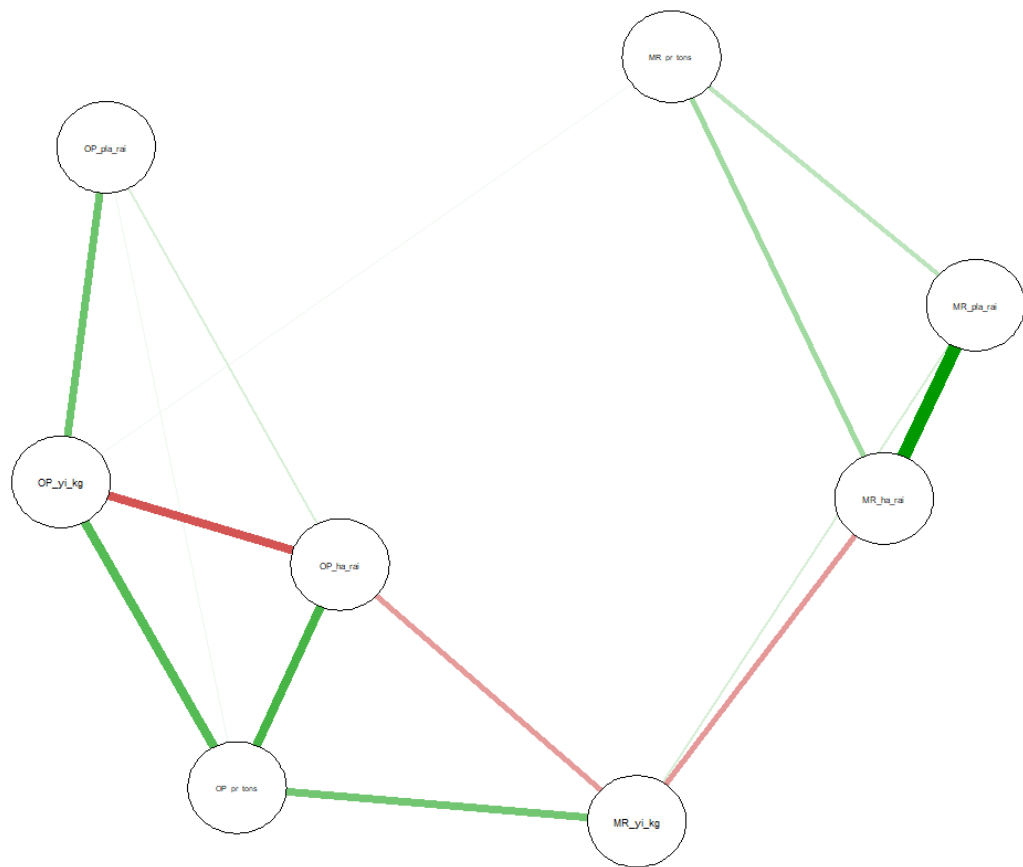


Figure: Contemporaneous network showing linkages between rice and oil palm variables

Between

The figure below illustrates the between province network, describing associations between intra-province mean levels of the oil palm and rice variables in the model, and applies to associations across provinces and across years. For this model, provinces with high average rice yield tend to also have high average rice produced.

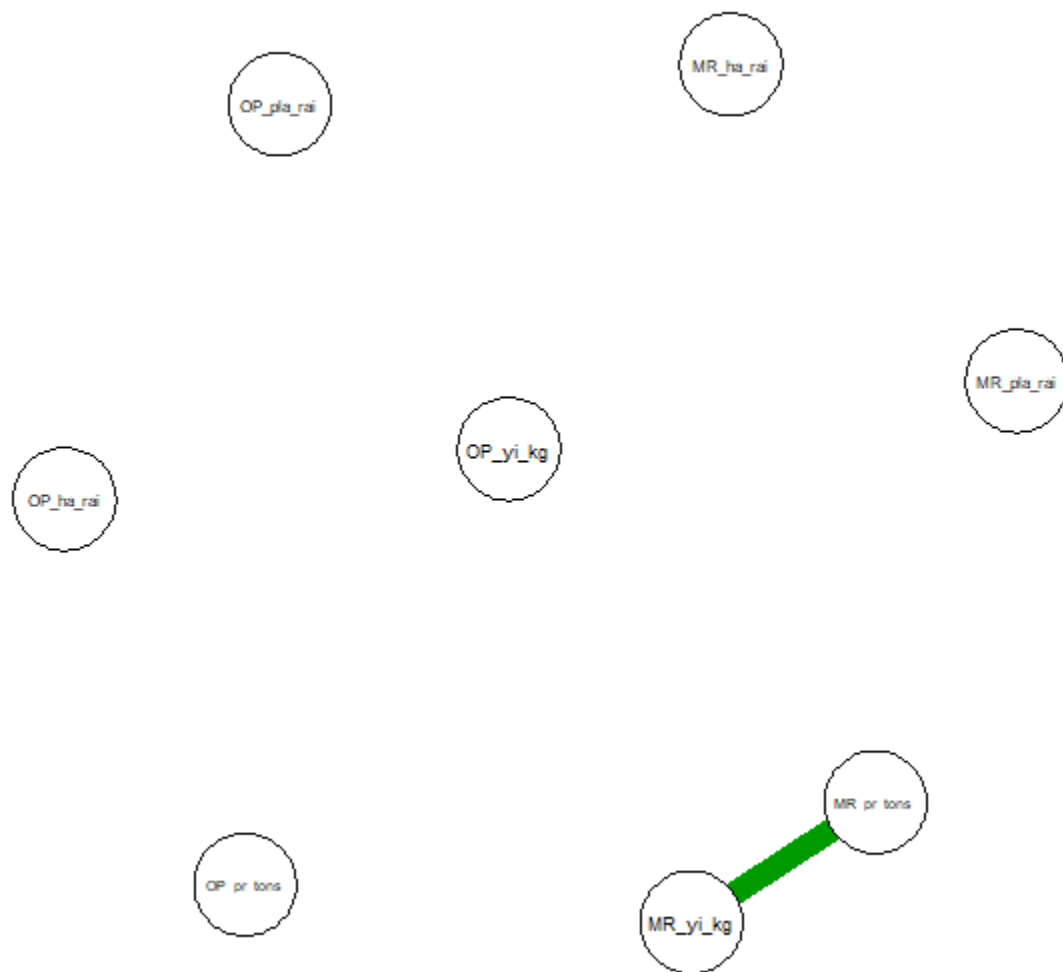


Figure: Between network for linkages between oil palm and rice variables

Appendix 5



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IRB Approval



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DATE: September 30, 2019

TO: Simran Singh
FROM: University of Maryland College Park (UMCP) IRB

PROJECT TITLE: [1438812-1] Is first generation biofuel production in Thailand and S.E. Asia sustainable? Normative Criteria for Equitably Representing Smallholder Voice in Sustainability Roundtables: The Case of Oil Palm Production.

REFERENCE #:
SUBMISSION TYPE: New Project

ACTION: APPROVED
APPROVAL DATE: September 30, 2019
EXPIRATION DATE: September 29, 2020
REVIEW TYPE: Expedited Review

REVIEW CATEGORY: Expedited review category # 7

Thank you for your submission of New Project materials for this project. The University of Maryland College Park (UMCP) IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

Prior to submission to the IRB Office, this project received scientific review from the departmental IRB Liaison.

This submission has received Expedited Review based on the applicable federal regulations.

This project has been determined to be a MINIMAL RISK project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the appropriate forms for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of September 29, 2020.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Unless a consent waiver or alteration has been approved, Federal regulations require that each participant receives a copy of the consent document.

Please note that any revision to previously approved materials must be approved by this committee prior to initiation. Please use the appropriate revision forms for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others (UPIRSOs) and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

Please note that all research records must be retained for a minimum of seven years after the completion of the project.

If you have any questions, please contact the IRB Office at 301-405-4212 or irb@umd.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Maryland College Park (UMCP) IRB's records.

Glossary

If needed.

Bibliography

- Van, F. (Afeissa, H.-S. (2008). The transformative value of ecological pragmatism. An introduction to the work of Bryan G. Norton. SAPI EN. S. Surveys and Perspectives Integrating Environment and Society, 1.1.
- Agee, M. D., & Crocker, T. D. (2013). Operationalizing the capability approach to assessing well-being. *The Journal of Socio-Economics*, 46, 80–86.
<https://doi.org/10.1016/j.socec.2013.07.003>
- Alalwan, H. A., Alminshid, A. H., & Aljaafari, H. A. (2019). Promising evolution of biofuel generations. *Subject review*. 127-139.
- Alkire, S. (2008). The capability approach: Mapping measurement issues and choosing dimensions. *The Many Dimensions of Poverty*.
- Alkire, S. (2008a). Concepts and Measures of Agency. OPHI Working Paper No. 9. Oxford Poverty and Development Initiative, University of Oxford.
<https://www.ophi.org.uk/wp-content/uploads/OPHI-wp09.pdf>
- Alkire, S. (2016). The Capability Approach and Well-Being Measurement for Public Policy (M. D. Adler & M. Fleurbaey, Eds.; Vol. 1). Oxford University Press.
<https://doi.org/10.1093/oxfordhb/9780199325818.013.18>

- Alonso-Fradejas, A., Liu, J., Salerno, T., & Xu, Y. (2015, May 19). The Political Economy of Oil Palm as a Flex Crop. *Think Piece Series on Flex Crops & Commodities*.
- Apriani E, Kim YS, Fisher LA, Baral H. (2020). Non-state certification of smallholders for sustainable palm oil in Sumatra, Indonesia. *Land use policy*. 105-112.
- Aptech Data Analytics Blog. (2021, April 15). *Introduction to the Fundamentals of Vector Autoregressive Models*. Retrieved from Aptech:
<https://www.aptech.com/blog/introduction-to-the-fundamentals-of-vector-autoregressive-models/>
- Aratrakorn, S., Thunhikorn, S., & Donald, P. (2006). Changes in bird communities following conversion of lowland forest to oil palm and rubber plantations in southern Thailand. *Bird conservation international*, 71-82.
- Armah, F. A., Odoi, J. O., Yengoh, G. T., Obiri, S., Yawson, D. O., & Afrifa, E. K. A. (2011). Food security and climate change in drought-sensitive savanna zones of Ghana. *Mitigation and Adaptation Strategies for Global Change*, 16(3), 291–306. <https://doi.org/10.1007/s11027-010-9263-9>
- Armitage, D. R., Plummer, R., Berkes, F., Arthur, R. I., Charles, A. T., Davidson-Hunt, I. J., . . . Wollenberg, E. K. (2009). Adaptive co-management for social–ecological complexity. *Frontiers in Ecology and the Environment*, 95-102.

- Asian Development Bank. (2016). *Indonesia: Future: Asia Biomass Energy Cooperation Promotion Office. Indonesia is Aiming to be a Leader in Biodiesel*. Asian Development Bank. Retrieved from <https://www.adb.org/sites/default/files/institutional-document/189713/ino-energy-asr.pdf>
- Auld, G., Balboa, C., Bernstein, S., & Cashore, B. (2009). The emergence of non-state market-driven (NSMD) global environmental governance: A cross-sectoral assessment. In M. A. Delmas & O. R. Young (Eds.), *Governance for the Environment: New Perspectives* (pp. 183–218). Cambridge University Press. <https://doi.org/10.1017/CBO9780511627170.009>
- Auld, G., & Gulbrandsen, L. H. (2010). Transparency in Nonstate Certification: Consequences for Accountability and Legitimacy. *Global Environmental Politics*, 10(3), 97–119. https://doi.org/10.1162/GLEP_a_00016
- Awudu, I., & Zhang, J. (2012). Uncertainties and sustainability concepts in biofuel supply chain management: A review. *Renewable and Sustainable Energy Reviews*, 1359-68.
- Bass, S., Hughes, C., & Hawthorne, W. (2001). Forests, biodiversity and livelihoods: linking policy and practice. In I. Koziell, *Living Off Biodiversity: Exploring Livelihoods and Biodiversity Issues in Natural Resources Management*.

- Baumgartner, J., & Tikubet, G. (2012). From tsetse control to sustainable rural development—progress and opportunities for an Ethiopian community. In *Rural Development-Contemporary Issues and Practices*. IntechOpen.
- Bennett, E. A. (2017). Who Governs Socially-Oriented Voluntary Sustainability Standards? Not the Producers of Certified Products. *World Development*, 91, 53–69. <https://doi.org/10.1016/j.worlddev.2016.10.010>
- Bell, D., Silalertruksa, T., Gheewala, S., & Kamens, R. (2011). The net cost of biofuels in Thailand—an economic analysis. *Energy Policy*, 834-43.
- Bernstein, S., & Cashore, B. (2007). Can non-state global governance be legitimate? An analytical framework. *Regulation & Governance*, 1(4), 347–371. <https://doi.org/10.1111/j.1748-5991.2007.00021.x>
- Biofuel evolution perspectives*. (2021, September 9). Retrieved from Enerdata Intelligence + Consulting: <https://www.enerdata.net/publications/executive-briefing/biofuels-market-dynamics.html>
- Bitzer, V., & Glasbergen, P. (2015). Business–NGO partnerships in global value chains: Part of the solution or part of the problem of sustainable change? *Current Opinion in Environmental Sustainability*, 12, 35–40. <https://doi.org/10.1016/j.cosust.2014.08.012>

- Blaber-Wegg, T., Hodbod, J., & Tomei, J. (2015). Incorporating equity into sustainability assessments of biofuels. *Current Opinion in Environmental Sustainability*, 14, 180–186. <https://doi.org/10.1016/j.cosust.2015.05.006>
- Borras, J., Franco, J., Isakson, S. R., Levidow, L., Vervest, P., de L. T. Oliveira, G., . . . Kröge. (2018, May 14). Flex Crops: A Primer. *Think Piece Series on Flex Crops & Commodities*.
- Borras Jr., S. M., Franco, J. C., Isakson, R., Levidow, L., & Vervest, P. (2016). The rise of flex crops and commodities: implications for research. *The Journal of Peasant Studies*, 93-115.
- Borras, S. M., Franco, J. C., Isakson, R., Levidow, L., & Vervest, P. (2014). Towards understanding the politics of flex crops and commodities: Implications for research and policy advocacy.
- Boström, M., & Hallström, K. T. (2013). Global multi-stakeholder standard setters: How fragile are they? *Journal of Global Ethics*, 9(1), 93–110. <https://doi.org/10.1080/17449626.2013.773180>
- Brassett, J., Richardson, B., & Smith, W. (2012). Private experiments in global governance: Primary commodity roundtables and the politics of deliberation. *International Theory*, 4(3), 367–399. <https://doi.org/10.1017/S1752971912000188>

Bhushan, N., Mohnert, F., Sloot, D., Jans, L., Albers, C., & Steg, L. (2019, May 9).

Using a Gaussian Graphical Model to Explore Relationships Between Items and Variables in Environmental Psychology Research. Retrieved from

Frontiers in Psychology:

<https://www.frontiersin.org/articles/10.3389/fpsyg.2019.01050/full>

Buyx, A., & Tait, J. (2011). Ethical framework for biofuels. *Science*.

Byerlee, D. (2014). The Fall and Rise Again of Plantations in Tropical Asia: History Repeated? . *Land*, 574-597.

Carlson, K., Curran, L., Ponette-González, A., Ratnasari, D., Lisnawati, N., Purwanto,

Y. Raymond, P. (2014). Influence of watershed-climate interactions on stream temperature, sediment yield, and metabolism along a land use intensity gradient in Indonesian Borneo. *Journal of Geophysical Research: Biogeosciences*, 1110-28.

Chao, S. M. H. (2012). Free, prior and informed consent and oil palm expansion in Southeast Asia—From principles to practice. South East Asia Consultation on Landgrabbing and Palm Oil Plantations: Civil Society Response in South East Asia. Report by Forest Peoples Programme.

Cheyns, E. (2014a). Making “minority voices” heard in transnational roundtables: The role of local NGOs in reintroducing justice and attachments. *Agriculture*

and Human Values, 31(3), 439–453. <https://doi.org/10.1007/s10460-014-9505-7>

Cheyne, E. (2014b). Making “minority voices” heard in transnational roundtables: The role of local NGOs in reintroducing justice and attachments. *Agriculture and Human Values*, 31(3), 439–453. <https://doi.org/10.1007/s10460-014-9505-7>

Cheyne, E., & Riisgaard, L. (2014a). Introduction to the symposium: The exercise of power through multi-stakeholder initiatives for sustainable agriculture and its inclusion and exclusion outcomes. *Agriculture and Human Values*, 31(3), 409–423. <https://doi.org/10.1007/s10460-014-9508-4>

Cheyne, E., & Riisgaard, L. (2014b). Introduction to the symposium. *Agriculture and Human Values*, 31(3), 409–423. <https://doi.org/10.1007/s10460-014-9508-4>

China: Biofuels Annual. (2021, September 16). Retrieved from Foreign Agricultural Service, USDA: <https://www.fas.usda.gov/data/china-biofuels-annual-7>

Christens, B., & Speer, P. W. (2006). Review Essay: Tyranny/Transformation: Power and Paradox in Participatory Development. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 7(2), Article 2. <https://doi.org/10.17169/fqs-7.2.91>

Cohen, J., & Sabel, C. (1997). Directly-Deliberative Polyarchy. *European Law Journal*, 3(4), 313–342. <https://doi.org/10.1111/1468-0386.00034>

Cohen, J., & Sabel, C. F. (2005). Global Democracy. *New York University Journal of International Law and Politics*, 37(4), 763–798.

Colchester, M. and Chao, S. (2011). 'Oil palm expansion in Southeast Asia: an overview', in M. Colchester and S. Chao (eds) *Oil Palm Expansion in Southeast Asia: Trends and Implications for Local Communities and Indigenous Peoples*. Moreton-in-Marsh: Forest Peoples Programme. pp. 1–23.

Correa, D., Beyer, H., Possingham, H., Thomas-Hall, S., & Schenk, P. (2017). Biodiversity impacts of bioenergy production: microalgae vs. first generation biofuels. *Renew Sustain Energy Rev* 74, 1131–1146 .

Cotula, L., Dyer, N., & Vermeulen, S. (2008). *Fuelling Exclusion?: The Biofuels Boom and Poor People's Access to Land*. iied.

Crocker, D. A. (2008a). *Ethics of global development: Agency, capability, and deliberative democracy*. Cambridge University Press.

Crocker, D. A. (2008b). *Sen's Concepts of Agency*.

Crocker, D. A., & Roebyns, I. (2010). Capability and Agency. In Morris, C.W. (Ed.), *Amartya Sen*. Cambridge.

Curran, L., Trigg, S., McDonald, A., Astiani, D., Hardiono, Y., Siregar, P., . . . Kasischke, E. (2004). Lowland forest loss in protected areas of Indonesian Borneo. *Science*, 1000-3.

Dale, B., Allen, M., Laser, M., & Lynd, L. (2009). Protein feeds coproduction in biomass conversion to fuels and chemicals. *Biofuels, bioproducts and biorefining*, 219-30.

Dale, V. H., Efroymsen, R. A., Kline, K. L., & Davitt, M. S. (2015). A framework for selecting indicators of bioenergy sustainability. *Biofuels, Bioproducts and Biorefining*.

Dallinger, J. (2011). Oil palm development in Thailand: Economic, social and environmental considerations. In M. Colchester, & S. Chao, *Oil Palm Expansion in South East Asia: Trends and Implications for Local Communities and Indigenous Peoples* (pp. 24-51). Moreton-in-Marsh, UK; Bagor, Indonesia: Forest Peoples Program; Sawit Watch.

Dallinger, J. (2013). Brief #3 of 8: Kingdom of Thailand. *National Updates on Agribusiness Large Scale Land Acquisitions in Southeast Asia*. Moreton-in-Marsh, UK: Forest Peoples Program.

Dauvergne, P., & Neville, K. J. (2010). Forests, food, and fuel in the tropics: The uneven social and ecological consequences of the emerging political

economy of biofuels. *The Journal of Peasant Studies*, 37(4), 631–660.

<https://doi.org/10.1080/03066150.2010.512451>

de Bakker, F. G. A., Rasche, A., & Ponte, S. (2019). Multi-Stakeholder Initiatives on Sustainability: A Cross-Disciplinary Review and Research Agenda for Business Ethics. *Business Ethics Quarterly*, 29(03), 343–383.

<https://doi.org/10.1017/beq.2019.10>

de Man, R., & German, L. (2017). Certifying the sustainability of biofuels: Promise and reality. *Energy Policy*, 109, 871–883.

<https://doi.org/10.1016/j.enpol.2017.05.047>

de Man, R., & Juranics, J. (2002). Minutes of the preparatory meeting Hayes (London), September 20, 2002. 74.

Degli Innocenti, E., & Oosterveer, P. (2020). Opportunities and bottlenecks for upstream learning within RSPO certified palm oil value chains: A comparative analysis between Indonesia and Thailand. *Journal of Rural Studies*, 78, 426–437. <https://doi.org/10.1016/j.jrurstud.2020.07.004>

Dingwerth, K. (2007). *The New Transnationalism: Transnational Governance and Democratic Legitimacy*. Springer.

- Dingwerth, K. (2008). Private Transnational Governance and the Developing World: A Comparative Perspective. *International Studies Quarterly*, 52(3), 607–634.
<https://doi.org/10.1111/j.1468-2478.2008.00517.x>
- DJP. (2015). Statistik Perkebunan Indonesia; kelapa sawit 2014–2016. Direktorat Jenderal Perkebunan, Jakarta.
- Dornburg, V., van Vuuren, D., van de Ven, G., Langeveld, H., Meeusen, M., Banse, M., . . . Faaij, A. (2010). Bioenergy revisited: key factors in global potentials of bioenergy. *Energy & Environmental Science*, 258-267.
- Dumrongrojwatthana, P., Wanich, K., & Trébuil, G. (2020). Driving factors and impact of land-use change in a fragile rainfed lowland rice-sugar palm cultural agroforestry system in southern Thailand. *Sustainability Science*, 1317–1335.
- Dutta, K., Daverey, A., & Lin, J. (2014). Evolution retrospective for alternative fuels: First to fourth generation. *Renewable energy*, 114-22.
- Eames, M., & Hunt, M. (2013). Energy justice in sustainability transitions research.
- EIA. (2018, February 8). Backtracking on reform: How Indonesia's Government is weakening its palm oil standards - EIA. <https://eia-international.org/news/backtracking-reform-indonesias-government-weakening-palm-oil-standards/>

- Elgert, L. (2012). Certified discourse? The politics of developing soy certification standards. *Geoforum*, 43(2), 295–304.
<https://doi.org/10.1016/j.geoforum.2011.08.008>
- Epskamp, S., Waldorp, L. J., Mõttus, R., & Borsboom, D. (2018). The Gaussian Graphical Model in Cross-sectional and Time-series Data. *Multivariate Behavioral Research*, 453-480.
- ETA, TBI. (2021). Intercropping in oil palm plantations: A technical guide. Ecological Trends Alliance, Tropenbos International.
- Fargione, J., Hill, J., Tilman, D., Polasky, S., & Hawthorne, P. (2008). Land clearing and the biofuel carbon debt. *Science*, 1235-8.
- Ferrante, L., & Fearnside, P. (2018). Amazon sugar cane: A threat to the forest. *Science*, 1476-.
- Ferrante, L., Baccaro, F., Ferreira, E., Sampaio, M., Santos, T., Justino, R., & Angulo, A. (2017). The matrix effect: how agricultural matrices shape forest fragment structure and amphibian composition. *Journal of Biogeography*, 1911-22.
- Fitzherbert, E., Struebig, M., Morel, A., Danielsen, F., Bruehl, C., Donald, P., & Phalan, B. (2008). How will oil palm expansion affect biodiversity? *Trends in Ecology & Evolution*, 538-545.

- Forest Peoples Program. (2017). *A Comparison of Leading Palm Oil Certification Standards*. Moreton-in-Marsh: Forest Peoples Program.
- Fougère, M., & Solitander, N. (2020a). Dissent in Consensusland: An Agonistic Problematization of Multi-stakeholder Governance. *Journal of Business Ethics*, 164(4), 683–699. <https://doi.org/10.1007/s10551-019-04398-z>
- Fougère, M., & Solitander, N. (2020b). Dissent in Consensusland: An Agonistic Problematization of Multi-stakeholder Governance. *Journal of Business Ethics*, 164(4), 683–699. <https://doi.org/10.1007/s10551-019-04398-z>
- Frith, C. D. (2014). Action, agency and responsibility. *Neuropsychologia*, 55, 137–142.
- Fuchs, D., Kalfagianni, A., & Havinga, T. (2011). Actors in private food governance: the legitimacy of retail standards and multistakeholder initiatives with civil society participation. *Agriculture and human values*, 28(3), 353-367.
- Fung, A. (2003). Survey article: Recipes for public spheres: eight institutional design choices and their consequences. *Journal of Philosophy*.
- Gamborg, C., Anker, H., & Sandøe, P. (2014). Ethical and legal challenges in bioenergy governance: Coping with value disagreement and regulatory complexity. *Energy Policy*.

- Gamborg, C., Millar, K., Shortall, O., & Sandøe, P. (2012). Bioenergy and land use: framing the ethical debate. *Journal of agricultural and environmental ethics*.
- Garrett, R. D., Carlson, K. M., Rueda, X., & Noojipady, P. (2016). Assessing the potential additionality of certification by the Round table on Responsible Soybeans and the Roundtable on Sustainable Palm Oil. *Environmental Research Letters*, 11(4), 045003. <https://doi.org/10.1088/1748-9326/11/4/045003>
- Gibbon, P., & Lazaro, E. (2010). Agro-food standards and Africa: An introduction. In *Global Agro-Food Trade and Standards* (pp. 1–20). Springer.
- Gilbert, D. U., & Rasche, A. (2007). Discourse Ethics and Social Accountability: The Ethics of SA 8000. *Business Ethics Quarterly*, 17(2), 187–216.
- Glasbergen, P. (2018a). Smallholders do not Eat Certificates. *Ecological Economics*, 147, 243–252. <https://doi.org/10.1016/j.ecolecon.2018.01.023>
- Glasbergen, P. (2018b). Smallholders do not Eat Certificates. *Ecological Economics*, 147, 243–252. <https://doi.org/10.1016/j.ecolecon.2018.01.023>
- Gulbrandsen, L. H. (2008). Accountability Arrangements in Non-State Standards Organizations: Instrumental Design and Imitation. *Organization*, 15(4), 563–583. <https://doi.org/10.1177/1350508408091007>

- Goulet, D. (2008). Participation in development: New avenues. *World Development*. 1989 Feb 1;17(2):165-78. In Crocker DA. *Ethics of Global Development: Agency, Capability, and Deliberative Democracy*. Cambridge University Press; 2008 Jul, 10.
- Gunderson, L. (2008a). Adaptive management and integrative assessments.
- Gunderson, L. (2008b). Adaptive Management and Integrative Assessments. In S. E. Jørgensen & B. D. Fath (Eds.), *Encyclopedia of Ecology* (pp. 55–59). Academic Press. <https://doi.org/10.1016/B978-008045405-4.00635-2>
- Haggard, P., & Tsakiris, M. (2009). The experience of agency: Feelings, judgments, and responsibility. *Current Directions in Psychological Science*, 18(4), 242–246.
- Hai, T. (2002). *THE PALM OIL INDUSTRY IN MALAYSIA From Seed to Frying Pan*. Malaysia: WWF.
- Hakelius, K., & Hansson, H. (2016). Members' attitudes towards cooperatives and their perception of agency problems. *International Food and Agribusiness Management Review*, 19(1030-2017–2123), 23–36.
- Hart, C. S., & Brando, N. (2018). A capability approach to children's well-being, agency and participatory rights in education. *European Journal of Education*, 53(3), 293–309. <https://doi.org/10.1111/ejed.12284>

- Haslbeck, J. M., Bringmann, L. F., & Waldorp, L. J. (2021). A Tutorial on Estimating Time-Varying Vector Autoregressive Models. *Multivariate Behavioral Research*, 120-149.
- Hatanaka, M. (2020). Technocratic and deliberative governance for sustainability: rethinking the roles of experts, consumers, and producers. *Agriculture and Human Values*, 37(3), 793-804.
- Havlík, P., Schneider, U., Schmid, E., Böttcher, H., Fritz, S., Skalský, R., . . . Leduc, S. (2011). Global land-use implications of first and second generation biofuel targets. *Energy Policy*, 5690-702.
- Heggenstaller, A., Anex, R., Liebman, M., Sundberg, D., & Gibson, L. (2008). Productivity and nutrient dynamics in bioenergy double-cropping systems. *Agronomy journal*, 1740-8.
- Hernández-Espallardo, M., Arcas-Lario, N., Sánchez-Navarro, J. L., & Marcos-Matás, G. (2021). Curbing members' opportunism in first-tier and federated agricultural marketing cooperatives. *Agribusiness*.
- Hess, T., Sumberg, J., Biggs, T., Georgescu, M., Haro-Monteagudo, D., Jewitt, G., . . . Marin, F. (2016). A sweet deal? Sugarcane, water and agricultural transformation in Sub-Saharan Africa. *Global Environmental Change*, 181-94.

- Hidayat, K. N., Glasbergen, P., & Offermans, A. (2015, September 1). Sustainability Certification and Palm Oil Smallholders' Livelihood: A Comparison between Scheme Smallholders and Independent Smallholders in Indonesia (No. 1030-2016-83041). *International Food and Agribusiness Management Review*.
[https://doi.org/\(ISSN #: 1559-2448\)](https://doi.org/(ISSN #: 1559-2448))
- Hodbod, J., Tomei, J., & Blaber-Wegg, T. (2015). A Comparative Analysis of the Equity Outcomes in Three Sugarcane–Ethanol Systems. *The Journal of Environment & Development*, 24(2), 211–236.
<https://doi.org/10.1177/1070496515583556>
- Hunsberger, C., & Alonso-Fradejas, A. (2016). The discursive flexibility of 'flex crops': comparing oil palm and jatropha. *The Journal of Peasant Studies*, 225-250.
- Huong Thi, T. H., Anton, V. R., Vu, K. C., Nguyen, A. T., & Vanacker, V. (2020). An application of multilevel model for the analysis of factors influencing paddy field productivity in the Northern Vietnamese Mountains. *Paddy and Water Environment*, 153-166.
- Ibnu, M., Glasbergen, P., Offermans, A., & Arifin, B. (2015). Farmer Preferences for Coffee Certification: A Conjoint Analysis of the Indonesian Smallholders. *Journal of Agricultural Science*, 7. <https://doi.org/10.5539/jas.v7n6p20>
- IEA. (2021). *Oil 2021: Analysis and forecast to 2021*. IEA.

IEA. (2022, May 1). *Renewables 2018: Analysis and forecasts to 2023*. Retrieved from <https://www.iea.org/reports/renewables-2018>

Immerzeel, D., Verweij, P., van der Hilst, F., & Faaij, A. (2014). Biodiversity impacts of bioenergy crop production: a state-of-the-art review. *GCB Bioenergy* 6, 183–209 .

Ingram, V., van den Berg, J., van Oorschot, M., Arets, E., & Judge, L. (2018). Governance Options to Enhance Ecosystem Services in Cocoa, Soy, Tropical Timber and Palm Oil Value Chains. *Environmental Management*, 62(1), 128–142. <https://doi.org/10.1007/s00267-018-0996-7>

International Energy Agency. (2018). *Renewables 2018: Analysis and Forecasts to 2023*. OECD/IEA.

International Renewable Energy Agency. (2017). *Biofuel Potential in Southeast Asia: Raising food yields, reducing food waste and utilising residues*. Abu Dhabi: International Renewable Energy Agency.

IPAD Palm Oil Explorer. (2021). Retrieved from Foreign Agricultural Service, USDA: 20. <https://ipad.fas.usda.gov/cropexplorer/cropview/commodityView.aspx?cropid=4243000>

- Jenkins, K., McCauley, D., Heffron, R., Stephan, H., & Rehner, R. (2016a). Energy justice: A conceptual review. *Energy Research & Social Science*, 11, 174–182. <https://doi.org/10.1016/j.erss.2015.10.004>
- Jenkins, K., McCauley, D., Heffron, R., Stephan, H., & Rehner, R. (2016b). Energy justice: A conceptual review. *Energy Research & Social Science*, 11, 174–182. <https://doi.org/10.1016/j.erss.2015.10.004>
- Kleinschmidt, J. (2007, January 1). Biofueling rural development: making the case for linking biofuel production to rural revitalization. *National Policy Brief No. 5*. Durham, N.H. : Carsey Institute, University of New Hampshire.
- Kline, K. L., Msangi, S., Dale, V. H., Woods, J., Souza, G. M., Osseweijer, P., . . . Mugeru, H. K. (2017). Reconciling food security and bioenergy: priorities for action. *Gcb Bioenergy*.
- Kochaphum, C., Gheewala, S. H., & Vinitnantharat, S. (2015). Does palm biodiesel driven land use change worsen greenhouse gas emissions? An environmental and socio-economic assessment. *Energy for Sustainable Development*, 100-111.
- Köhne, M. (2014). Multi-stakeholder initiative governance as assemblage: Roundtable on Sustainable Palm Oil as a political resource in land conflicts related to oil palm plantations. *Agriculture and Human Values*, 31(3), 469–480. <https://doi.org/10.1007/s10460-014-9507-5>

- Kooiman, J., & Bavinck, M. (2005). The governance perspective. *Fish for life: interactive governance for fisheries*. Amsterdam: Netherlands Amsterdam University Press.
- Kruuse, M., Reming Tangbæk, K., Jespersen, K., & Gallemore, C. (2019). Navigating Input and Output Legitimacy in Multi-Stakeholder Initiatives: Institutional Stewards at Work. *Sustainability*, 11(23), 6621.
<https://doi.org/10.3390/su11236621>
- Kumar, S., Abdul Salam, P., Shrestha, P., & Ackom, E. (2013). An Assessment of Thailand's Biofuel Development. *Sustainability*.
- Kumar, S., Shrestha, P., & Abdul Salam, P. (2013). A review of biofuel policies in the major biofuel producing countries of ASEAN: Production, targets, policy drivers and impacts. *Renewable and Sustainable Energy Reviews*, 822-36.
- Kwiatkowski, D., Phillips, P. C., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root: How sure are we that economic time series have a unit root? *Journal of Econometrics*, 159-178.
- Lao People's Democratic Republic Peace Independence Democracy Unity Prosperity. (2011). *Renewable Energy Development Strategy in Lao PDR*. Lao People's Democratic Republic Peace Independence Democracy Unity Prosperity.

Larsen, R. K. (2015). Biofuels, oil palm and agribusiness in Southeast Asia – planning for sustainability? Stockholm Environment Institute.

Lau, H., Zhang, K., Bokka, H., & Ramakrishna, S. (2022). A Review of the Status of Fossil and Renewable Energies in Southeast Asia and Its Implications on the Decarbonization of ASEAN. *Energies*.

Lee, K. N. (1993). *Compass and gyroscope: integrating science and politics for the environment*. Washington, DC: Island Press.

Liu, H., Qin, S., Sirohi, R., Ahluwalia, V., Zhou, Y., Sindhu, R., . . . Kumar Awasthi, M. (2021a). Sustainable blueberry waste recycling towards biorefinery strategy and circular bioeconomy: A review. *Bioresour. Technol.*, 332.

Maher, R., & Buhmann, K. (2019). Meaningful stakeholder engagement: Bottom-up initiatives within global governance frameworks. *Geoforum*, 107, 231–234.
<https://doi.org/10.1016/j.geoforum.2019.06.013>

Malaysia Energy Commission. (2016). *Peninsular Malaysia Energy Supply Industry Outlook 2016*. p. 34. . Malaysia: Putrajaya: Suruhanjaya Tenaga.

Malézieux, E., Crozat, Y., Dupraz, C., Laurans, M., Makowski, D., Ozier-Lafontaine, H., . . . Valantin-Morison, M. (2009). Mixing plant species in cropping systems: concepts, tools and models: a review. *Sustainable agriculture*, 329-353.

- Malik, A. (2012). Potential and Use of Bioenergy in The Association of Southeast Asian Nations (ASEAN) Countries—A Review. In A. Gebremedhin, *Sustainable Energy-Recent Studies*. InTech.
- Manivong, P., & Bourgois, E. (2017). *Thai Sugarcane Sector and Sustainability*. Fair Agora Asia Co. Ltd.
- Martens K, Kunz Y, Rosyani I, Faust H. (2020). Environmental governance meets reality: A micro-scale perspective on sustainability certification schemes for oil palm smallholders in Jambi, Sumatra. *Society & Natural Resources*, 634-50.
- Mason, M. (2020). Transparency, accountability and empowerment in sustainability governance: A conceptual review. *Journal of Environmental Policy & Planning*, 22(1), 98–111. <https://doi.org/10.1080/1523908X.2019.1661231>
- Mayntz, R. (2011). Legitimacy and Compliance in Transnational Governance.
- McDermott, C. L. (2013). Certification and equity: Applying an “equity framework” to compare certification schemes across product sectors and scales. *Environmental Science & Policy*, 33, 428–437. <https://doi.org/10.1016/j.envsci.2012.06.008>
- Mendoza, T., & Mendoza, B. (2016). A Review of Sustainability Challenges of Biomass for Energy: Focus in the Philippines. *J. Agric. Technol*, 281-310.

Ministry of Energy, Thailand (2018). Alternative Energy Development Plan 2018-2037 (AEDP 2018-2037).

Mohr, A., & Raman, S. (2013). Lessons from first generation biofuels and implications for the sustainability appraisal of second generation biofuels. *Energy Policy*, 114-22.

Mohr, A., & Raman, S. (2013). Lessons from first generation biofuels and implications for the sustainability appraisal of second generation biofuels. *Energy Policy*, 114-22.

Morris, M. W., Menon, T., & Ames, D. R. (2001). Culturally Conferred Conceptions of Agency: A Key to Social Perception of Persons, Groups, and Other Actors. *Personality and Social Psychology Review*, 5(2), 169–182.
https://doi.org/10.1207/S15327957PSPR0502_7

Murphy, D. J., Goggin, K., & Paterson, R. M. (2021). *Oil palm in the 2020s and beyond: challenges and solutions*. Retrieved from CABI Agriculture and Bioscience: <https://doi.org/10.1186/s43170-021-00058-3>

Naik, S., Goud, V., Rout, P., & Dalai, A. (2010). Production of first and second-generation biofuels: a comprehensive review. *Renewable and sustainable energy reviews*, 578-97.

Naiki, Y. (2016). Trade and Bioenergy: Explaining and Assessing the Regime Complex for Sustainable Bioenergy. *European Journal of International Law*, 129-159.

<https://academic.oup.com/ejil/article/27/1/129/2756320?login=true>

Naqvi, M., & Yan, J. (2015). First-Generation Biofuels. John Wiley & Sons, Ltd.

National Bureau of Agricultural Commodity and Food Standards & Ministry of Agriculture and Cooperatives. (2013). Good Agricultural Practices for Food Crop. https://www.acfs.go.th/standard/download/eng/GAP_Food_Crop.pdf

Nesadurai, H. E. S. (2013). Food security, the palm oil–land conflict nexus, and sustainability: A governance role for a private multi-stakeholder regime like the RSPO? *The Pacific Review*, 26(5), 505–529.

<https://doi.org/10.1080/09512748.2013.842311>

Newton, L. H. (2003). Ethics and sustainability: Sustainable development and the moral life.

Ng, J., Ng, H., & Gan, S. (2010). Recent trends in policies, socioeconomy and future directions of the biodiesel industry. *Clean Technologies and Environmental Policy*.

Nkongho, R. N., Feintrenie, L., & Levang, P. (2014). Strengths and weaknesses of the smallholder oil palm sector in Cameroon. *OCL*, 21(2), D208.

<https://doi.org/10.1051/ocl/2013043>

- Norton, B. G. (2005). *Sustainability: A philosophy of adaptive ecosystem management*. University of Chicago Press.
- Norton, B. G. (2015). *Sustainable values, sustainable change: a guide to environmental decision making*. University of Chicago Press.
- Nussbaum, M. C. (2009). Creating capabilities: The human development approach and its implementation. *Hypatia*, 24(3), 211–215.
- OECD-FAO Agricultural Outlook 2016-2025. (n.d.). Retrieved from OECD Library:
https://stats.oecd.org/Index.aspx?DataSetCode=HIGH_AGLINK_2016
- Open Development Cambodia. (2021, July 29). Retrieved from Open Development:
<https://opendevelopmentcambodia.net/topics/biofuel-crops/>
- Pan, W. K., & Bilsburrow, R. E. (2005). The use of a multilevel statistical model to analyze factors influencing land use: a study of the Ecuadorian Amazon. *Global and Planetary Change*, 232-252.
- Partzsch, L. (2011). The legitimacy of biofuel certification. *Agriculture and Human Values*, 28(3), 413–425. <https://doi.org/10.1007/s10460-009-9235-4>
- Patel, A., Singhanian, R., Sim, S., & Pandey, A. (2019). Thermostable cellulases: Current status and perspectives. *Bioresour. Technol.* , 279, 385–392.

Patnaik, S., & Prasad, C. S. (2014). Revisiting Sustainable Livelihoods: Insights from Implementation Studies in India. *Vision*, 18(4), 353–358.

<https://doi.org/10.1177/0972262914553258>

Peskett, L., Slater, R., Stevens, C., & Dufey, A. (2007). Biofuels, agriculture and poverty reduction. *Natural resource perspectives*.

Peskett, L., Slater, R., Stevens, C., & Dufey, A. (2007). Biofuels, agriculture and poverty reduction. *Natural resource perspectives*, 1-6.

Phalan, B. (2009, November 1). The social and environmental impacts of biofuels in Asia: an overview. *Applied Energy*.

Phitthayaphinant, P., Somboonsuke, B., & Eksomtramage, T. (2013). Price variation and factors determining prices of Thai palm oil and oil palm. *International Journal of Agricultural Technology*, 749-767.

Pletcher, J. (1991). Regulation with growth: The political economy of palm oil in Malaysia. *World Development*, 623-636.

Ponte, S. (2008). Greener than Thou: The Political Economy of Fish Ecolabeling and Its Local Manifestations in South Africa. *World Development*, 36(1), 159–175.

<https://doi.org/10.1016/j.worlddev.2007.02.014>

Ponte, S. (2014). Roundtabling Sustainability: Lessons from the Biofuel Industry.

Geoforum, 261-271. <https://doi.org/10.1016/j.geoforum.2013.07.008>

Ponte, S. (2019). Business, power and sustainability in a world of global value chains.
Zed Books Ltd.

Ponte, S., & Cheyns, E. (2013). Voluntary standards, expert knowledge and the
governance of sustainability networks. *Global Networks*, 13(4), 459–477.
<https://doi.org/10.1111/glob.12011>

Praiwan, Y. (2018, January 29). OPG turns focus to Laos for oil palm plantation.
Bangkok Post.

Retrieved May 31, 2018, from

[https://www.bangkokpost.com/business/1403718/opg-turns-focus-to-laos-
for-oil-palm-plantation](https://www.bangkokpost.com/business/1403718/opg-turns-focus-to-laos-for-oil-palm-plantation)

Pye, O. (2019). Commodifying sustainability: Development, nature and politics in the
palm oil industry. *World Development*, 121, 218–228.
<https://doi.org/10.1016/j.worlddev.2018.02.014>

Redman, G. (2008). Assessment of on-farm AD in the UK. The Andersons Centre,
National Non-Food Crops Centre.

Reed, M. S. (2008). Stakeholder participation for environmental management: A
literature review. *Biological Conservation*, 141(10), 2417–2431.

Reinecke, J., & Ansari, S. (2015). What Is a “Fair” Price? Ethics as Sensemaking. *Organization Science*, 26(3), 867–888.

<https://doi.org/10.1287/orsc.2015.0968>

Renewables 2021 Report Extract Biofuels. (2021). Retrieved from IEA:

<https://www.iea.org/reports/renewables->

2021/biofuels?mode=transport®ion=World&publication=2021&flow=Consumption&product=Ethanol

Rist, L., Feintrenie, L., & Levang, P. (2010). The livelihood impacts of oil palm: smallholders in Indonesia. *Biodiversity and Conservation*, 1009-1024.

Ritchie, H., & Roser, M. (2021). *Forests and Deforestation*. Retrieved from

OurWorldInData.org: <https://ourworldindata.org/forests-and-deforestation>

Rivera-Ferre, M. G., Ortega-Cerdà, M., & Baumgärtner, J. (2013). Rethinking study and management of agricultural systems for policy design. *Sustainability*, 5(9), 3858–3875.

Robeyns, I. (2005). Selecting capabilities for quality of life measurement. *Social Indicators Research*, 74(1), 191–215.

Robeyns, I. (2011). *The Capability Approach*.

<https://stanford.library.sydney.edu.au/archives/win2018/entries/capability-approach/>

Robeyns, I. (2016). Capabilitarianism. *Journal of Human Development and Capabilities*, 17(3), 397–414.

<https://doi.org/10.1080/19452829.2016.1145631>

Rouhany, M., & Montgomery, H. (2019). Global Biodiesel Production: The State of the Art and Impact on Climate Change. *Biofuel and Biorefinery Technologies*, vol 8.

Roundtable on Sustainable Palm Oil. (2017). RSPO Theory of Change.

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjxLTn5Ob0AhVcmHIEHXdnDE0QFnoECAkQAQ&url=https%3A%2F%2Frspo.org%2Ffiles%2Fdownload%2Fffa3a73598c8916&usg=AOvVaw1ovDDW7kQsgRC_t9kMqaV2

RSPO. (2015a). Palm oil and deforestation: The solution is sourcing 100% Certified Sustainable Palm Oil | Articles. RSPO - Roundtable on Sustainable Palm Oil. <https://www.rspo.org/news-and-events/news/palm-oil-and-deforestation-the-solution-is-sourcing-100-certified-sustainable-palm-oil>

RSPO. (2015, September 29). Growth of certified palm oil smallholders in Thailand showing no signs of slowing down. RSPO - Roundtable on Sustainable Palm Oil. <https://rspo.org/news-and-events/news/growth-of-certified-palm-oil-smallholders-in-thailand-showing-no-signs-of-slowing-down>

RSPO. (2016). World's single largest independent smallholder group receives RSPO certification | Articles. RSPO - Roundtable on Sustainable Palm Oil.
<https://rspo.org/news-and-events/news/worlds-single-largest-independent-smallholder-group-receives-rspo-certification>

RSPO. (2018). *Smallholder Strategy 2018*. Retrieved from RSPO. RSPO Smallholder Strategy. 2018. Accessed at: <https://rspo.org/smallholders/smallholders-strategy>

RSPO. (2019). RSPO Independent Smallholder Standard.
<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwj7ifKeq-n0AhWiqXIEHdPxB3UQFnoECCEQAQ&url=https%3A%2F%2Frspo.org%2Fpublications%2Fdownload%2Faac5de95f6aea42&usg=AOvVaw3kkBYwlaZ2CxoLz4mFXKnD>

RSPO. (2020). Terms of Reference—Smallholder Standing Committee.
https://rspo.org/library/lib_files/preview/1011

RSPO. (2020a). Annex 2 Oil Palm Smallholders: An overview.
<https://www.rspo.org/file/Annex2%20-%20An%20Overview%20of%20Palm%20Oil%20Smallholders.pdf>

RSPO. (2021). RSPO General Assembly Meeting Minutes Archive. RSPO - Roundtable on Sustainable Palm Oil. <https://rspo.org/resources/rspo-meeting-minutes/general-assembly-meeting-minutes>

RSPO. (2021a). About the RSPO. <https://www.rspo.org/about>

RSPO. (2021b). Our Organisation. <https://rspo.org/about/our-organisation>

RSPO. (2021c). Supporting Bodies. <https://rspo.org/about/supporting-bodies>

Rulli, M., Bellomi, D., Cazzoli, A., De Carolis, G., & D'Odorico, P. (2016). The water-land-food nexus of first-generation biofuels. *Scientific Reports*.

Ruysschaert, D., & Salles, D. (2014). Towards global voluntary standards: Questioning the effectiveness in attaining conservation goals: The case of the Roundtable on Sustainable Palm Oil (RSPO). *Ecological Economics*, 107, 438–446. <https://doi.org/10.1016/j.ecolecon.2014.09.016>

Sabel, C. F., & Zeitlin, J. (2011). Experimentalism in Transnational Governance: Emergent Pathways and Diffusion Mechanisms. 8.

Sakchai, P., & Prasertsri, P. (2016). Thailand Biofuels Annual 2016 (GAIN Reports No. TH6075). USDA. https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Biofuels%20Annual_Bangkok_Thailand_7-22-2016.pdf

Sanchez, S. T., Woods, J., Akhurst, M., Brander, M., O'Hare, M., Dawson, T. P., . . .

Malpas, R. (2012). Accounting for indirect land-use change in the life cycle assessment of biofuel supply chains. *Journal of The Royal Society Interface*.

Saner, M. A., & Bordt, M. (2016). Building the consensus: The moral space of earth measurement. *Ecological Economics*, 130, 74–81.

Saswattecha, K., Hein, L., Kroeze, C., & Jawjit, W. (2016). Effects of oil palm expansion through direct and indirect land use change in Tapi river basin, Thailand. *International Journal of Biodiversity Science, Ecosystem Services & Management*, 291-313.

Schleifer, P. (2017). Let's Bargain! Setting Standards of Sustainable Biofuels. In A. Esguerra, N. Helmerich, & T. Risse (Eds.), *Sustainability Politics and Limited Statehood: Contesting the New Modes of Governance* (pp. 47–73). Springer International Publishing. https://doi.org/10.1007/978-3-319-39871-6_3

Schleifer, P. (2019). Varieties of multi-stakeholder governance: Selecting legitimization strategies in transnational sustainability politics. *Globalizations*, 16(1), 50–66. <https://doi.org/10.1080/14747731.2018.1518863>

Schleifer, P., Fiorini, M., & Fransen, L. (2019a). Missing the Bigger Picture: A Population-level Analysis of Transnational Private Governance Organizations Active in the Global South. *Ecological Economics*, 164, 106362. <https://doi.org/10.1016/j.ecolecon.2019.106362>

- Schleifer, P., Fiorini, M., & Fransen, L. (2019b). Missing the Bigger Picture: A Population-level Analysis of Transnational Private Governance Organizations Active in the Global South. *Ecological Economics*, 164, 106362.
<https://doi.org/10.1016/j.ecolecon.2019.106362>
- Schlosberg, D. (2003). The justice of environmental justice: Reconciling equity, recognition, and participation in a political movement. *Moral and Political Reasoning in Environmental Practice*, 77, 106.
- Schott, C. (2009). *Socio-Economic Dynamics of Biofuel Development in Asia Pacific*. Jakarta: Friedrich Ebert Stiftung.
- Schouten, G., Leroy, P., & Glasbergen, P. (2012). On the deliberative capacity of private multi-stakeholder governance: The Roundtables on Responsible Soy and Sustainable Palm Oil. *Ecological Economics*, 83, 42–50.
<https://doi.org/10.1016/j.ecolecon.2012.08.007>
- Serrano, A. (2020, February 20). Can Small-Scale Farming Save Oil Palm? Edge Effects.
- Sethaputra, K. (2014). Understanding the oil palm change in Nong Khai Province: the farmers perspectives and the policy processes of the oil palm plantations. *Masters thesis*. Institute of Development Studies, University of Sussex.

- Silalertruksa, T., & Gheewala, S. H. (2009, November 1). Environmental sustainability assessment of bio-ethanol production in Thailand. *Energy*, pp. 1933-46.
- Silalertruksa, T., & Gheewala, S. (2011). The environmental and socio-economic impacts of bio-ethanol production in Thailand. *Energy Procedia*, 35-43.
- Silalertruksa, T., & Gheewala, S. (2012). Environmental sustainability assessment of palm biodiesel production in Thailand. *Energy*, 306-14.
- Silalertruksa, T., & Gheewala, S. H. (2018). Land-water-energy nexus of sugarcane production in Thailand. *Journal of Cleaner Production*, 521-8.
- Sims, R., Mabee, W., Saddler, J., & Taylor, M. (2010). An overview of second generation biofuel technologies. *Bioresour. Technol.*, 1570–1580.
- Singh, A., Nigam, P., & Murphy, J. (2011). Renewable fuels from algae: an answer to debatable land based fuels. *Bioresource technology*.
- Singh, A., Rodríguez Jasso, R. M., Gonzalez-Gloria, K. D., Rosales, M., & et al. (2019). Enzyme biorefinery platform for advanced biofuels production. *Bioresource technology reports*.
- Singhania, R., Ruiz, H., Awasthi, M., Dong, C.-D., Chen, C.-W., & Patel, A. (2021b). Challenges in cellulase bioprocess for biofuel applications. *Renew. Sustain. Energy Rev.* 151.

- Sodhi, N., Koh, L., Brook, B., & Ng, P. (2004). Southeast Asian biodiversity: an impending disaster. *Trends in ecology & evolution*, 654-60.
- Sorda, G., Banse, M., & Kemfert, C. (2010). An overview of biofuel policies across the world. *Energy Policy*, 6977-88.
- Stock, J. H., & Watson, M. W. (2001). Vector Autoregressions. *Journal of Economic Perspectives*, 101-115.
- Sunmonu, A., & Rothwell, G. (2011). Food Vs Fuel: Can Biofuels Improve the Incomes of Rural Farmers In Nigeria?
- Tauli-Corpuz, V., & Tamang, P. (2007). Oil palm and other commercial tree plantations, monocropping: impacts on indigenous peoples' land tenure and resource management systems and livelihoods. *UN Permanent Forum on Indigenous Issues*.
- Teoh, C. H. (2002). The Palm Oil Industry in Malaysia.
https://wwfeu.awsassets.panda.org/downloads/oilpalmchainpartaandb_esri.pdf
- THE 17 GOALS - Sustainable Development Goals*. (2022). Retrieved from <https://sdgs.un.org/goals>

- Tilman, D., Socolow, R., Foley, J., Hill, J., Larson, E., Lynd, L., . . . Williams, R. (2009). Beneficial biofuels—the food, energy, and environment trilemma. *Science*, 270-1.
- Tudge, S. J., Purvis, A., & De Palma, A. (2021, July 24). The impacts of biofuel crops on local biodiversity: a global synthesis. *Biodiversity and Conservation volume 30*.
- United Nations. (2008). Biofuel production technologies: status, prospects and implications for trade and development. New York: United Nations.
- USDA Foreign Agricultural Service. (2016). *Thailand Biofuels Annual 2016*. USDA Foreign Agricultural Service.
- USDA Foreign Agricultural Service. (2017). *Biofuels Annual 2017 Country reports for Indonesia, Malaysia and Thailand*. USDA Foreign Agricultural Service.
- Van Eijck, J., & Romijn, H. (2008). Prospects for Jatropha biofuels in Tanzania: an analysis with strategic niche management. *Energy Policy*, 311-25.
- Vermeulen, S., & Goad, N. (2006). Towards better practice in smallholder palm oil production. *Natural Resource Issues*. iied.
- Walker, G. (2009). Beyond distribution and proximity: Exploring the multiple spatialities of environmental justice. *Antipode*, 41(4), 614–636.

- Wangrakdiskul, U., & Yodpijit, N. (2012). Roundtable on Sustainable Palm Oil (RSPO) in smallholder farmers of Thailand. The 13th Asia Pacific Industrial Engineering and Management Systems Conference (APIEMS 2012), 2–5.
- WEF. (2010). *The Future of Industrial Biorefineries*. Retrieved from Geneva: World Economic Forum: www.weforum.org
- Wicke, J. (2019). Sustainable palm oil or certified dispossession? NGOs within scalar struggles over the RSPO private governance standard. 36.
- Willems, M. (2015). Sustainable Oil Palm Production in Thailand: Exploring Environmentally and Socially Sustainable Pathways for Palm Oil Production in Thailand. Environmental Policy Group, Wageningen University.
- Wong, W. H. (2012). Internal Affairs: How the Structure of NGOs Transforms Human Rights. Cornell University Press.
- Yasinta, T., & Karuniasa, M. (2021). Palm Oil-Based Biofuels and Sustainability in Indonesia: Assess Social, Environmental and Economic Aspects. *Environmental Science and Sustainability*.
- Ying, H., Phun Chien, C., & Yee 2020). Operational Management Implemented in Biofuel Upstream Supply Chain and Downstream International Trading: Current Issues in Southeast Asia. *Energies*.

