Chapter 7
Bioeconomy in the Oil Palm Republic of Indonesia

Abstract Biofuels give but a prelude of broader bioeconomy development in the Southeast Asian nation. Although many biofuel production chains were initially envisaged in Indonesia, palm oil reigns supreme as the only feedstock commercially used on a large scale. Its production occurs primarily in industry-owned plantations or through farming contracts between private companies and rural households. These arrangements have provided rural workers or smallholders with a much-needed income that alleviates their poverty; however, the allocation of rights, roles, benefits and burdens is highly inequitable. Moreover, the environmental degradation from oil palm plantations further makes their expansion unsustainable, despite attempts to frame them as climate-friendly due to their role as carbon sinks. Foreign investments play a significant role, but domestic promotion policies arguably remain the only *sine qua non* cause for biofuel expansion in Indonesia. State and private-sector advocates of agribusiness have firmly pushed for plantations as a form of land use and development. Meanwhile, adversaries advocating for conservation have not yet offered a clear alternative development path. Most criticize the mainstream agenda without saying much about how to address Indonesia's development needs sustainably. Credible alternatives may be imperative for the country's land use and to develop its bioeconomy on a more sustainable footing.

Keywords Biofuels · Palm oil · Biodiesel · Tropical forests · Equity · Governance

Maybe nowhere else in the world is the bioeconomy so dependent on one single crop as it is in this still megadiverse country. Indonesia is the world's largest supplier of vegetable oil, whose demand has considerably increased in recent years—among other uses, for biofuels. Its crop of choice is oil palm, a high-yielding oil-bearing tree of West African origin. It has adapted very well to Southeast Asian climates and has given Indonesia its most lucrative export product after coal (Ministry of Trade 2020). However, while this agroindustry brings large sums of foreign exchange to the country, its sustainability has been contested. Growing biofuel production and broader bioeconomy ambitions have further inflamed the debate, raising many questions about land-use changes from oil palm expansion, the role of policies from importers such as the European Union (EU), and also how equitable this palm-centered development is.

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With an inevitable focus on the oil palm sector and to understand the foundations of Indonesia's bioeconomy, this chapter analyzes its now decade-long biofuel industry and why certain production patterns have prevailed. After briefly appraising its energy and agri-food contexts, it assesses Indonesia's biofuel production chains and the evolution of support policies. The chapter then analyzes the distributive outcomes and social impacts of biofuels, agency in Indonesia's biofuel governance, and it concludes with critical insights on the country's bioeconomy development so far.

7.1 Biofuels in Indonesia: How and Why

7.1.1 The Indonesian Setting: Energy and Agri-Food Contexts

7.1.1.1 Energy Context

Indonesia's energy context is characterized by growing consumption, substantive domestic supplies of natural gas and coal (the latter being mostly exported), but declining oil production due to depleting reserves and, thus, a sensitive liquid-fuel import dependence. In absolute terms, energy demand more than doubled between 1990 and 2020. Since 2000, the Indonesian economy has on average grown by 5–6% per year, with its per capita energy intensity also on the rise (IEA 2008; MEMR 2019).

Despite abundant coal supplies—and being, on the whole, a net energy exporter—as much as 40–45% of Indonesia's energy consumption takes place in the transport sector. Therefore, its overall energy demand is primarily met by oil (39%), on which Indonesia's import dependency stands at 35% (National Energy Council 2019). This foreign dependency is a curious twist for a founding member of the Organization of Petroleum Exporting Countries (OPEC). Most of Indonesia's domestic oil production comes from mature fields exploited since the 1950s, and since 2004 the country has been a net oil importer (IEA 2008; EIA 2011). Indonesia left OPEC in 2009, joined it again for a brief period in 2015, but was suspended a year later due to disagreements with the organization's policies—in what might be a structural sign that its strategic position has misaligned from that of actual oil exporters.

Indonesia's refining capacity, too, has stagnated. It lacks investments and has been outpaced by the demand for oil derivates such as gasoline and diesel. This stalled capacity has meant increasing foreign exchange expenditures and budget expenses on subsidies (IEA 2008, 2010). Fossil fuel subsidy reforms have been politically challenging in Indonesia, not unlike elsewhere. Here, such subsidies have consumed a large share of the country's economic resources—as much as 20% of the central government's budget in the 2008–2014 period (Chelminski 2018; MEMR and MF 2019). In 2020, it was estimated that biodiesel alone could save the country USD 4.5 billion from what would have otherwise been fossil fuel imports (Sapp 2020).

Biofuels have, therefore, appeared as a broadly beneficial initiative to Indonesia's energy situation. In a short period, they have grown significantly from meeting only 1% of the country's total energy consumption in 2008 to as much as 13% in 2018 (MEMR 2019 p. 27). Unlike elsewhere where the electrification of transportation is forecast to take hold, the forecast is that electric vehicles will continue to play a very marginal role by 2050 in Indonesia. By that year, in the best-case scenarios for renewables, biofuels are expected to fulfill as much as 62% of the country's transport energy needs (National Energy Council 2019, p. 25).

7.1.1.2 Agri-Food Context

Indonesia's agri-food context is marked by competition between agriculture and other land uses (not only forest conservation, but also urbanization and infrastructure growth), rapid oil palm expansion, and perennial food security concerns—particularly an unyielding import dependence on rice, Indonesia's main staple.

About 71% of Indonesia's territory is formally forestland (Bastos Lima et al. 2013). However, the official estimates are that, in reality, about half of the country's land is covered by forests, without necessarily matching the same areas on paper (Ministry of Forestry 2009; Tsujino et al. 2016). Deforestation has been the single largest environmental issue for Indonesian agriculture and the country's most significant source of greenhouse gas emissions (IPCC 2019). Oil palm cultivation, in particular, has rapidly expanded across the archipelago. It grew in area at a staggering annual rate of up to 10% in the 2000s and early 2010s (Indonesia Statistics 2019), and most often at the expense of forests (Koh and Wilcove 2008; Vijay et al. 2016). Official estimates are that oil palm already occupies more than 16 million hectares (Mha) in the country; however, illegal plantations are rampant, representing as much as one-fifth of the total according to one governmental investigation (Listiyorini and Rusmana 2019). Indonesian civil society assesses that 21 Mha is more likely the actual area (Suwastoyo 2018).

Indonesia's palm oil production has become the world's largest by far, having the country account for 35% of global vegetable oil exports (OECD/FAO 2019). This substantive role is even though domestic biodiesel manufacturing already captures 22% of the country's vegetable oil supply—a share forecast to increase to 28% by 2028 (OECD/FAO 2019). Although domestic consumption is increasing, two-thirds of Indonesia's production is exported, mostly as crude palm oil (CPO) (Rahmanulloh 2020). Thus, oil palm expansion is largely a response to international market demand, notably from India, the EU, China, and the United States. While part of that foreign demand is for biodiesel and oleochemical industries, it is used primarily in processed foods—leading some to provocatively ask whether the world is "junking its forests for junk food" (Huay Lee et al. 2016).

That said, the share of exports in Indonesia's palm oil production is gradually decreasing as the country turns its attention to a booming domestic market (Rahmanulloh 2020). Domestic CPO consumption is growing fast with the expansion of Indonesia's biodiesel sector, along with industry enthusiasm for new bioeconomy

uses of oil palm products, such as palm-based bioplastics (GAPKI 2020a). Besides the biorefining of CPO, which produces refined palm oil alongside co-products such as olein, stearin and glycerol, production of palm kernel oil (extracted from the seeds rather than the fruit pulp) is also on the rise, with utilization in the cosmetics industry.

Meanwhile, the Indonesian government has attempted to overcome the country's persistent dependence on rice imports (primarily from Thailand and Vietnam). While demand is growing, domestic production is increasing just enough not to let the import dependency augment. Rice is grown mostly in Java and Bali, islands of high population density that have experienced a continuous land conversion to non-agricultural, urban uses (McDonald and Meylinah 2019). Agricultural expansion on Sumatra, Borneo, and other outer islands, in turn, has been mostly for cash-crops, such as cocoa and oil palm.

7.1.2 Biofuel Production and Consumption Chains

7.1.2.1 Ethanol

Sugarcane has been Indonesia's preferred feedstock for ethanol, but fuel production is yet to take off. Sugarcane is cultivated mostly in Java and in Sumatra's Lampung Province, though new frontiers have been pursued in the outer islands. By world standards, however, Indonesia has only a modest sugarcane industry, producing about 2.1 million tons of sugar—less than one-tenth of the Indian production. As Indonesia consumes twice as much sugar as it produces, imports (primarily from Thailand) meet more than half of its demand (Meylinah 2020a). Indonesia, therefore, has targeted only sugarcane molasses for ethanol production to avoid sugar vs. ethanol competition. At any rate, fuel-ethanol production remains economically unattractive to the industry and has not taken place since 2010 despite some policy incentives (Rahmanulloh 2019). Pertamina, Indonesia's state-controlled oil company, made an agreement in 2012 with the US-based Celanese Corporation to advance cellulosic ethanol production (Celanese 2013), while during the COVID-19 pandemic the oil palm industry advertised hand sanitizers made with alcohol from palm biomass (GAPKI 2020b). However, as far as fuel is concerned, as of 2020 neither first- nor second-generation ethanol production had taken place at a commercial scale.

7.1.2.2 Biodiesel

Palm oil has been Indonesia's only commercial biofuel feedstock, but others were tried and tested in the early days. Namely, Indonesia has—like India—promoted jatropha as a biodiesel feedstock in the belief it could grow well under marginal conditions, without irrigation or chemical inputs (see Silitonga et al. 2011). Government agencies widely encouraged smallholders to grow it, expecting private companies to purchase it. However, this plan never materialized due to jatropha's low yields

and inability to compete with (cheaper) palm oil as a feedstock (see Dillon et al. 2008). By the early 2010s, jatropha seeds for making one liter of vegetable oil would cost on average IDR 8,000 (~US$ 0.90), in contrast to IDR 5,000 (~US$ 0.56) for palm oil (Slette and Wiyono 2011). As such, the many smallholders who had been approached were left without a buyer. Jatropha remains under R&D efforts to select high-yielding and more tolerant varieties, but it has not (yet) reached commercial viability.

Oil palm is considered the most efficient biodiesel feedstock crop, with yields at least three times higher than any other vegetable oil crop per hectare (Tan et al. 2009; see also Sheil et al. 2009). Its cultivation takes place mostly as cash-crop monocultures: 10% managed by the government, 55% by private companies, and 35% by smallholders (Suwastoyo 2018). However, independent smallholders can hardly afford the high start-up costs of oil palm cultivation and bear the four years of maturation period; therefore, most of them work under buy-back contracts called "nucleus-plasma schemes." The government mandates that smallholders manage at least 20% of the land in oil palm plantations to reduce conflicts between companies and rural communities (Feintrenie et al. 2010a; McCarthy et al. 2012).[1] Usually, the company acquires 70% of the farmers' land (to become the plantation "nucleus") and contracts their work on the remaining 30% (the "plasma"), providing seedlings, inputs, and technical advice at a cost. A bank (usually public) provides credit to the farmers, with the company acting as a guarantor to cover their needs during the crop's long maturation period. Once they start producing, farmers start to pay back the debt as a fixed percentage of what they earn selling fresh fruit bunches (FFB) to the company. The latter processes FFB into CPO and occasionally into more refined products, and market it downstream (Feintrenie et al. 2010a, b; Rist et al. 2010).

The biodiesel industry has come as an add-on to an already thriving palm oil sector. Therefore, this biofuel industry is not about new players coming in but existing ones extending their activities to meet the demands of a new market. Private investments to install capacity for processing palm oil into biodiesel began en masse in 2006–2007, when international petroleum prices increased and CPO prices were low (Dillon et al. 2008; Schoneveld 2010; Caroko et al. 2011). Market volatility, however, soon revealed to be an issue when CPO prices rose in late 2007, and many processing units downscaled or suspended their operations (Caroko et al. 2011, p. 17). Biofuel production only resumed after the government agreed to provide further incentives and procure biodiesel according to a formula that ties it to fluctuating CPO prices.

Indonesian biodiesel production and consumption would substantially increase through the 2010s. With a mandatory consumption of 30% biodiesel blends (B30) in 2020, production of this fuel was estimated at close to 10 billion liters (bl)—essentially making Indonesia the world's largest biodiesel producer and consumer. Installed capacity for 2021 has reached 12.5–13bl, following growing domestic demand. As for exports, while historically they have played a significant role,

[1] See Ministry of Agriculture regulation No. 26/Permentan/OT.140/2/2007, superceded by regulation No. 98/Permentan/OT.140/9/2013, which maintained the requirement, so-called "plasma obligation".

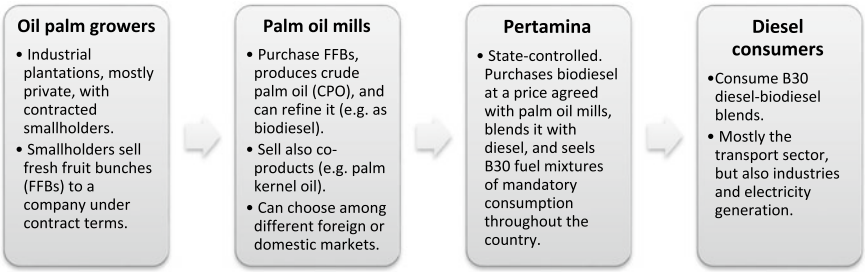

Fig. 7.1 Production and consumption chain of palm-based biodiesel in Indonesia

representing as much as 1.7bl or nearly half of Indonesia's biodiesel production in 2018, this is expected to decrease as key consumer markets (notably in the EU) reject palm-based fuel (Rahmanulloh 2019). The EU classification of palm-based biodiesel as "high risk" in terms of indirect land-use change, with a gradual phase-out through the 2020s until its complete elimination by 2030, has severely reduced Indonesian export prospects. Even if the European policy allows for exceptions depending on the specific production area, that can be a game-changer.

In the growing Indonesian domestic market, biodiesel procurement, blending and distribution are done primarily by the state-owned oil giant Pertamina (Dillon et al. 2008; Caroko et al. 2011). Blends with a share of biofuel receive various names depending on fuel specifications, such as *bio-premium* or *bio-pertamax* for the gasoline-ethanol blends[2] and *bio-solar* for the diesel-biodiesel blend. Initially, biodiesel blends were limited to public-sector transport, mostly heavy-duty vehicles (Sianipar 2012); however, this has expanded to include all diesel sold in the country. See Fig. 7.1.

Currently, CPO exports are the main competition for Indonesia's biodiesel production, as they are often favored when international prices become attractive. Domestic CPO availability—for biodiesel manufacturing as well as other purposes—therefore fluctuates. This fluctuation is despite an export tax the Indonesian government levies on CPO. As such, partly as an effort to increase the security of supply, Pertamina has started investing in having its own palm oil refining plants while seeking from the government a domestic supply obligation applicable to all CPO producers (Asmarini and Christina 2020). If this path is taken, it will increase vertical integration upward in the biodiesel value chain, with the state taking control of further steps upstream to secure its biofuel policy goals.

[2]Pertamina distributes various types of gasoline in Indonesia, the main ones being: subsidized 88-octane (branded "Premium"), and non-subsidized higher-performance, 92-octane gasoline (branded "Pertamax") (Rahmanulloh 2019).

7.1.3 Indonesia's Biofuel Policy Framework

Indonesia's policy of phasing-in biofuels began with the release of a blueprint for the country's energy planning in 2005, which became consolidated in the 2006 National Energy Policy (Government of Indonesia 2006; Legowo et al. 2007). A presidential decree created the National Team for Biofuel Development (TIMNAS BBN), a group of government and private sector representatives with the mission of drawing up a roadmap with milestones of biofuel consumption targets until 2025 (Legowo et al. 2007; Dillon et al. 2008; Caroko et al. 2011). The roadmap aimed at a 10% replacement of diesel by 2010 and 20% by 2020, accompanied respectively by 5% and 15% gasoline replacement with ethanol (Legowo et al. 2007).

To meet those targets, the government foresaw the expansion of feedstock plantations onto an additional 5.25 Mha of "unused land" by 2010, projected to increase to 10.25Mha by 2015 (Caroko et al. 2011). The government offered two new lines of subsidized credit through public banks as well as tax exemptions and other fiscal incentives to biofuel industries (Dillon et al. 2008; Caroko et al. 2011). It also revised regulations concerning private sector investments in plantations. In 2007, a new investment law (Law 25/2007) simplified the land-leasing bureaucracy for agribusiness investors and extended the duration of the required land-use permits (HGU, *hak guna usaha*, "right to cultivate"; and HGB, *hak guna bangunan*, the "right to build" agricultural processing infrastructure).[3] Concurrently, the Ministry of Agriculture set higher ceilings for the area sizes that can be leased for private plantations. These ceilings are crop-specific and, tellingly, are much higher for biofuel feedstocks. While traditional—but non-feedstock—Indonesian commodities such as cocoa and coffee are limited to 5,000 ha, jatropha's ceiling is ten times higher (50,000 ha), as are oil palm's (100,000 ha) and sugarcane's (150,000 ha). Only feedstock crops have ceilings above 25,000 ha.[4] All these caps are twice as high for Papua, perceived by the government as having abundant lands available.[5] Finally, the government sought international cooperation on biofuels and signed 67 agreements in 2007, including bilateral technological cooperation with Brazil (Dillon et al. 2008). These efforts underscored the beginning of Indonesia's biofuel strategy (see Table 7.1).

However, despite those incentives, biofuels remained uncompetitive due to fossil fuel subsidization (Krismantari 2007). Then, in 2008 the government introduced *mandatory* blending targets. Palm oil mills remained reluctant to produce biofuels, as CPO prices were more attractive on the international market (Sasisitiya and Liem 2009). The Indonesian Biofuel Producers Association requested a benchmarked biodiesel price based on that of CPO, a request to which the government acquiesced later in 2009 (Wulandari 2009). Still, with the continuous increases in CPO market prices, palm-oil biodiesel became too expensive to produce without further economic

[3]It increased the duration of HGU permits from 35 years (with the possibility of renewal for additional 25 years) to 60 years (renewal for 35 years), and HGB permits from 30 years (renewal for 20 years) to 50 years (renewal for 30 years) (Caroko et al. 2011).

[4]Ministry of Agriculture Decree No. 26/Permentan/Ot.140/2/2007, appendix 3.

[5]Ministry of Agriculture Decree No. 26/Permentan/Ot.140/2/2007, Art. 12, par. 3.

Table 7.1 Initial phase of Indonesian policies for biofuel promotion

Year	Policy	Policy instrument type(s) and target(s)	Effect
2005	National Energy Blueprint 2005–2025	National consumption targets	Phasing-in of biofuels in the energy mix: 2% by 2010, 3% by 2015, and 5% by 2025[a]
2006	National Energy Policy	National consumption targets	Adoption of blueprint projections with specific targets for biodiesel, ethanol, straight vegetable oil, and total biofuels. National agencies to devise policy instruments to stimulate production projects and facilitate land procurement for feedstock crops[b]
	Creation of the National Team for Biofuel Development (TIMNAS BBN)	Governance	Preparation of a biofuel development roadmap to create employment and alleviate poverty[c]
	Fuel specifications for ethanol and biodiesel	Economic regulation (*fuel distributors*)	Technical fuel specifications and permission to blend 10% of ethanol and 10% of biodiesel[d]
	Taxation on ethanol imports	Import tariff (*Foreign ethanol industries*)	Import tariff of IDR 10,000 per liter of ethanol plus 30% *ad valorem*[e]
	Subsidized credit to individual farmers growing feedstock	Public credit (*oil palm growers*)	National banks to provide farmers with subsidized credit for establishing feedstock plantations, particularly oil palm[f]
2007	Economic incentives for biofuels	Fiscal incentives (*biodiesel and ethanol industries*)	Income tax deductions, accelerated depreciation and amortization of costs, and government guarantee against operational losses[g]
	New Investment Law	Land (de)regulation (*sugarcane, jatropha or oil palm growers*)	More favorable land regulations to investors, including longer concession periods[h]
	New guidelines on plantation licenses	Land (de)regulation (*sugarcane, jatropha or oil palm growers*)	Higher area limits to plantation licenses, particularly on feedstock crops such as sugarcane, oil palm, and jatropha[i]
	Subsidized credit to farmer cooperatives growing feedstock	Public credit (*sugarcane, jatropha or oil palm growers*)	National banks to provide farmers and cooperatives with subsidized credit for development projects on food and energy crops[j]

[a]Legowo et al. (2007), [b]Presidential regulation No. 5/2006; [c]Presidential regulation No. 10/2006; [d]Director General of Oil and Gas Decrees No. 3674 and No. 3675; [e]Ministry of Finance Decree No. 89/PMK.04/2006; [f]Ministry of Finance Decree No. 117/PMK.06/2006; [g]Government regulation No. 1/2007; [h]Law No. 25/2007; [i]Ministry of Agriculture Decree No. 26/Permentan/Ot.140/2/2007; [j]Ministry of Finance Decree No. 79/PMK.05/2007

incentives (Sasisitiya 2010). The government response was to provide further fiscal incentives and double the direct subsidy paid to processors, from IDR 1,000/liter to IDR 2,000/liter for the year 2010 (Caroko et al. 2011). Biodiesel production then finally started to increase and gained scale.

A new National Energy Policy in 2014 consolidated public incentives for biofuels (Government Regulation 79/2014). It also set Indonesia's renewable energy targets at 23% by 2025 and 31% by 2050, respectively, requiring the consumption of 13.9bl and 52.3bl of biofuel in the country (Rahmanulloh 2019). The government introduced progressive export taxes on both CPO and biodiesel that apply whenever their international market prices go beyond an established threshold, to prioritize domestic use. As per the Ministry of Finance Regulation 23/2019, a USD 25/ton export tax applies to CPO when its prices stand between USD 570–619/ton, and USD 50/ton when CPO prices go above USD 619/ton. Levies are also collected from biodiesel exports when its prices are within the same range, but these levies are lower (respectively USD 10/ton and USD 20/ton) to encourage domestic processing (Rahmanulloh 2019). These taxes feed into an Estate Crop Fund for palm oil, also called the CPO Fund, used to subsidize biodiesel manufacturing in times of low petroleum prices as well as for broader investments in oil palm R&D, smallholder support, and crop replanting (Nurfatriani et al. 2019).

Meanwhile, the government has continued to incentivize private investment in oil palm plantations. In 2014, a new Law on Plantations dropped earlier limits on foreign ownership. Oil palm plantations, in particular, are increasingly framed as strategically contributing to both the nation's food and energy needs. Since a 2009 policy on special economic zones (with facilitated conditions for investment), such plantations have started to be regarded as "Food and Energy Estates" (Ginting and Pye 2011). The flagship example of this policy has been the Merauke Integrated Food and Energy Estate (MIFEE),[6] a program to set new plantations on up to 2 Mha in Merauke district, Papua (see Ginting and Pye 2011; Ito et al. 2014, Obidzinski et al. 2014). Initially launched by President Susilo Bambang Yudhoyono in 2011, it was relaunched in 2015 by President Joko Widodo, who has linked MIFEE to Indonesia's increasing self-sufficiency aspirations on energy and food despite negative impacts on local communities and natural forests (Suryiani 2016; Indrawan et al. 2017).

To dispel growing sustainability concerns from major importers, the government created the Indonesian Sustainable Palm Oil (ISPO) certification. This initiative came after industry complaints that certification from the Roundtable on Sustainable Palm Oil (RSPO) is too demanding, costly, and not sufficiently rewarding in providing either market penetration or premium price. This policy came in tandem with a similar initiative in Malaysia, which announced its Malaysian Sustainable Palm Oil (MSPO) certification. While some stakeholders argue that this is a greenwashing movement from the government to "certify" the domestic industry under laxer requirements, others contend that it is meant as a stepping-stone towards acquiring the stricter RSPO certification. After years of limbo, in 2020, ISPO became mandatory to all

[6]The project has been legally enshrined in the letter of the Governor of Papua Province No. 050/1879/SET, dated May 26, 2010, regarding MIFEE.

palm oil producers while coming to have more precise criteria and a governance structure to increase both its domestic uptake and foreign market acceptance.

For the future, it seems clear that Indonesia's biodiesel strategy increasingly has a domestic orientation. As key markets abroad limit palm-based biodiesel importation, both the Indonesian government and the country's Biodiesel Producers Association have started eyeing B40 blends and beyond (Suwastoyo 2020). Table 7.2 shows Indonesia's key policies related to biofuel production since 2008.

7.1.4 Assessing Institutional Causality

Four reasons make Indonesian public policies the primary driver of biofuel production in the country. First, they have provided the private biofuel sector with essential economic incentives, without which the sector essentially is not viable (see Dillon et al. 2008; Schoneveld 2010; Caroko et al. 2011). Second, they have made Pertamina procure, blend, and distribute biofuels. The only domestic buyer is essentially the state itself, in a monopsony. Third, public policies have granted needed permissions and necessary bureaucratic facilitation to private land-based investments, without which such investments would arguably be much fewer. Fourth, the government has directly engaged in garnering international support through agreements and technology exchange to improve biofuel production. Albeit less successfully, it has also engaged in a form of "palm oil diplomacy" through ISPO on behalf of its palm oil industry. As such, although biofuel policies have not *created* the feedstock production systems in place, there is a broad consensus that they have boosted private investors' interest in and government support to the expansion of plantations (Santosa 2008; McCarthy and Cramb 2009; Caroko et al. 2011). Table 7.3 summarizes the key rationales behind Indonesia's biofuel policy-making.

As a significant exporter, Indonesia's palm-based biodiesel industry seems more strongly influenced by foreign drivers than those of India and Brazil. The US and the EU are significant import markets and sources of much private investment (Pye 2010). Therefore, biofuel expansion—as the overall expansion of oil palm in the country—owes both to foreign market demand and to Indonesia's public policies, even if the latter have been the only essential, *sine qua non* cause.

7.2 Allocation and Access: Analyzing Institutional Performance

7.2.1 Allocation Patterns: Who Owns, Does, and Gets What

As in the rest of developing Asia, fast economic growth in Indonesia (at 5–6% a year) has been accompanied by a sharp rise in inequality. Its Gini index increased

Table 7.2 Evolution of Indonesia's policies for biofuel production since 2008

Year	Policy	Policy instrument type(s) and target(s)	Effect
2008	Ministry of Energy regulation on supply, utilization, and marketing of biofuels	Consumption targets (*fuel distributors*)	Milestones for mandatory biofuel consumption by different sectors from 2009 to 2025[a]
2009	Subsidies to biofuel processors	Direct subsidy (*biofuel industries*)	Subsidy of IDR 1,000 (USD 0.10)/liter to biofuel processing industries[b]
	Ministry of Finance decree on biofuels	Fiscal incentives (*biofuel industries*)	The government to absorb value-added tax levied on the biofuel sector[c]
	Special Economic Zones	Zoning (*plantation investors*)	Zones with facilitated conditions for investment in strategic sectors such as energy and agriculture[d]
	Procurement and distribution of biofuels	Economic regulation (*fuel distributors*)	Ministry of Energy and Mineral Resources (MEMR) to set a pricing formula for biofuel procurement[e]
	First of a series of increases in biofuel subsidies	Direct subsidy (*biofuel industries*)	Biofuel subsidies to processors are doubled, from IDR 1,000(~USD 0.10)/litre to IDR 2,000 (~USD 0.20)/litre[f]
2010	Directorate General (DG) of New and Renewable Energy	Governance	Creation of a New and Renewable Energy directorate-general in the MEMR to promote and steer biofuel production and consumption
	Foreign equity shares	Land (de)regulation (*plantation investors*)	Foreign investors allowed up to 95% of joint ventures on oil palm or jatropha plantations[g]
	Food and Energy Estates	Land (de)regulation	Creation of the "Food and Energy Estates" format within a special economic zones policy to facilitate investment in food and feedstock crops[h]
2011	The second increase in biofuel subsidies	Direct subsidy (*biofuel industries*)	Biofuel subsidies to processors raised from IDR 2,000(~USD 0.20)/litre to IDR 2,500–3,000(~USD 0.25–0.30)/litre for biodiesel and IDR 3,000–3,500 (USD 0.30–0.35)/litre for ethanol[i]
	ISPO sustainability certification	Certification	Creation of the government-run Indonesian Sustainable Palm Oil (ISPO) certification[j]
2014	National Energy Policy	Consumption targets (*Domestic industries*)	Renewable energy targets of 23% by 2025 and 31% by 2050, including biofuel consumption of 13.6 billion liters (bl) and 52.3 bl, respectively[k]
2018	Estate Crop Fund (CPO Fund)	Direct subsidy (*biodiesel industries*)	Established in 2015 and updated in 2018, a fund to subsidize biodiesel production and oil palm planting[l]
2019	CPO and biodiesel export levies	Export taxes (*Domestic industries*)	Export taxes on CPO or biodiesel exports if prices exceed USD 570/ton. Pooled into the CPO Fund[m]
2020	New ISPO rules	Certification	ISPO becomes mandatory to all palm oil producers, with more precise criteria and governance structure[n]
	B30	Blending mandate	30% biodiesel blending becomes mandatory

[a]Ministry of Energy and Mineral Resources regulation 32/2008; [b]State Budget—Fiscal Year 2009; [c]Ministry of Finance decree No. 156/PMK.011/2009; [d]Government regulation No. 39/2009; [e]Presidential regulation No. 45/2009; [f]State Budget—Fiscal Year 2010; [g]Presidential Regulation No. 36/2010; [h]Government Decree No. 18/2010; [i]State Budget—Fiscal Year 2012; [j]Ministry of Agriculture Decree No. 19/Permentan/OT.140/3/2011; [k]Government Regulation 79/2014; [l]Nurfatriani et al. (2019); [m]Ministry of Finance Regulation 23/2019. [n]President Regulation 44/2020

Table 7.3 Rationales for biofuel policies in Indonesia

Rationale	Specific interests
National energy security	Increasing domestic energy production to reduce reliance on foreign oil and expenditures on fossil fuel subsidies, eventually becoming a biofuel exporter[a]
Rural development	Rural employment in feedstock cultivation, particularly oil palm[b]
Climate change mitigation	Reduction of GHG emissions through fossil fuel substitution in transportation[c]

[a]Government of Indonesia (2006), Legowo et al. (2007), Hadiwidjoyo (2009), Caroko et al. (2011), [b]Legowo et al. (2007), Hadiwidjoyo (2009); [c]Legowo et al. (2007), and State Ministry of Environment (2007)

from 0.29 in the early 1990s to 0.39 by 2018 (Asian Development Bank 2012; World Bank 2020). The Asian Development Bank (2012) notes that market-oriented development policies and greater integration in the global economy have been the leading cause. The outcomes have been notably different from the more equitable growth experienced by Asia's newly industrialized economies (Japan, South Korea, Singapore, Taiwan) in the 1960s and 1970s. The Bank further argues that two factors are crucial: (i) large economic reliance on physical capital, including exhaustible natural resources, disproportionately benefitting those who own or control it, and (ii) regional disparities, such as the urban-rural divide. In Indonesia's case, there are also significant inequalities among the islands, with Java and Bali being the most urbanized, industrialized and densely populated ones, followed by Sumatra and Borneo, while Papua and the other eastern islands are on the other extreme (Asian Development Bank 2012).

Palm oil production systems have arguably contributed to such an inequitable development. First, they reallocate control over land and freshwater resources from rural communities to mostly private agroindustries, making the former utterly dependent on the latter for their income and food security. Second, even though such systems incorporate local communities as palm-fruit suppliers or plantation workers, the industry retains control of cultivation. Contracted smallholders must purchase expensive chemical inputs from the company; they are susceptible to its uneven bargaining power, as the company is frequently the only buyer in the area (monopsony). Moreover, according to some farmers, they occasionally are also subject to abuses from company staff, who allegedly are not always honest when determining the palm fruit quality and, thus, its price (Personal interviews).

Third, smallholders are limited to the role of raw-material suppliers without any prospects of climbing up in the value chain. In contrast, the industry benefits both from governmental subsidies and increasingly profitable markets—not only from palm oil and its derivates but also from co-products such as palm kernel oil. As such, in relative terms, the companies benefit much more. They keep the most advantageous roles, most income, control over technology and production, and simply use rural communities as hired labor. Still, this labor is ridden with health risks and exploitation cases (Gottwald 2018; Suwastoyo 2019). The incorporation of locals

and, in particular, the "plasma obligation" is also a form of reducing land conflicts (Feintrenie et al. 2010a; McCarthy et al. 2012), a tactic that could easily be regarded as also a form of co-optation. A study by the Worldwatch Institute suggests that self-employment in traditional farming can provide livelihoods to 260 times more people per hectare than oil palm plantations do (Renner et al. 2008). However, these alternatives are simply not on the agenda.

The government's strategy has been to promote private oil palm agroindustries as "agents of change" to increase domestic (renewable) fuel supplies and improve rural socio-economic standards. Such an approach is clear from how regulatory and economic incentives are nearly all aimed at the private sector. Even instruments that target other actors, such as subsidized credit to farmers, seem ultimately linked to the industry—in this case, because farmers need a loan guarantor, who is usually a private company (McCarthy 2010). Therefore, this lending works as a tool to enable rural Indonesians to participate in such privately-run systems. Arguably, it indirectly targets the industry as much as it targets the smallholder.

Meanwhile, economic burdens are allocated to the state—and not only in the form of subsidies. Pertamina's role as Indonesia's sole fuel distributor means it has to absorb the higher costs of blending biofuels despite cheaper gasoline and diesel. As such, not only does the policy channel public funds to the private sector, but it also allocates the least economical step of the value chain to the state.

7.2.2 Access to Resources: Land, Water, Food and Energy

Access to land in Indonesia is conflictive both at the institutional level and on the ground (Colchester et al. 2006; Colchester 2011; Dhiaulhaq and McCarthy 2020). Most disputes refer to customary ownership *versus* land-use rights granted by the government to private companies for mining or plantation development (Colchester et al. 2006; Caroko et al. 2011). Regulations are fuzzy, and land tenure status is often unclear. Although the Basic Agrarian Law of 1960 recognizes customary ownership rights, it makes them subordinate to national interests as interpreted by the state (see Bastos Lima et al. 2013). As such, many conflicts have either emerged or been exacerbated by oil palm expansion and biofuel promotion (Marti 2008; McCarthy and Zen 2010; Colbran 2011, Colchester 2011; Abram et al. 2017). Throughout the 2010s, the Indonesian NGO Sawit Watch annually registered over 500 land conflicts involving local communities and palm oil companies in Indonesia (see Drost et al. 2019). Such conflicts have significantly affected indigenous peoples and other forest-dependent communities. Their lands rest mostly on agricultural frontiers (e.g., Kalimantan, Papua), and their customary rights are hardly recognized in practice (Colchester 2011; Abram et al. 2017).[7]

[7]Indigenous peoples seem also more sensitive to losses in terms of aesthetic values, sacred sites, and traditionally used plants (Colbran 2011).

In the case of smallholders incorporated into nucleus-plasma systems with private companies, most interviewed analysts regard the price paid for the 70% of land acquired as too low. Smallholders frequently agree it is, but they usually see it as a price to pay for the development opportunity that oil palm brings (McCarthy 2010; Feintrenie et al. 2010a). Nonetheless, they frequently misunderstand the contract terms. Once the leasing license expires (after 25 or 35 years), the land normally goes to the state, but farmers often believe that it comes back to them (Personal interviews). As such, further conflicts seem poised to erupt when current contracts end.

Oil palm expansion is also problematic from the perspective of access to water. Over 21 million Indonesians still lack improved access to safe drinking water (WHO/UNICEF 2019). Pesticide contamination of water bodies, aquatic biota and humans has been increasingly an issue (Sudaryanto et al. 2006; Koh et al. 2009; Nooteboom and De Jong 2010). Such environmental contamination also comes from palm oil mill effluents discharged without treatment (Marti 2008; McCarthy and Zen 2010; Stichnothe and Schuchardt 2011). Besides, there is increasing depletion due to extensive freshwater use for palm oil processing (McCarthy and Zen 2010) and peatland conversion into plantations (Sumarga et al. 2016). Such land-use change is highly problematic because peat absorbs water during rainy seasons and retains it during dry ones; therefore, peat conversion has led to increased flooding when it rains and reduced water availability during dry seasons (Koh et al. 2011; Yule 2010).

In terms of access to food, there have been mixed impacts. On the one hand, forest conversion has negatively impacted forest-dependent peoples losing traditional food sources (Colbran 2011; Colchester 2011; Abram et al. 2017). Fishing communities, too, have suffered disproportionately from water contamination (Nooteboom and De Jong 2010). On the other hand, many smallholders have welcomed the higher incomes obtained from oil palm cultivation, which have increased their purchasing power and access to food (Rist et al. 2010; Feintrenie et al. 2010a; b). However, they have become vulnerable to palm oil price fluctuations, over which they have no control.

There is a longstanding food security concern, shared both by parts of the Indonesian government and particularly female smallholders, about rice paddies' replacement by oil palm plantations (Personal interviews; see also Marti 2008). Indonesia remains an importer of rice, its key staple, though the level of import dependency has been decreasing (Slette and Meylinah 2013; Meylinah 2020b). As 8.3% of the Indonesian population (approximately 22 million people) is undernourished (FAO 2019), there is a fear that cash-crop and particularly oil palm expansion may aggravate the problem. Government officials at various levels seem divided, with some expressing concern while others deny that such a replacement takes place, and claiming they succeed in avoiding it. Many rural women, in turn, are categorical that it has happened and have resented the loss of local food self-reliance despite the income brought by oil palm (Personal interviews).

As for access to energy, Indonesia's rate of electrification improved substantially in the past decades. From only 59% in 2006—with significant regional disparities, such as 71% in Bali against only 28% in Papua—it reached over 98% before 2020 (IEA 2008, 2019). However, this near-total coverage does not mean that the quality,

frequency, or reliability of access are comparable across the board. Rural areas and outer islands, in many cases, only have electricity access for a limited number of hours each day, besides still using traditional biomass for other needs such as cooking (Bhatia and Angelou 2015). Moreover, this has been achieved mostly by expanding the fossil fuel-based grid, as local and decentralized electricity production remains limited despite Indonesia's spread-out geography (IRENA 2017). As seen, biodiesel has been used primarily in transportation; thus, it has aimed mostly at motorists who already had access to energy. Those are either (mostly urban) drivers in Indonesia or export markets such as Europe. Plans to use jatropha oil in stationary engines for energy self-sufficient villages broadly failed due to low yields and lack of procurement for processing, except for a few NGO-supported cases (Caroko et al. 2011). Electricity production from palm oil-biodiesel has recently come to the agenda and would represent another market for this sector, but this is yet to gain scale. At any rate, it would still be the only structural change in Indonesia's energy access coming from biofuels.

In the end, there is no consensus on the extent to which oil palm expansion is positive or negative to rural communities—at least in the short run. Although such communities lose autonomy, control over the land, and at times access to other natural resources such as clean water, they earn a much-needed income (Rist et al. 2010; Feintrenie et al. 2010a, b). This trade-off might be seen as a "Faustian bargain," as rural communities have their environment degraded by chemical input-intensive oil palm monocultures—due to biodiversity loss (Fitzherbert et al. 2008; Koh and Wilcove 2008; Koh et al. 2011), soil depletion (Stichnothe and Schuchardt 2011; UNEP 2011), and freshwater contamination (Marti, 2008; McCarthy and Zen 2010; Stichnothe and Schuchardt 2011)—and become wholly dependent on that (one) industry. Still, smallholders contend that without oil palm their living standards would be much lower, with less financial resources and reduced access to transportation, infrastructure and education, among others (Feintrenie 2010a; Rist et al. 2010). The present situation has mostly been a take-it-or-leave-it deal for rural communities, who often find in oil palm plantations the only development opportunity available.

7.3 Agency in Biofuel Governance in Indonesia

7.3.1 Main Coalitions and Their Policy Beliefs

By affecting Indonesia's land-use policy, biofuels have entered a major ongoing conflict between conservation and plantation-expansion interests. There is a balance—in engagement if not in effectiveness—among state, business, and civil society agents, including foreign environmental NGOs. Such NGOs appear to play a more important agency role in Indonesia than in India or Brazil, possibly because agricultural issues here are closely linked to tropical deforestation, a topic of global concern. (Why international NGOs have been more influential in Indonesia than in

Brazil remains open for debate.) Indigenous peoples and farmers' unions also play relevant roles as agents.

The dominant coalition, which can be referred to as the *plantation coalition*, is formed by the state and the private sector, with minor participation from the scientific community. They believe biofuels can and should replace fossil fuels on a large scale in Indonesia, but without significant changes in fuel distribution or consumption patterns (Government of Indonesia 2006; Legowo et al. 2007; World Growth 2011). In their view, Indonesia should become a major producer and, to a degree, also an international supplier of palm-oil biodiesel, particularly to EU and US markets (World Growth 2011). These dominant agents see no food vs. fuel conflict in the country but food and cash-crop production going hand in hand. Moreover, some argue that as Indonesia still has significant forest cover (far above the world average), it is acceptable to convert land to agriculture for the sake of economic growth, food and energy security (World Growth 2011; Personal interviews). Biofuel production is thus seen as part of a poverty reduction and development agenda, where plantation expansion provides jobs and income to the rural poor and improves their access to infrastructure and services. In this view, the imposition of sustainability requirements by import markets such as the US or the EU is seen as an unjustified form of "green protectionism" or as a trade war—an attempt to benefit their biofuel producers at the expense of Indonesia's more competitive ones (World Growth 2011; Personal interviews).

Although such policy-core beliefs have remained mostly unchanged, this coalition has revised many of its secondary beliefs, related to more specific aspects and policy instruments. For one, the plantation coalition believed that high levels of biofuel blending could materialize quickly, but targets had to be lowered. Similarly, it had initially thought that biofuel production would be economical even without subsidies, benchmark procurement prices, or blending mandates — another belief that proved wrong and had to change. Finally, as in India and elsewhere, jatropha was believed to achieve high yields without water or other agricultural inputs, even in poor soils. The coalition later reconsidered that, and its members became focused on R&D investments to increase jatropha yields before largely abandoning it to favor palm-based biodiesel (see Slette and Wiyono 2011, 2013).

As the government and the private sector control different stages of the biofuel production chain, they are "symbiotically interdependent"—as in the Brazilian and Indian cases. It means they need one another to concretize their individual policy goals (Fenger and Klok 2001). Such interdependence is evident in the continuous negotiation on biofuel prices and policy incentives: success or failure of these negotiations has determined Indonesia's biodiesel and ethanol sectors' contrasting fates. An additional bonding factor is that they use complementary resources in agency (see Weible 2006; Sabatier and Weible 2007). While the private sector finances plantations and agro-industrial facilities, the government uses its legal authority to navigate investors through the bureaucracy and give them the necessary land-investment permits. This pattern is different from Brazil's case, for instance, where financing is largely public and investors can buy private lands relatively independently of the

government. Such resource complementarity leads to even stronger interdependence and coalition coordination in Indonesia.

However, this mainstream agenda faces the opposition of what can be called the *conservation coalition*, which is composed of social and environmental NGOs (Indonesian and foreign), indigenous peoples, and part of the scientific community. These agents contend that plantation expansion degrades the environment and frequently leads to land grabbing and social conflict (Wakker 2005; Colchester et al. 2006; Colchester 2011). They have focused much more extensively on criticizing the plantation coalition than articulating an alternative view. A few have argued for development based on principles of self-determination and food sovereignty, emphasizing local communities' rights to decide how to use their resources and to prioritize their own needs, thus building resilience from external decisions and food price volatility (Wakker 2005; Colchester et al. 2006; Colchester 2011). Nevertheless, how such principles would translate into specific biofuel policy choices—if any—remains mostly unspecified. On a more general level, it is possible to divide such conservation coalition contenders into two sub-groups. On the one hand, those who believe that feedstock cultivation can play a role as a cash-crop or for local energy consumption. On the other hand, the ones who see no place for biofuels on an alternative development agenda and instead focus on food (Personal interviews).

Lastly, oil palm farmers (who are mostly smallholders) have argued for their views and beliefs without significant articulation with other actors. Their central policy belief is that biofuels production—and, more broadly, agriculture—should provide them with a decent income and improve access to services and modern infrastructure. Besides, they believe farmers' access to sufficient land and tenure security should be ensured (Personal interviews). Despite their participation in the large-scale palm-biodiesel chain, they do not necessarily share the plantation coalition's policy-core beliefs. There is also little evidence that their advocacy has any nontrivial coordination (see Sabatier and Weible 2007) with those other biofuel governance actors. They seem much more concerned about their own needs and have thus performed a form of isolated advocacy, apart from the two coalitions described above (see Table 7.4).

7.3.2 Strategic Uses of Power

The previous section explained how the plantation coalition strategically combines financial resources and access to legal authority positions to advance its agenda. Inside the coalition, it is interesting to observe how the government deftly uses its structural power to push biofuel policy goals ahead within the broader plantation-oriented vision of development. Not only does it set a captive market, siphoning off CPO and helping drive its prices up. It also compels palm oil producers to contribute to the biofuel agenda via a revolving door: the levies collected from CPO exports return primarily to the same palm oil companies as subsidies, so long as they comply with the biodiesel production agenda (see ICCT 2017). Still, the state shows its limited trust in private companies (which are largely of foreign capital) when public

Table 7.4 Main agents, coalitions, and policy-related beliefs on biofuels in Indonesia

Main agents	Policy-core beliefs	Secondary aspects
Majority within the government Oil palm agribusiness Sugarcane agribusiness Jatropha processing industry Scientific community	• Biofuels should replace fossil fuels on a large scale, but without structural changes in fuel distribution and consumption patterns • Indonesia should become a major producer and international supplier of biodiesel, particularly to the EU and the US. Sustainability requirements imposed by import markets are "green protectionism" • There is no food vs. fuel conflict in Indonesia; food and cash-crop production go hand in hand • Biofuel production promotes development. Feedstock plantations create jobs for the rural poor and improve access to infrastructure and services • Forests cover half of Indonesia, so it is acceptable to convert some of them for development, energy and food security	• ~~Production of palm-biodiesel and sugarcane-ethanol (from molasses) is economical without the need for blending mandates or subsidies.~~ (Revised: Subsidies to the industry are needed, as are blending mandates and benchmarked biofuel procurement prices to make it rewarding to the industry) • ~~Jatropha is capable of producing well without inputs.~~ (Revised: agricultural R&D to increase productivity) • ~~Feedstock and biofuel production do not need sustainability certification.~~ (Revised: ISPO certification is useful to minimize adverse environmental impacts)
Oil palm farmers	• Policies should provide smallholder farmers with a fair price, raise incomes, and improve access to services and modern infrastructure • Ensure to farmers access to sufficient land and tenure security	• Increase (>30%) smallholders' land share in nucleus-plasma schemes • After nucleus-plasma schemes, all land should return to the rural community instead of going to the government
Scientific community Environmental NGOs (moderate critics)	• Indonesia's land-use governance needs far greater attention to conservation. Plantation expansion is the primary driver of deforestation, greenhouse gas emissions, biodiversity loss, land grabbing, and social conflict in Indonesia. Policies should, therefore, focus on forest protection and ensure that agriculture meets sustainability standards	• Biofuel production can be sustainable if it helps secure farmers' access to land and tenure, without such tight corporate control
Environmental NGOs (strong critics) Indigenous peoples		• No role for liquid biofuels in sustainable development. Other forms of bioenergy, such as biogas or electricity generation from biomass, are more attractive

NB: Gray areas represent different coalitions; crossed-out text under *secondary aspects* indicates former beliefs replaced

companies such as Pertamina asserts itself. It is illustrative that the state-controlled oil company now seeks to directly produce palm-biodiesel, fearing that private mills may fail to deliver sufficient supplies given the frequently higher attractiveness of international CPO markets. It reveals tensions within the plantation coalition, which nevertheless have been managed to advance the common policy beliefs and interests of its members.

On the other camp, the conservation coalition has relied mainly on information as an advocacy resource.[8] Environmental NGOs (particularly Europe-based ones) and like-minded scientists have published extensively on the negative impacts of oil palm expansion in Indonesia, trying to expose the government and private agribusiness (e.g., Wakker 2005; Marti 2008; Colchester et al. 2006; Colchester 2011; Koh et al. 2011). Their target audience is not so much the Indonesian public opinion but the international community (mainly in palm oil-importing countries) to influence foreign policy-making (Personal interviews). Scientists have supplied evidence and detailed analyses of environmental degradation caused by oil palm plantations (e.g., Koh et al. 2011; Fitzherbert et al. 2008). In turn, NGOs have utilized "name and shame" tactics and engaged in strong consumer-oriented campaigns against palm oil, particularly targeting large food-processing companies in Europe (e.g., Unilever; see The Economist 2010). As such, the agency of NGOs and that of scientists have been complementary and mutually reinforcing. NGOs have been key in consumer-led certification schemes such as RSPO, holding both structural power (as board members that help craft the agenda) and discursive power (over companies and consumers who adopted the certification).

Indigenous peoples, too, have targeted international audiences by denouncing human rights violations from plantation expansion. Together with foreign and Indonesian NGOs, indigenous peoples sent a request to the UN Human Rights Council to internationally condemn the MIFEE project in Papua, which in their view should be suspended (Sawit Watch et al. 2011). The Council responded by formally requesting the Indonesian government to disclose information on the Merauke project and accept inspection visits in Papua of the UN Special Rapporteurs on human rights, indigenous peoples' rights, and the right to food (UN Human Rights Council 2012). Although the Indonesian government initially refused such requests (UPR Info 2012), the UN Special Rapporteurs eventually visited and issued several critiques about plantation expansion in Papua (see UN General Assembly 2018).

These strategies of weaker agents recognize the plantation coalition's vulnerability to foreign consumers' and investors' decisions. Such actors seem more easily swayed by environmental and human rights issues than dominant Indonesian ones. Foreign support may strengthen the conservation coalition (e.g., by adding members and resources). It may also impose resource constraints on the plantation coalition, whose agenda depends on international trade and financing. For instance, oil palm agribusiness resources suffered a setback between 2009 and 2011, when the World Bank suspended its financing of the sector after substantive criticism from civil society (see Van Gelder and Kouwenhoven 2011). Even if it did not significantly alter Indonesia's development course, it temporarily reduced the plantation coalition's material capabilities. A more lasting achievement has been conservationists' success in changing the initial assumption that biofuels were automatically sustainable, helping push sustainability standards in the EU and the US. The imposition of standards—which broadly reject palm-oil biodiesel—has dealt a blow to Indonesia's

[8] See Weible 2006 on the use of information as an advocacy resource.

oil palm sector, which has continuously questioned them. Such civil society advocacy in importing countries also led industry boards in Belgium, the Netherlands, and the United Kingdom to limit non-certified palm oil (Balch 2013). These moves may not have changed the policy-core beliefs of the plantation coalition (as it regards these restrictions as unjustifiable). However, they affect its material capabilities by limiting access to export markets. The reorientation of Indonesia's palm oil producers increasingly towards the domestic market, especially pulled by ever more ambitious biodiesel consumption targets, is in a way a response to the closing of some markets abroad.

The plantation coalition has responded with information and discourse, too. Supportive scientists have played key roles in publishing studies that buttress the coalition's policy beliefs. For instance, analyses that refute criticism on oil palm plantations' environmental profile,[9] or reassert the potentials and worth of large-scale fossil fuel replacement by biofuels, and overall give tacit or explicit support to Indonesia's biofuel policy (see, e.g., Silitonga et al. 2011; Gunawan et al. 2011; Jayed et al. 2011). For instance, a common argument has been to emphasize oil palm's climate benefits as a carbon sink—while ignoring or downplaying its other environmental problems.[10] Similar scientific backing was pivotal for the jatropha hype in Indonesia, primarily based on published overestimations (Afiff 2014). The private sector, too, has tried to gain discursive leverage, mostly by highlighting the importance of oil palm for the country's economy, but on occasion also blaming deforestation on smallholder agriculture instead (see Bahroeny 2009; World Growth 2011).

The creation of Indonesia's own palm oil certification scheme (ISPO), in turn, can be seen as a response to the perceived NGO-influenced consumer-orientation of RSPO. ISPO, in contrast, has a government-set agenda, granting the plantation coalition more structural power than it has in RSPO. Even if Europe and the US reject it, Indonesia can still rely on large emerging markets such as India and China, which impose no sustainability standards and where the discursive power of this conservation coalition is far weaker.

This agency context shows that Indonesia's more substantial reliance on global markets makes foreign affairs related to biofuels far more relevant here than in India or Brazil. Perhaps strangely, most of the discursive battle about Indonesia's development arguably takes place abroad. From a theoretical perspective, this case provides a good illustration of the importance of "forum shopping" and multilevel policy entrepreneurship. In practice, it means that Indonesia's biofuel governance—or land-use governance in general—is highly vulnerable to factors out of its domestic actors' control. Such a vulnerability is not only to international price volatility but also to foreign policy-makers (as seen in the case of the US and EU sustainability criteria), foreign investors, and multilateral financing organizations (see Caldecott et al. 2013;

[9] See Tan et al. 2009 for a pro-plantation piece that treats and rejects various claims of environmental degradation from oil palm expansion.

[10] This same argument has been used in Indonesia (and elsewhere) to advocate for timber plantations, too (see Bastos Lima et al. 2013).

Bastos Lima and Gupta 2014). However, such Western leverage is gradually eclipsing as Indonesia's oil palm sector turns increasingly inwards and to other Asian markets.

Amid this conflict between plantation advocates and conservationists, it remains unclear to what extent smallholder interests are represented. Oil palm farmers' advocacy relies only on their own capabilities—primarily through GAPPERINDO, the national plantation farmers union, and APKASINDO, the national oil palm farmers union. Others in rural communities do not have even that; they have no direct participation in the agenda-setting and no discursive power to speak of. Their primary agency is through demonstrations and protests—that is, by using *themselves* as "mobilizable troops," a typical resource of poor actors (Sabatier and Weible 2007). That has been done particularly as resistance to land evictions and in conflicts with plantation companies (Saragih 2012). However, this sometimes results in murder and torture, as companies rely on government military protection or private security (Asian Human Rights Commission 2011).

The advocacy of conservationists, too, has threatened rural and forest-based communities, such as through various cases of "green grabbing" (i.e., private leases of forest areas for conservation without taking into account populations who depend on local resources uses; Fairhead et al. 2012). These practices have increased in Indonesia as international funds start to flow for conservation activities, such as under the REDD+ framework (Reducing Emissions from Deforestation and Forest Degradation). Governments at various levels in Indonesia have started to seek revenue to keep forests standing (Astuti and McGregor 2017). Meanwhile, policies that reconcile conservation with traditional rural livelihoods such as *hutan desa* ("village forests"), which has received much praise from local NGOs and smallholders, appear to have been blocked on the agenda. Issuance of new village forest licenses by the central government has been scarce, and local governments have shown little interest as they have not received many economic benefits from such ventures. Instead, local governments often prefer to advance revenue-generating plantations or privately funded conservation (Bastos Lima et al. 2013). As such, smallholders find themselves squashed between the strides of the two coalitions, having the least power and yet the highest stakes (see Table 7.5).

7.4 Conclusions

7.4.1 Key Insights

Although many biofuel production chains were initially envisaged, palm oil reigns solely and supremely as the only feedstock commercially used at scale in Indonesia. While jatropha-biodiesel and sugarcane-ethanol have proved uneconomical and failed to take off, oil palm cultivation expands faster than any other crop in the country, and biodiesel production from palm oil grows substantially. Production occurs either in large-scale plantations or through farming contracts between private

Table 7.5 Features of the dispute between the plantation and conservation coalitions

	Plantation coalition	Smallholders	Conservation coalition
Key underlying interests	Economic growth; Development; Carbon stocks	Employment; Access	Biodiversity conservation
Main resources used	Financial; Information; Access to positions of legal authority (mainly within Indonesia);	Mobilizable troops	Financial; Information; Access to positions of legal authority in developed countries and international organizations
Persuasion strategies	To highlight oil palm's role as carbon sinks and the sector's contribution to Indonesia's economic development; To appeal to a sense of international market competition;	–	To frame plantation businesses as unsustainable and conservation as beneficial to all; To show that conservation also sustains indigenous livelihoods
Persuasion tools	Economic indexes (e.g., palm oil exports, contribution to GDP); Oil palm's high productivity and hence Indonesia's comparative advantage; Indonesia's forest-cover rate above the world average; Positive environmental indicators on plantations (e.g., carbon storage)	–	Negative environmental indicators on plantations (e.g., biodiversity); Opportunities to channel international funds for conservation (e.g., REDD+)
Strategies to undermine the opponent's arguments and actions	To picture the conservation agenda as being foreign-driven	–	Dissemination of information on the negative social and ecological impacts of plantations
Framing of the opponent	Protectionist; Self-interested; Uncommitted to Indonesia's socio-economic development	–	Profit-driven; Self-interested; Socially unjust; Unsustainable

companies and smallholders. The sector provides rural communities with a much-needed income that reduces their poverty, but the allocation of rights, roles, benefits and burdens is highly inequitable. Moreover, the environmental degradation caused by oil palm plantations further makes their continuous expansion unsustainable, despite attempts to frame them as climate-friendly due to their role as carbon sinks.

This chapter's analysis indicates the following reasons for the prevalence of such a development strategy to date. On a more immediate level, this biofuel production pattern is due to a combination of foreign investments and supportive domestic policies, causes that appear to be interdependent. Such investments play a more significant role in Indonesia than in Brazil or India (see Chapters 5 and 6). However, domestic policies arguably remain the only *sine qua non* cause both for biofuel expansion and for the particular shape it has taken. Those policies have included: consumption targets and blending mandates to create an artificial demand for biofuels, regulatory changes to encourage investments in feedstock crop cultivation, and generous subsidies to private palm oil industries. Finally, the Government of Indonesia has also created a national certification scheme (ISPO) to increase market penetration abroad.

Underpinning these policy instruments is a strategy to enhance food and energy production while creating jobs on plantations. To increase legitimacy, this is framed as Indonesia's contribution to national and global food and energy security. In the oil palm case, there is also a norm—reflected in the "plasma obligation"—to integrate smallholders, create jobs, and reduce rural poverty. The biggest challenge, however, has been to harmonize oil palm plantations and international norms on sustainability, which have become increasingly important for foreign market acceptance. Indonesia's answer has been the ISPO certification, which arguably owes much more to international normative pressures than to genuine domestic concerns.

These priorities and approaches, in turn, stem from the policy beliefs of state and private-sector advocates of agribusiness. These agents have firmly pushed for plantations as a form of land use and development, sometimes going as far as to frame them as environmentally friendly due to their function as carbon sinks. However, this coalition's dominance does not owe so much to its discourse but to the instrumental and structural power it exerts. These forms of power mainly rely on the private financial resources the coalition commands and on the positions of legal authority held in the government. In the latter, bureaucracy has been manipulated to either facilitate or block courses of action—as it has happened to the Village Forest program. Another critical factor is that the adversary, conservation coalition has not yet offered an alternative development path. Instead, it mostly criticizes the mainstream agenda and defends conservation interests without saying much about addressing the country's development needs sustainably. Arguably, this gap is the origin of much of the criticism received by the conservationists in Indonesia. It is perhaps the main reason for the lack of alignment with farmers and for the coalition's limited effectiveness so far.

Finally, this oil palm expansion strategy's distributive outcomes and social impacts are arguably the ultimate reason it has prevailed. As in India, there is a systematic transfer of legal or de facto control over land and freshwater resources from local

communities to private companies and the government. Moreover, short-term financial gains and otherwise limited access to modern services have helped obtain the local communities' support. Such communities have generally been supportive even though most benefits accrue to state and private industry actors, local food security becomes more vulnerable to external shocks, and their access to land and clean water decreases. In a way, their inclusion co-opts such rural communities who otherwise are known to enter conflicts against private companies, and who could attempt to coordinate agency and confront the dominant coalition with the support of conservationists. The oil palm plantation strategy pre-empts such moves and tames potential opposition while increasing dominant agents' material capabilities and control over vital natural resources. As in the other cases, this is a cyclical process of self-serving power accumulation by plantation businesses and Indonesia's central government (see Fig. 7.2).

This context is particularly worrisome for Indonesia because of the environmental unsustainability of this development path. Even its short-term development benefits are limited, as investors are primarily cashing-in at the cost of the country's biodiversity, water, and soil while keeping most benefits to themselves. Indonesia could learn from the erstwhile "banana republics" of twentieth-century Latin America, which based their economies on foreign investments in single-crop plantations, environmental degradation, cheap labor, and inequitable development (see Bucheli 2008). However, as this analysis demonstrates, shifting the course of development is not an easy task. It requires not only institutional reform but also a counterweight to the agency that keeps the current structures in place.

7.4.2 Alternatives

First, to increase economic benefits and spur technological development, the government could incentivize further domestic value-added through palm oil refining. The increasing production of palm-based biodiesel is a step in this direction, but the bioeconomy is likely to make such downstream industry options much vaster. Oil palm cultivation could also become much more sustainable by conditioning to socio-environmental requirements the policy incentives given to plantation companies. In particular, more equitable outcomes could be achieved by increasing the land that smallholders retain in nucleus-plasma schemes (beyond 20–30%) and by returning it to them at the end of leasing contracts.

Second, an additional safeguard would be to mix oil palm plantations with food crops to reduce smallholder vulnerability. Moreover, integrated agroforestry systems could break with the land-sparing paradigm that so ravages Indonesia—squeezing smallholders between "green grabbing" on one side and corporate-controlled plantations on the other—and help local communities. The utilization of oil palm within agroforestry systems, instead of monoculture plantations, could significantly improve local economic benefits while conserving Indonesia's biodiversity (Bhagwat et al. 2008). In time, such systems could potentially develop a plethora of new bioeconomy

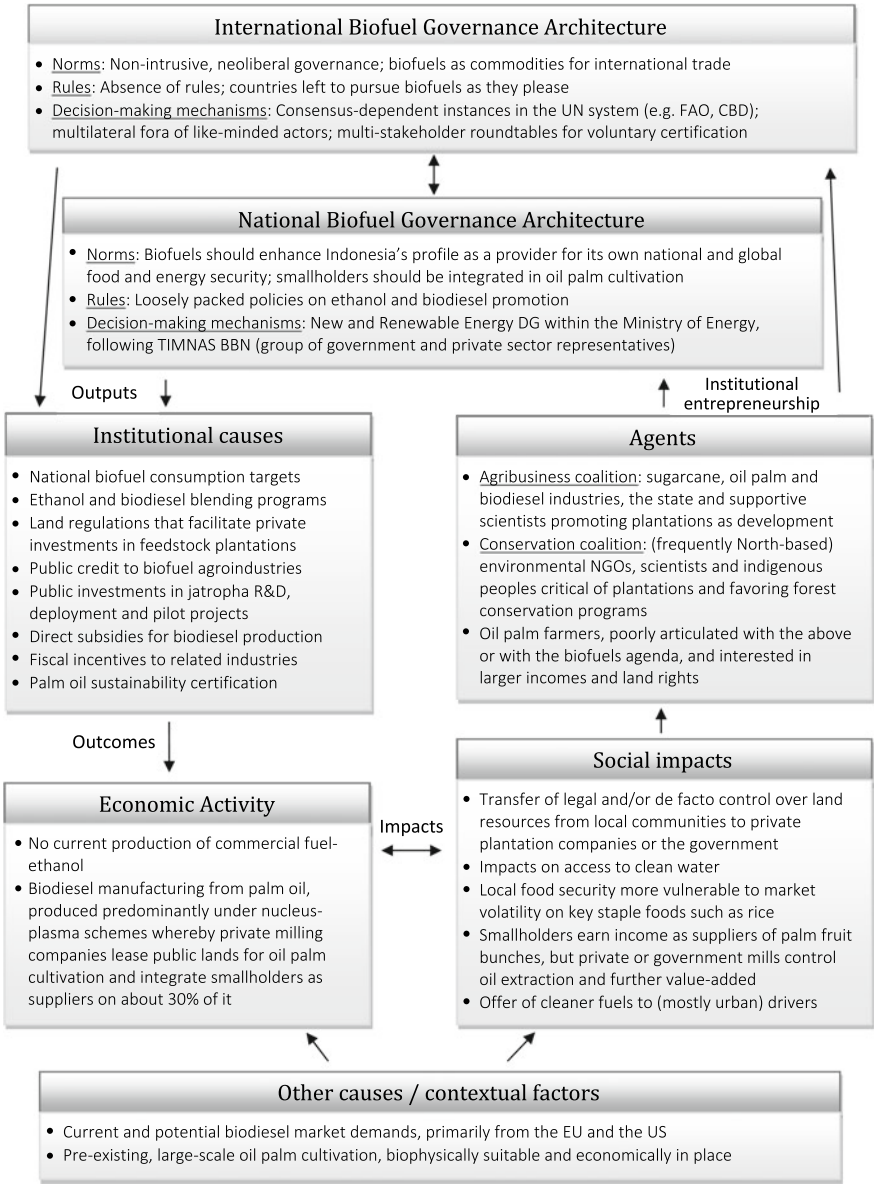

Fig. 7.2 Analyzing institutional, social and political dimensions of biofuels in Indonesia

value chains, too, based not solely on oil palm but also on other crops and products from Indonesia's native biodiversity.

Third, a way to make supply contracts more equitable would be to require the participation of grassroots organizations in the negotiation process to validate land deals and contract terms. Such more equitable arrangements, perceived as fairer, would likely reduce land conflicts between industries and rural communities, too. Still, local development benefits are limited unless smallholders climb to the value-added stages of production (i.e., palm fruit processing and oil extraction; and, eventually, also in other conjugated bioeconomy value chains). Value-added, however, requires additional material and institutional capacity.

To push for these policy changes, the conservation coalition could seek an alliance with smallholders to help with political, technological, and economic resources. In the end, the best conservation strategy for Indonesia may be sustainable rural development. Diverse agroforestry systems with a more considerable measure of locally owned technology, in particular, hold great promise (Dewi et al. 2005; Bastos Lima et al. 2013; Pratiwi and Suzuki 2019). However, the pursuit of these and other sustainable development arrangements require far more effective advocacy and creative strategizing from the ones preoccupied with the country's current course.

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