Land Use Policy 114 (2022) 105942

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol

Making illegality visible: The governance dilemmas created by visualising illegal palm oil plantations in Central Kalimantan, Indonesia

Rini Astuti [a,*], Michelle Ann Miller [b], Andrew McGregor [c], M. Dedy Pratama Sukmara [d], Wiko Saputra [d], Sulistyanto [e], David Taylor [f]

[a] Crawford School of Public Policy, Australian National University, Australia
[b] Asia Research Institute, National University of Singapore, Singapore
[c] Department of Geography and Planning, Macquarie University, Australia
[d] Auriga Nusantara, Indonesia
[e] Corruption Eradication Commission, Indonesia
[f] Department of Geography, National University of Singapore, Singapore

ARTICLE INFO

Keywords:
One Map Policy
Illegal plantations
Palm oil sector
Indonesia
Omnibus Law
Forest governance

ABSTRACT

This study focuses on how Indonesia's One Map Policy renders illegal palm oil plantations in Indonesia visible and the governance dilemmas this creates. Using Central Kalimantan as a case study, we first draw on spatial data to visualise the extent of illegal palm oil plantations on forest land. The vast majority of illegal palm oil is large plantations, with illegal independent smallholdings constituting just 0.4%. We then draw on key stakeholder interviews to analyse the governance dilemmas such visualisations create. We explore stakeholder perspectives of the new Omnibus Law and other attempts to legalise illegality. Four governance scenarios that emphasise the interests of either business, smallholders, environments, or adopt a multi-stakeholder perspective are developed and measured according to their different social and ecological land use implications. In the interests of promoting sustainable and effective governance for forests, peatlands and palm oil production, we caution against the pro-business option currently favoured by the Indonesian government that aims to legalise illegal plantations and which risks the reassignment of forests for commercial production. Our article outlines alternative policy solutions, including an approach that seeks to balance business and environmental interests while also paying heed to sustainable development needs. This approach could be applied in other contexts similarly struggling with the governance dilemmas about what to do when widespread land use illegalities are made visible.

1. Introduction

Speaking at a ministerial meeting on the One Map Policy (OMP) in February 2020, President Joko Widodo highlighted the challenges for spatial planning in Indonesia arising from a national history of non-uniform mapping of natural resources. This pattern of unregulated land use and planning has contributed to current uncertainties regarding land use on more than 77 million hectares (Mha), or about 40% of Indonesia's total land area (Setkab, 2020). The OMP is an ambitious and innovative nation-wide program led by the Government of Indonesia (GoI) aimed at establishing unified geospatial information data as an authoritative reference for regulating land use (Shahab, 2016). Earlier thematic maps developed by individual line ministries and government agencies for specific departmental purposes have been inaccurate, incomplete and disputed (Astuti and McGregor, 2015; Nugroho and Hikmat, 2017). Consequently, Indonesia has faced protracted forest governance issues, such as fragmented land use administration, overlapping concession areas, tenurial disputes, uneven spatial development and the illegal encroachment of palm oil plantations into state forests (Pramudya et al., 2018; Wakker, 2014).

A national map of palm oil plantations is one of several, corresponding thematic maps that have been created under the OMP. In a concerted effort led by the Corruption Eradication Commission (CEC), which includes authors of this study, palm oil concessions were compiled and reviewed in conjunction with high resolution geospatial data (KPK, 2019). Overlapping and illegal land use, including conversion of state forest into palm oil plantations, were rendered visible in the mapping process. Revealing widespread illegal plantations has created a

* Corresponding author.
E-mail address: rini.astuti@anu.edu.au (R. Astuti).

https://doi.org/10.1016/j.landusepol.2021.105942
Received 22 December 2020; Received in revised form 14 December 2021; Accepted 15 December 2021
Available online 21 December 2021

governance dilemma for authorities about how best to respond. In this paper we examine this dilemma and how competing solutions have been proposed and integrated into policy and what this means for ongoing efforts to make this sector more sustainable.

Illegality, understood here as the transgression of legislation and mandatory certification criteria, is a common pathway to legality in the palm oil sector in Indonesia. Land is often illegally acquired and prepared before the new owners retrospectively apply for land use permits and other requisite certification (Fitzherbert et al., 2008; Pramudya et al., 2018; Purnomo et al., 2018). Ambiguities in ownership structures open up opportunities for local authorities to illegally sell palm oil plantations to outside investors, displacing traditional owners whose own lands were typically traded away through informal agreements often signed only by village heads as witnesses (Miller, 2021). Other palm oil producer countries share similar dilemmas of illegal ownership linked to unclear or vernacular property relations. In Latin American and African palm oil producing countries, the illegal expansion of plantations into the traditional homelands of Indigenous communities has increased the prevalence of land disputes, contributing to processes of rural displacement and dispossession (Araya, 2019; Attah, 2013; Carmody and Taylor, 2016; Glinskis and Gutierrez-Velez, 2019). In Peru, where an estimated 40% of new palm oil plantations have been created through encroachment into primary forests, the retrospective acquisition of land use permits to render illegal land conversion legal is commonplace (Cardona, 2019). Somewhat differently, in Malaysia forests are often acquired and cleared legally by one company for the sole purpose of harvesting timber creates opportunities for other companies to convert these lands into palm oil plantations. While legality is not precisely the problem in this case, it illustrates how deforestation can, and often does, create a "blind spot" in sustainable palm oil production (Tong, 2021).

The illegal encroachment of palm oil plantations into forested areas constitutes a growing policy challenge, including for the GoI, which is seeking to reform forest governance and align palm oil production with sustainable industry standards. Illegality has figured prominently in multi-stakeholder discussions about obstacles to sustainability in palm oil and forestland governance (Schoneveld et al., 2019b). Addressing illegality is particularly challenging within Indonesia's political history of land dispossession, whereby forest territorialisation and mapping processes have been used, both deliberately and unintentionally, by the state to deprive Indigenous peoples and local communities of their land rights (Peluso and Vandergeest, 2001). Illegality in this context does not only apply to the contested terrain of Indonesian state authority. It equally applies to customary law (*adat*), which, in Indonesia, has been abused by Indigenous groups to pursue illegal or quasi-legal land claims (Astuti and McGregor, 2017; Li, 2000) and by agribusinesses to further marginalise subsistence farmers through the omission of customary law provisions from partnership agreements (Miller, 2021).

Despite Indonesia's substantial contributions to global palm oil production (57% in 2019), tracing its domestic sources is extremely difficult owing to the large number of undocumented independent smallholders and illegal large plantations (Jelsma et al., 2017; McCarthy et al., 2012; Schoneveld et al., 2019b). Apart from the OMP, the GoI has sought to address these issues through a palm oil moratorium policy, introduced in 2018, that prevents the establishment of new palm oil plantations. This policy aims to strengthen land legality where appropriate and improve smallholder productivity through plantation revitalisation (Alika, 2019; Nugraha, 2019). The GoI's latest intervention in addressing illegality is through the Law on Job Creation No. 11/2020, commonly known as the Omnibus Law, which allows large illegal plantation owners to seek amnesty and to secure legality by relaxing existing environmental protection policies (Eyes on the Forest, 2021).

In this paper we analyse the governance of illegal palm oil plantations and reveal the limits of existing efforts, such as the Omnibus Law, to meet sustainability standards. Our approach is broadly informed by political ecology, recognising that political and economic priorities shape and are shaped by land degradation (Robbins, 2019). Diverse efforts to make the palm oil sector more sustainable have ranged from legislative reforms to clarify legal ambiguities, strengthened law enforcement, moratoria on the clearance of primary forest and improved land tenure security. However, the governance landscape of the palm oil sector remains multi-layered, complex and constantly shifting (Dauvergne, 2018). In this messy policy context, sustainability certification can perversely offer new opportunities to conceal and deflect attention away from illegal or quasi-legal political economies (Hamilton-Hart, 2015). Recent research has shown that stringent and well-enforced regulations can provide redress for the adverse material effects of deforestation, peatland drainage and biodiversity depletion resulting from illegal palm oil expansion (Bakhtiar et al., 2019). However, the availability of accurate, detailed data on the location and borders of illegal plantations has been a major barrier to effective palm oil governance (Pramudya et al., 2018). Illicit activities are by definition deliberately hidden (McCarthy, 2011), and, in Indonesia, are often protected by predatory patronage networks that include state officials with business interests in the palm oil sector (Kartodihardjo et al., 2019).

Drawing on our research of the OMP implementation in Central Kalimantan province, we address key gaps in knowledge about the extent and form of illegal palm oil in Indonesia. The research combines quantitative spatial analysis with qualitative interviews involving palm oil stakeholders using a mixed methods approach. Two objectives guide and underpin the research: (1) to quantify the extent of illegal palm oil in Central Kalimantan; and (2) to canvass the implications of different governance solutions for sustainable land use and ownership. In doing so our research has direct implications for policy making in Indonesia but also other countries struggling with illegality and palm oil production. We focus on Central Kalimantan as a case study owing to its priority for OMP implementation following the rapid expansion of palm oil plantations in the province, accounting for almost 60% of new palm oil planted in Indonesia between 2005 and 2015 (Schoneveld et al., 2019a). Central Kalimantan is also of wider regional interest in Southeast Asia, having been increasingly linked to recurrent biomass burning associated with palm oil plantations producing transboundary air pollution, or "haze" as it is legally and commonly known in Southeast Asia (Astuti, 2020).

The study is structured as follows. The next section examines the political ecology and trajectory of Indonesia's illegal palm oil plantation area expansion and reviews the OMP initiative and the Omnibus Law in the palm oil sector. We then describe our mixed methods approach of combining quantitative digital spatial data with semi-structured interviews. This is followed by a spatial analysis of Central Kalimantan to highlight areas of illegal palm oil production. We then examine four policy options outlined in the Omnibus Law that respond to widespread illegality and how stakeholders perceive these options. In the penultimate section we analyse the spatial impacts of four governance scenarios that are related to these policy options but also extend beyond them in ways that are either weighted towards business, smallholders, environment or multiple stakeholders. In doing so the research aims to facilitate evidence-based and targeted decision-making that can inform countries struggling to address illegality in palm oil production, and, specifically, how to tackle overlapping land use claims and land access inequality in Central Kalimantan.

2. Addressing the political economy of illegal palm oil plantations in Indonesia

Indonesia's National Audit Board outlined the extent of the illegal palm oil problem when it announced in 2019 that 81% of palm oil companies in Indonesia were in violation of regulations (BPK, 2019). Violations include operations without required permits and/or mandatory Indonesia Sustainable Palm Oil (ISPO) certification, as well as production in areas that had competing claims to ownership in overlapping concession areas, both of which are perpetuated by corruption

in the national palm oil licensing regime (KPK, 2016). Large plantation owners also frequently failed to meet the requirements of Indonesia's Nucleus Estate and Smallholder Scheme (BPK, 2019) that mandates the allocation of 20% of concession areas for smallholder cultivation.

The illegal establishment and expansion of palm oil plantations have been facilitated by a complex forest governance landscape involving contradictory policies and overlapping concessions (Setiawan et al., 2016). The most fundamental division of land governance in Indonesia is between forested and non-forested areas. Whereas forested areas, or state forest, fall under the jurisdiction of the Ministry of Environment and Forestry (MOEF), non-forested areas are governed by the Ministry of Agrarian and Spatial Planning (MASP). State forests are further sub-divided into Conservation forests, Production forests and Protection forests (Table 1). In order to cultivate palm oil in state forests (limited to Convertible Production Forest area only), the interested party must first acquire a forest release certificate in addition to the permits required for establishing a plantation (Table 2). The MOEF is tasked with issuing forest release certificates, which must first be approved by the national parliament.

While Government Regulation No. 33/1970 on forest land use demarcates 70% of terrestrial Indonesia as state forest, decisions about this demarcation and subsequent forest categorisations have often been made without public participation and on the basis of incomplete or inaccurate data (Peluso and Vandergeest, 2001; Siscawati, 2012). Furthermore, Spatial Planning Law No.26/2007, issued during a nationwide democratic decentralization process, required provincial governments to carry out their own land use planning for locally important resources. This fiscal decentralization process benefited resource-rich provinces (McCarthy, 2004), by granting them control over the management of their own resource revenues (Resosudarmo, 2004). For local governments, issuing permits for plantations and the exploitation of other natural resources, notably timber, became one of the surest means of securing revenue and developing decentralized patronage networks (Varkkey, 2013). Uncertainties associated with overlapping state forest land claims have thus been exploited by local governments and national ministries to shape land use planning regimes in their own economic and political interests (Setiawan et al., 2016).

Patron-client relations have been particularly influential in shaping the direction of land use in Indonesia (Astuti, 2021; Thorburn and Kull, 2015). Rent seeking practices, partial or contradictory spatial data and overlapping jurisdictional responsibilities have contributed to the creation of legal pluralism and uncertainty that politically connected palm oil producers have been able to exploit in extending their operations into forested zones. Smallholders, too, have expanded their land holdings into state forests with a high degree of impunity (Potter, 2016). Civil society organizations (CSOs) have argued that unequal access to land is a key driver of illegal encroachment by smallholders and that some smallholders view access to land as an inalienable right (Bakhtiar et al., 2019). Inequalities of access to land in Indonesia are extreme, where a small wealthy elite manage almost 6 Mha of palm oil plantations (TUK Indonesia, 2018).

Table 1
Categories of state forest based on designated use in Indonesia.

Forest category	Definition
Production Forest	State forestland designated for production purposes Divided into: 1) Permanent Production Forest: forestland designated for production purposes and cannot be converted to non-forest land use 2) Limited Production Forest: forestland designated for limited production purposes due to the topographic and soil conditions 3) Convertible Production Forest: forestland designated for production purposes and targeted for conversion into non-forest development
Protection Forest	Forestland designated for protecting soil and hydrology
Conservation Forest	Forestland designated for conservation purposes. This class includes national parks, nature reserves, wildlife reserves and other protected areas

Table 2
Palm oil permits required for large plantation.

Permit*	Definition	Issuing authority
Location Permit	Permit to acquire land for business purposes	■ Head of District for plantation situated within a district ■ Governor for plantation confined within a province ■ Minister of Agrarian and Spatial Planning for cross-provincial plantations
Environmental Permit	Outlines the environmental impact assessment of the proposed plantation and strategies to manage them	Environmental agencies in the respective jurisdictional area provide recommendation to Head of District/Governor to issue Environmental Permit
Plantation Business Permit	Permit for the plantation holder (larger than 25 ha) to commence land preparation and cultivate palm oil	■ Head of District for plantation situated within a district ■ Governor for plantation confined within a province ■ Minister of Agriculture for cross-provincial plantations
Forest release certificate	In addition to the set of permits above, a forest release certificate is required to open plantations inside state forest (limited to Convertible Production Forest)	Minister of Environment and Forestry
Land Use Rights Permit	Permit to operate palm oil plantation (full legal land tenure) for 35 years and can be extended for another 25 years	Minister of Agrarian and Spatial Planning

* Permits are listed based on the sequence of which they should be applied for (based on the Ministerial Regulation of Agriculture No. 98/Permentan/OT.140/9/2013).

Reforming the palm oil sector is complicated by differences in available data on the extent and legality of existing palm oil plantations, something the OMP seeks to address. According to the Directorate General of Estate Crops, palm oil plantations in Indonesia account for over 14.5 Mha of land (DJP, 2019). This figure is less than the CEC's estimate of 16.8 Mha of palm oil plantations. Differences derive from the lack of an authoritative map of palm oil plantation cover owing to difficulties in compiling permit documents and generating consistent data. The MASP is the responsible authority for issuing palm oil concession rights (the Land Use Rights Permit). Local governments at the district and provincial levels, however, can also issue Location and Plantation Business permits (see Table 2). The transfer of information from these sub-national governments to national authorities is partial and incomplete because state authorities with vested interests often intentionally conceal information (Astuti and McGregor, 2015). Fragmented licensing regimes create opportunities for rent-seeking activities in which actors benefit from the unavailability of authoritative spatial data.

The CEC, as the agency responsible for preventing corruption in Indonesia, has used the GNPSDA and OMP initiatives to compile high-resolution satellite images and conduct a comprehensive review of information on land use licenses, including forest release certificates. Through this process, the CEC aimed to identify overlapping land uses and areas where palm oil plantations have illegally encroached into forests. In 2019, through collaboration with MOASP, MOEF, Ministry of

Agriculture (MOA), the Geospatial Information Agency and the National Space and Aeronautics Agency, the CEC issued a map of national palm oil cover (KPK, 2019). In the next section, we explain how we draw upon this map to visualise the extent of palm oil illegality in Central Kalimantan.

3. Methods and materials

To explore the spatial distribution of illegal palm oil plantations and the subsequent governance dilemmas and responses caused by their exposure we adopted a mixed methods approach. During the first phase we built upon the CEC analysis with permit data to track the spread of palm oil into forests in Central Kalimantan. Our multidisciplinary team adopted a collaborative approach involving academics, government officials and representatives of civil society organisations (CSOs) working together to generate, integrate and analyse the data. Three of our authors were directly involved in leading and facilitating the CEC's GNPSDA and OMP to clarify land holdings, reduce resource disputes and prevent corruption in the palm oil sector (KPK, 2016). The approach adopted and expertise deployed have enabled assessment of the extent and complexity of the illegal palm oil problem in Indonesia, and particularly in Central Kalimantan.

In phase 2 thirty qualitative semi-structured interviews were conducted in 2019, with seven interviewees re-interviewed in 2021 to explore appropriate policy responses to illegal palm oil cultivation on forested lands. The 30 respondents comprised a diversity of agrarian activists, farmers, scientists, government officials and palm oil industry associations. Each respondent was interviewed for 60–90 min in the Indonesian language. All interviewees were anonymised due to the politically sensitive nature of palm oil research in Indonesia. The focus of the interviews was on exploring appropriate governance responses to the exposure of widespread illegality associated with palm oil production on forested land. We provide more detail on the spatial and qualitative data analysis methods in the following sections.

3.1. Analysing the spatial extent of illegal palm oil in Central Kalimantan

According to spatial data relating to palm oil cover in Indonesia (KPK, 2019), an estimated 16.8 Mha of palm oil plantations extend across 25 of Indonesia's 34 provinces. Of this, around 82% is located in eight provinces: Riau, North Sumatra, Central Kalimantan, West Kalimantan, South Kalimantan, East Kalimantan, Aceh and Jambi (see KPK, 2019 for detailed breakdown). To determine the extent of illegal palm oil in Central Kalimantan, we compared the national data on palm oil cultivation (KPK, 2019) with MOEF land cover data and information on state forests in Central Kalimantan that were opened up for palm oil development until July 2019. The latter provides a basis for determining the legality of palm oil plantations in state forests and peatlands. To operate legally, a forest release certificate must first be obtained from MOEF. Areas of illegal palm oil cultivation were further divided into three sub-categories based on photomorphic evidence and permit reviews with support from provincial and district level government data for Central Kalimantan. These three sub-categories are: (a) large plantations with incomplete permits; (b) large plantations without permits; and (c) independent smallholdings (Table 3).

Large palm oil plantations were easier to distinguish, appearing in satellite images as extensive, homogeneous, and neatly planted rows of trees with infrastructure such as roads, canals and, on occasion, buildings. Their presence was further verified using palm oil concession permit information (see Table 2) provided by MASP and local government agencies. By comparison, independent palm oil smallholdings often appeared in remotely sensed data as smaller in area, irregularly shaped, not necessarily contiguous, often comprising palm oil plants mixed with other crops and in association with poorly- or partially-developed infrastructure in the form of large buildings and access roads.

In our analysis, we follow the GoI's definition of independent smallholders as household-based enterprises with a maximum plantation size of 25 ha (DJP, 2019). However, we acknowledge that in some rare cases independent smallholdings might exceed 25 ha areas, such as in North Sumatra, which hosts some of the oldest independent smallholding plantations in Indonesia. Verification of these independent smallholdings was complicated by a lack of official information and legal permit documentation. It is important to note that in this study we do not assess compliance with the Nucleus Estate and Smallholder Scheme, or large plantation company-assisted smallholder plantation schemes that commenced in Indonesia with the Plasma Transmigration Program of the late 1980 s. The nature of this study relies on high resolution geospatial data and permit reviews, making it impossible to differentiate smallholders from their nucleus plantation due to their similar photomorphic appearance.

We analysed the area of illegal palm oil plantations on ecologically significant protected peatlands to examine the efficacy of Indonesia's peatland protection policy. For this, we used the peatland ecological function map supplied by MOEF. Much of the peatland area in Central Kalimantan comprises deep peat (>3 m depth) (Sumarga et al., 2016), the drainage of which for planting requires a level of mechanization that only large plantation companies can normally afford (Purnomo et al., 2017).

The accuracy of identifying different land covers based on high-resolution satellite data was tested for more than 900 ground-control points using imagery collected with an unmanned aerial vehicle. The latter enabled relatively remote areas to be included in the validation exercise. An example of accuracy analysis is presented in Appendix 1.

3.2. Assessing the governance implications

To examine the governance implications of illegal palm oil production, we analysed the qualitative interview data to generate four plausible policy scenarios favoured by different stakeholders. This process entailed re-analysing the spatial data to estimate the environmental

Table 3
Sub-categories of illegal palm oil plantations in Central Kalimantan.

Category	Large plantations with incomplete permits	Large plantation without permits	Independent smallholdings
Permit status	• Plantations that have acquired Location and Plantation Business Permits from local authorities but lack Land Use Rights Permits and forest release certificates from national authorities • Plantations that have fulfilled two required permits from local authorities (Location and Plantation Business Permits) and acquired Land Use Rights Permits from Ministry of Agrarian and Spatial Planning but lack forest release certificates	Large plantations that are established within state forest without any supporting permits	Smallholder plantations with less than 25 ha area that are established within state forest. Current permit regime in Indonesia doesn't allow smallholding plantations inside state forest
Photomorphic characteristics	Extensive, homogeneous, and neatly planted rows of trees in association with infrastructure in the form of roads and/or canals and, on occasion, buildings		Irregularly shaped, not necessarily contiguous, often in the form of mixed garden crops and surrounded by poorly-or partially-developed infrastructure.

impacts of each scenario on forest encroachment, in addition to their socioeconomic consequences on land access equality, as both of these are central concerns of the OMP initiative. Together, the spatial data and scenario-building exercise provide a model for evidence-based decision-making aimed at resolving the problem of overlapping land uses and illegal palm oil encroachment.

4. Results

4.1. Illegal palm oil in Central Kalimantan province

Our analysis indicated that an estimated 0.85 Mha of palm oil is illegally cultivated in Central Kalimantan, of which over 0.6 Mha (70%) takes the form of large plantations that lack either the full set of permits or a forest release certificate. We found 0.18 Mha of illegal palm oil plantations resembling large palm oil plantations in remotely sensed data that are not verified by supporting permits. Follow-up interviews suggested the involvement of large land-owners or the illegal extension of plantations outside concession boundaries. We classify these as large plantations without permits. A much smaller area (3700 ha) of palm oil in state forests (around 0.4% of illegal palm oil cover) has the characteristics of independent smallholdings (Table 4).

Our study found that the majority of illegal palm oil (around 95%) in Central Kalimantan is located in state forest designated as Production Forest (Table 4 and Fig. 1). More than 0.6 Mha of illegal palm oil in Central Kalimantan has at least one of the requisite permits but lacks a forest release certificate, suggesting that plantation owners may be in the process of trying to convert illegally acquired lands into legal concessions. Out of 0.6 Mha of plantations with incomplete permits, around 60% had Location and Plantation Business permits issued by local government authorities, but lacked Land Use Rights permits and forest release certificates. This suggests a high degree of local authority involvement in the perpetuation of illegal palm oil production in Central Kalimantan. In the politically, economically and administratively decentralized context of Indonesia, the issuance of palm oil concessions and other natural resource licenses to private developers has become one of the quickest and easiest mechanisms to generate local revenues. Researchers have identified a tendency among governors and district heads to issue palm oil concessions to bolster their re-election campaigns (Burgess et al., 2012; Purnomo et al., 2019).

Around 40% of the plantations with incomplete permits have managed to acquire Land Use Rights permits from MASP without securing forest release certificates. This shows the ongoing inability of the OMP to address the problem of fragmented land administration within the ministerial silos of MASP and MOEF. Moreover, the bureaucratic system of resource entitlements has created difficult, time-consuming and expensive barriers for corporations in securing the requisite permits to establish a fully legal basis for their operations (McCarthy, 2011; Setiawan et al., 2016). Interviews suggest that it can take more than three years to secure a forest release certificate and that concessionaires often provide hefty unofficial payments to corrupt authorities.

A total of around 58,000 ha of illegal palm oil plantations are located on protected peatlands, of which around 62% are large plantations with an incomplete set of permits (Table 5). A further 35% are large plantations without permits, while only around 3% are independent smallholdings. This ratio is to be expected given the additional costs involved in draining peatlands for palm oil production. According to our data, a further 0.9 Mha of state forest in Central Kalimantan has been released for palm oil cultivation, meaning that the concessionaires have fulfilled their legal requirements to obtain permits but have not yet been issued with a forest release certificate. Building on the work of CEC, our spatial analysis shows that illegal palm oil plantations are widespread, particularly in Production Forest but also present in other forest categories, creating enormous challenges for authorities that have limited resources to monitor and respond to the extent of illegality.

Table 4
Estimated extent (ha) of illegal palm oil in different forest designations in Indonesian province of Central Kalimantan. Note that the estimates have been rounded to the nearest 10 where the original figure is ≥ 1000 and to the nearest 5 where the original figure is < 1000.

Forest Function	Large plantations with incomplete permit	Large plantations without permit	Independent smallholder plantations	Total
Conservation Forest	5740	5870	35	11,650
Convertible Production Forest	267,210	90,870	2380	360,450
Limited Production Forest	58,330	3630	190	62,160
Permanent Production Forest	278,430	114,090	785	393,300
Protection Forest	12,415	19,300	330	32,045
Total	**622,120**	**233,760**	**3720**	**859,600**

5. Discussion

5.1. Emerging policy propositions to address illegal palm oil

The process of making illegal land uses visible, as part of the OMP process, creates substantial policy dilemmas. In this section, we review the options established under the Omnibus Law and how these accord with suggestions for illegal palm oil plantations in Central Kalimantan proposed by key informants about how the current situation should be best resolved. We then develop four governance scenarios and consider the spatial impacts, strengths and weaknesses of each. Almost all of our respondents were concerned about the illegal encroachment of plantations into state forests and wanted to find a solution. Illegal palm oil production currently creates problems not only for forestland governance and forest resource users, but also for Indonesia's palm oil sector by tarnishing the reputation of its products (Hidayat et al., 2018). This in turn affects the industry's viability as its socio-ecological impacts are criticised by important markets, such as the European Union (Partzsch, 2021).

5.2. Policy proposals to address overlapping land uses and the illegal encroachment of palm oil on state forest land

Here, we consider how the GoI is intending to respond to illegality through the Omnibus Law, and associated stakeholder perspectives. The GoI, when faced with examples of illegal incursions into state forest, tends to respond in ways that avoid condemning business leaders while also minimizing impacts on local communities. According to a MOEF representative, this tendency is evidenced in efforts to address the illegal occupation of state forests through the Omnibus Law No. 11/2020 and its derivative technical regulations.[1] The regulations provide four options based on plantation size, land ownership and permits: (1) for large plantations with incomplete permits the regulations provide ways of securing legality through administrative sanctions and limited fines; (2) a conditional land amnesty for large plantations without permits

[1] Two Government Regulations have been issued to offer solutions addressing the problem of illegal palm oil plantations; Government Regulation No. 23/2021 on Forest Management, and Government Regulation No. 24/2021 on Imposing Administrative Sanctions and Procedures to Deriving Non-Tax State Revenue from Administrative Fines in the Forestry Sector.

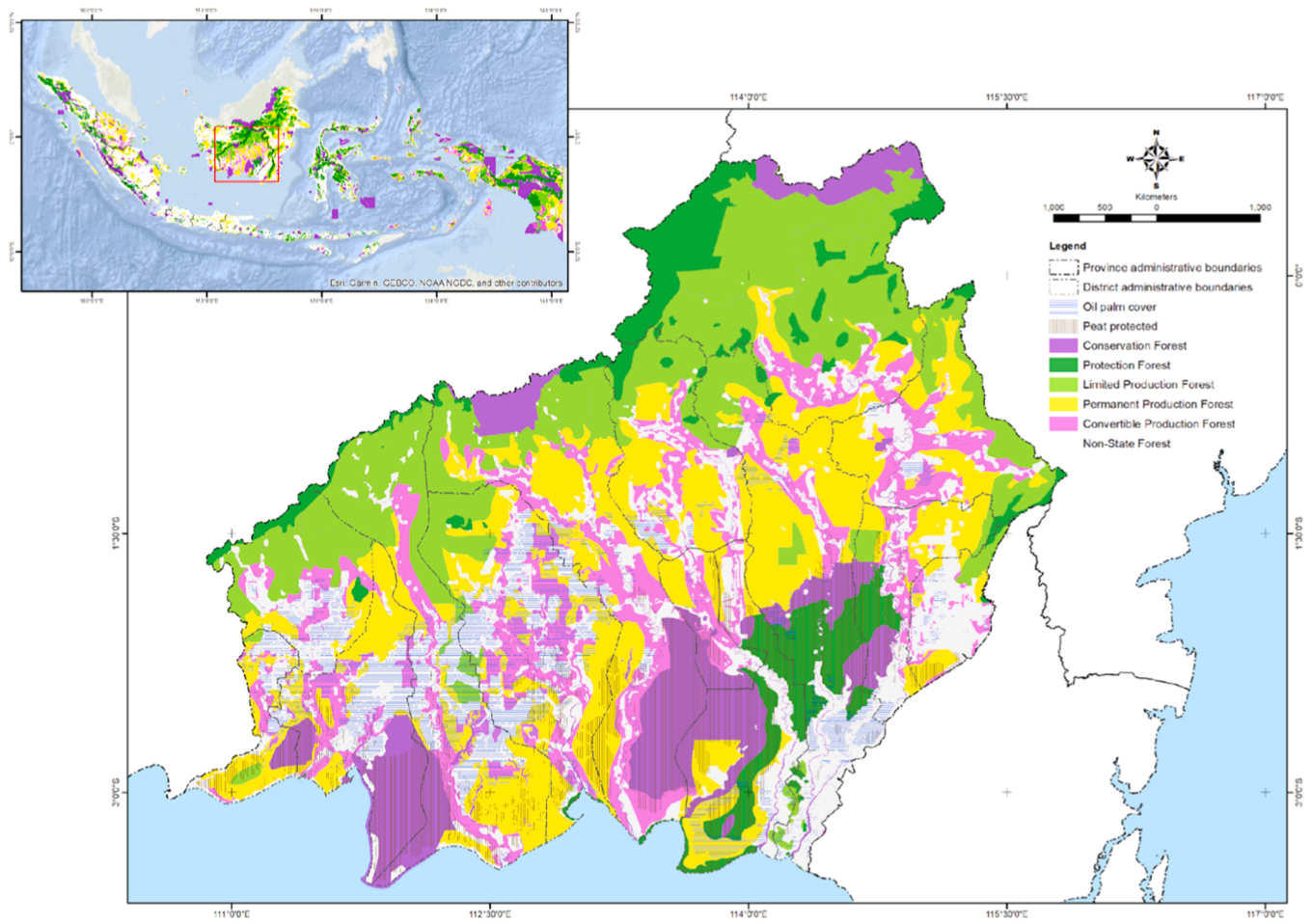

Fig. 1. The main panel shows the distribution and extent of illegal palm oil across different forest designations in the Indonesian province of Central Kalimantan. Inset shows country-wide distribution of illegal palm oil across different forest designation types in Indonesia. Map based on data provided by Indonesia's Corruption Eradication Commission in collaboration with Ministry of Agriculture, Ministry of Environment and Forestry, Geospatial Information Agency, and the National Space and Aeronautics Agency.

Table 5
Distribution of illegal palm oil in the Indonesian province of Central Kalimantan across protected peatlands (ha). Note that the estimates have been rounded to the nearest 10 where the original figure is $\geq$ 1000 and to the nearest 5 where the original figure is $<$ 1000.

Location of protected peatlands	Large plantations with incomplete permit	Large plantations without permit	Independent smallholder plantations	Total
Conservation Forest	70	685	0	760
Convertible Production Forest	6310	3200	360	9870
Limited Production Forest	4820	225	44	5090
Permanent Production Forest	13,750	6575	135	20,460
Protection Forest	7,810	14,360	20	22,190
Total	**32,760**	**25,050**	**560**	**58,380**

through hefty fines; (3) the implementation of social forestry to ecologically rehabilitate smallholdings and; (4) forest release through agrarian reforms.

Under Option 1, large plantation owners with incomplete permits generally prefer illegally acquired forest lands to be reclassified as legal non-forest lands, irrespective of their environmental impacts. MOA representatives explained that retrospectively issuing forest release certificates to convert illegal plantations with incomplete permits into legitimate Production Forests would resolve some of the negative outcomes arising from a confusing and often contradictory spatial planning process (Interview 1, 2, August 2019 & November 2021). A palm oil producer similarly argued that re-gazetting illegally occupied state forest land as legally managed non-state forest land is essential for national economic development and to provide legal certainty and protection for investors (Interview 3, July 2019):

Many palm oil companies came into this illegal situation because partly it is the government's mistake. We obtained permits legally from the local government agencies, invested money and infrastructures, helped villages around our plantations, and suddenly the government declared that our operations are illegal. The government has to find a win-win solution, that supports rural development, economic growth and our international standing position with the European Union. This can be done by releasing the forest status and declaring that our plantations are legal (Interview 3, July 2019).

The majority of large plantation owners justify their illegal encroachment into state forests by blaming the GoI's inefficient bureaucracies, overlapping legislations, and opaque land use regimes. Many state officials sympathise with their argument and see turning illegally occupied forest lands into non-forest zones as an expedient

solution to a complex problem.

The Omnibus Law ended the previous unpopular land swap policy (Government Regulation No. 104/2015 on Mechanisms to Change the Status and Function of State Forests), whereby illegal plantation companies with incomplete permits were given a year within which they could only apply for forest release status if they were able to provide an equivalent area of land in exchange. Under this swap and release scheme, companies were required to exchange forested lands with lands adjacent to state forest in the same province (Setiawan et al., 2016). Not surprisingly, land scarcity often made it impossible for plantation companies to secure a suitable land swap, diminishing the effectiveness of this scheme (Wibowo et al., 2019).

Supported by the Indonesian Chamber of Commerce, the Omnibus Law outlines a simpler way to secure legality by offering the owners of illegal plantations a three-year period to obtain forest release certificates, and pay administrative fines to secure legality. Additionally, large plantations with incomplete permits that overlap with Conservation or Protection forests (including on deep peatlands) can receive approval to continue operating for 15 years after planting. Researchers have cautioned that reclassifying illegal palm oil plantations in this way creates opportunities for greenwashing by enabling illegal agribusinesses to apply for sustainability standard certifications such as ISPO. Interviewees from conservation organizations expressed concerns about the lack of clear policies on forest restoration mechanisms following the closure of illegal palm oil plantations at the end of their 15 year tenure (Interview 6, 7, and 8, November 2021).

Option 2 grants conditional amnesty for illegal palm oil plantation owners who do not have any permits. In an interview, a palm oil company representative said the idea of land amnesty derives from the GoI's tax amnesty policy (Interview 4, July 2019), which was implemented in 2016 to encourage the repatriation of offshore assets through a tax write-off scheme that involves no administrative and criminal sanctions so long as the claimant pays a financial penalty (Sayidah and Assagaf, 2019). Proponents of the land amnesty policy argue that the GoI should allow palm oil producers to declare their illegal status and make reparations accordingly by paying a prescribed penalty and taxes owed, which would then facilitate their application for the necessary documentation required to operate legally (Interview 4 & 5, July 2019). Powerful corporate and government actors with business interests in the palm oil sector claim their payment of taxes, which generates substantial government revenues, entitles them to lighter penalties for infractions. The adoption of the amnesty policy in the Omnibus Law further provides mechanisms for owners of large illegal plantations to avoid custodial sentences or the confiscation of assets.

However, by providing amnesty, the Omnibus Law risks undermining social and environmental goals, including efforts to restore and protect important carbon stocks and mitigate climate change. Environmental and agrarian NGOs say illegal palm oil growers, especially those without permits, would abuse a fine-based system to expand ever deeper into forested areas, as opposed to harsher penalties such as jail terms or asset forfeiture (Interview 6, 7 & 8, July 2019, and 11 & 12 November 2021). For their part, palm oil industry representatives argue that punitive actions are unfair because the government has perpetuated illegality through its unclear and often contradictory spatial planning laws (Interview 3, July 2019). As an alternative, some have suggested reclassifying palm oil as a forest plant (Interview 9, August 2019). Taking this view, an academic from Bogor Agricultural Institute explained:

Indonesia is a sovereign country. We don't have to follow a classification imposed upon us by an international organization which I don't think is free from bias and particular interest. Classifying palm oil as a non-forestry crop is an old colonialistic strategy to intentionally benefit producers of other vegetable oils - which are mostly western countries. Meanwhile, palm oil producing countries like Indonesia or Malaysia have to endure unfair scrutiny because of this politically motivated classification (Interview 9, August 2019).

Currently, Indonesia's forest policy follows the United Nation's Food and Agriculture Agency's (FAO) classification system in not recognizing palm oil as a forestry crop. However, if palm oil were reclassified as a forestry crop, as with timber plantations, then illegal palm oil plantations currently located in areas designated as Production Forest could become legal and therefore potentially eligible for ISPO certification. Although the Omnibus Law has thus far prevented palm oil from being reclassified as a forestry crop, silviculture (the mixed cultivation of forests for conservation and commerce) offers one potentail legalization mechanism for illegal plantation conversion in Conservation and Protection forests. However, this strategy, like Option 1, provides a convenient solution based on re-classification of land that does nothing to address the socioecological damage caused by illegality and may conversely aid its extension deeper into forests.

Option 3 seeks to enable the ecological restoration of smallholdings through social agroforestry, aligning with the GoI's Social Forestry program that aims to provide community access to 12.7 Mha of state forest. In its ongoing efforts to address rural poverty and improve land access, the GoI allocated a further 2 Mha of land to landless farmers and awarded 2.9 Mha of uncertified lands to poor households. These initiatives have been the cornerstones of President Joko Widodo's (2014-present) agrarian reforms that aim to reduce inequalities in land access and ownership, resolve tenurial disputes, increase agrarian welfare and alleviate rural poverty (Setkab, 2017). A representative of Indonesia's Palm Oil Farmer's Association, Apkasindo, estimated that more than 90% of independent smallholder farmers in Indonesia have no formal land certificate (Interview 10, August 2019). Many independent smallholder farmers find the costs of obtaining the required permits prohibitively expensive and legal status carries the additional burden of having to pay taxes (Daemeter Consulting, 2015). CSOs that advocate harsh punitive measures for large illegal plantation owners are more sympathetic toward independent smallholders, proposing participation in social forestry programs as a fairer alternative to eviction and resettlement (Bakhtiar et al., 2019).

As several interviewees pointed out, however, and as our spatial data analysis shows, independent smallholders only represent a fraction of Central Kalimantan's illegal palm oil plantation problem. Even for this relatively small area there are difficulties in implementation. An agrarian activist and MOA officer believed the GoI's social forestry program is unlikely to achieve its objectives for as long as the social forestry regulation remains ill-equipped to transfer legal ownership of fully-functioning palm oil plantations to smallholders (Interview 11 & 12, August 2019). This is because 12 years after planting, smallholder trees become ineligible for inclusion in social forestry programs (even though they remain productive well beyond this cut-off period) and are classified as agricultural not forestry commodities (Bakhtiar et al., 2019). CSOs have thus urged revision of the current social forestry regulation to allow smallholder farmers whose land is located inside state forest to continue to tend their plantations until their palm oil trees exceed their most productive age.

CSO advocacy has successfully influenced a new MOEF social forestry regulation (Ministerial Regulation No. 9/2021) in allowing palm oil smallholders in Production Forest to maintain their crops for 25 years on the condition that they implement a restorative phase. Meanwhile, instead of subjecting illegal smallholder plantations that overlap with Conservation and Protection forests to immediate resettlement, the new social forestry policy allows for a phased vacating of forests over a period of 15 years. Interviewees tended to view this approach in terms of a gradual transition to agroforestry based on intercropping (formulated in the regulation as a minimum of 100 trees per hectare), which has the advantage of providing a buffer against fluctuations in the market value of palm oil, as occurred during the COVID-19 pandemic (Neo, 2020).

Option 4 also concentrates upon smallholders, seeking forest release through agrarian reforms. CSOs have advocated legalising independent smallholdings in cases where lands have been cultivated for more than 20 years and consequently have low conservation value (situated in the

Convertible Production Forest). This agrarian reform target ultimately involves reclassifying forests into non-forest areas. However, several independent smallholder interviewees in Central Kalimantan felt that these agrarian reforms are biased against land ownership in the outer islands of Indonesia, as existing agrarian reform policies only apply to holdings smaller than 5 ha. Farmlands in Central Kalimantan and other peripheral provinces usually exceed 5 ha and are often bound up in customary law regimes of informal and partial communal ownership. Land ownership requirements stipulating a maximum of 5 ha land per person could thus reduce community access to customary agricultural lands. However, more positively, the recent Government Regulation No. 20/2021 allows unmanaged and unplanted concessions to be reallocated for social forestry and agrarian reform. In the case of Central Kalimantan, our data show 0.9 Mha of unplanted palm oil concessions in Central Kalimantan that can potentially be targeted under the agrarian reform policy.

5.3. Spatial implications of different governance priorities

The Omnibus Law provides a variety of mechanisms for responding to illegality, however the implementation of these and other possibilities depends on the governance priorities of the GoI. In what follows we discuss four broad governance scenarios, drawing upon the policy scenario analysis of Sharma et al. (2018) to explore their spatial land use ramifications (Table 6). The first pro-business scenario supports efforts currently underway to make large illegal palm oil holdings legal. This strategy is economically driven and, should it succeed, will come at the expense of protected forests and peatlands. In this scenario, policy propositions advanced by palm oil industry representatives focus on pathways to legality, such as land amnesty and reclassifying palm oil as a forestry crop, that are designed to confer legal rights to palm oil producers currently working illegally in state forests and peatlands. The second, pro-small farmer scenario is aimed at improving land access for smallholdings while allocating a small fraction of state forest for community management. The third pro-environment scenario is premised on forest and peatland protection, fire mitigation and the maintenance and enhancement of biodiversity and carbon stores. Issues of securing land access for smallholders and conferring legality to large plantation companies are subordinated to ecological concerns in this scenario. The fourth mixed-method scenario entails a mixture of the first three scenarios, taking into account the complexity of palm oil governance by tailoring policy propositions according to forest type, typology of land ownership and illegality.

Based on our illegal palm oil data for Central Kalimantan (Tables 4 and 5), the implementation of Scenario 1 would grant legal status to large tracts of illegal plantations. This scenario addresses overlapping land uses and provides clarity on the function and status of more than 0.85 Mha forest area, enabling the owners to apply for ISPO certification. However, granting amnesty to large plantations would further degrade around 0.1 Mha of nationally and internationally important protected peatlands and high conservation value forests that otherwise could be targeted for restoration initiatives. Consequently, land amnesty will negatively impact biodiversity protection, fire mitigation efforts and greenhouse gas emissions reduction targets, in addition to jeopardising potential future income from carbon offset programs (Tan, et al., in press). Moreover, full implementation of the land amnesty proposal would increase the concession sizes of some companies to over 100,000 ha, placing them in breach of Government Regulation No.26/2021 that aims to prevent land grabs by large plantation companies. Perversely, this pro-business strategy could encourage large growers to encroach farther into state forests, secure in the knowledge that the government is not serious about conserving forests and peatlands.

Implementation of the second pro-smallholder scenario would provide legal recognition for over 3720 ha of existing smallholdings that include areas of protected peatland and high conservation value forest

Table 6
Comparative matrix of policy propositions.

Scenario	Policy proposition	Total extent of high conservation area and protected peatlands impacted (hectares)*
Scenario 1: Pro-business Emphasis on legal certainty and land access for either large plantations with incomplete or without permits	• Land amnesty for large plantation (administrative sanctions for incomplete permit and prescribed financial fines for plantation without permit) • Redefinition of palm oil as a forestry crop	• Protected peatlands impacted: 57810 ha • High conservation area impacted: 43,330 ha • Legal status granted to large plantations: 0.85 Mha
Scenario 2: Pro-small farmer Emphasis on improving land access for independent smallholdings	• Independent smallholders' plantations are reclassified to non-forest area • 0.9 Mha unplanted large palm oil concessions targeted for agrarian reform by reclassifying to non-forest area	• Legal status granted for smallholdings: 3720 ha • Protected Peatlands impacted: 560 ha • High conservation area impacted: 365 ha • Additional 0.9 Mha for smallholdings from unplanted palm oil concessions
Scenario 3: Pro-environment Emphasis on environmental concerns	• 15 years limitation for smallholder farmers in the Protection and Conservation Forests • Closure of large plantations (either with incomplete or without permits) in the Protection and Conservation forests • Cancellation of permit for unplanted large plantations and targeted for restoration program	**Smallholder farmed:** • By the end of 15 years tenure, access denied to existing smallholdings in the Protection and Conservation Forests: 365 ha **Large plantations (including unplanted plantations):** • Closure of large plantations (either with incomplete or without permits) in the Protection and Conservation Forest and made available for restoration: 43,325 ha • Cancelled permit on unplanted plantation and made available for restoration: 0.9 Mha • Total area available for restoration: around 0.943 Mha
Scenario 4: Multi-stakeholder approach Taking into consideration the complexity of palm oil governance including contested legality, land access, social and environmental concerns. Approach is defined by typology of land ownership and emphasis on forest and peatland function	Social forestry with phased restorative approach for 15 years for independent smallholders whose plantations are situated on Protection and Conservation forests. Independent smallholder farmers whose plantations are situated on Production Forest are reclassified into non-forest area. Reclassification of forest to non-forest for large companies with incomplete permit	**Smallholder farmed:** • Protected peatlands impacted: 560 ha • High conservation area impacted for 15 years: 365 ha • Legal status granted to palm oil on state forest land: 3355 ha + 365 ha for 15 years • Denied access to state forest by the end of 15 years: 365 ha **Large plantations (including unplanted**

(*continued on next page*)

Table 6 (*continued*)

Scenario	Policy proposition	Total extent of high conservation area and protected peatlands impacted (hectares)*
	whose plantations are situated on Production Forest (even if overlap with protected peatland)Approval to use forest area for 15 years with a restorative approach for large companies with incomplete permit whose plantations are located on forest with Conservation and Protection function and protected peat.Approval to use forest area for plantation without permit in production forest for 25 years. Closure of plantation without permits on Protection and Conservation forests. Revocation of permit for unplanted large plantation companies and areas targeted for restoration.	**plantations):** • Legal status granted for large plantations: around 0.7 Mha • Protected peatland impacted: 42,760 ha • High conservation area impacted for 15 years: 18,155 ha • High conservation area made available for restoration: 25,170 ha • Cancelled permit on unplanted concessions and made available for restoration: around 0.9 Mha • Total area protected: around 0.925 Mha

* High conservation area is consisted of forest with Conservation and Protection designations. See Tables 4 and 5 for breakdown of these areas by forest function.

(Tables 4 and 5), as well as an additional 0.9 Mha of addition land for smallholder production on unplanted large palm oil concessions. The only way of mitigating the environmental degradation generated by this pro-small farmer strategy would be to integrate it into the social forestry program. This would require taking a phased restorative approach to offset the negative environmental impacts that will invariably follow. This strategy, however, could not be taken in isolation as it does not engage with existing large palm oil plantations, the main drivers of illegal palm oil operations in Central Kalimantan.

Under the third pro-environment scenario, the resettlement of smallholder farmers at the end of their 15 year tenure would deny them access to existing livelihoods, with implications for unemployment, rural poverty and social injustice. Resettlement also threatens to exacerbate tenurial and resource disputes between migrant smallholders and resident communities. However, from an environmental governance perspective, Scenario 3 is ideal in affording protection to extensive areas of important deep peatlands and high conservation value forests, while forcing the closure of large unplanted concessions, in the process creating new forest restoration opportunities. More negatively, this would forego the opportunity to make 0.9 Mha land available for agrarian reform. This scenario is predicated upon an ability by law enforcement to tackle illegality in ways that are currently lacking in Indonesia, but could potentially be boosted through carbon offset programs, although these have to date struggled for effectiveness in Indonesia. As such, this approach reveals the environmental potential of effective law enforcement, while at the same time exposing the complexity of socio-ecological relationships in Indonesia, particularly on remote, outer islands.

By combining aspects of the first three scenarios, the fourth mixed-method scenario would ideally lead to a reduction in negative environmental impacts in deep peatlands while enhancing rural livelihoods through the implementation of social forestry through a phased restorative approach. Under Scenario 4, the relocation of illegal independent smallholdings after 15 years tenure would create conditions conducive to restoring 365 ha of high conservation value forests, while confirming the legal status of over 3355 ha of smallholdings in Production Forest for rural sustainable development. Scenario 4 would grant legal status for around 0.6 Mha of large plantations with incomplete permits situated in Production Forest. Large plantations would have to withdraw from around 15,000 ha of deep peatland and over 0.91 Mha of state forest, thereby adding support for activities centred on the protection of biodiversity and carbon stocks. As with other scenarios, the feasibility of Scenario 4 would depend, in the first instance, on the production of baseline and thematic maps under the OMP initiative to monitor and impose strict penalties for transgressions. Current forest zoning would determine how both large and small independent plantation owners are individually affected. Our analysis shows that Scenario 4 has the greatest potential to balance the interests of palm oil producers with local ecological conditions. However, our interview data reveal that large plantation companies have a distinct preference for Scenario 1, while environmental activists prefer Scenario 3.

Since the introduction of the Omnibus law, Scenarios 1 and 2 have been prioritised by the GoI. While the Omnibus Law will streamline land use regulations and simplify Indonesia's licencing process to facilitate business and job creation, in the medium to longer term it will scale-down or dilute key environmental protections with potentially disastrous socio-ecological impacts. With large plantations leading the illegal push into state forests and peatlands, land access and the flow of finances are likely to remain concentrated among corporations and outside investors. In the context of Indonesia's neoliberal policy framework, within which state officials are generally reluctant to challenge corporate misconduct directly, scholars and environmental activists have cautioned that the new legislation will pave the way for the exoneration of crimes committed by illegal large plantations. We strongly believe scenario 4 provides a more balanced and desirable approach that is more likely to provide suitable social and ecological benefits, while disincentivising illegal land uses.

While the OMP initiative provides a useful starting point for addressing illegal palm oil plantations by clarifying spatial planning and land use boundaries in Indonesia, existing regulations perpetuate problems that give rise to land tenure conflicts between companies and communities inside state forest areas. The Omnibus Law, for instance, only addresses questions of illegality in plantations that overlap with state forest, but overlooks unresolved customary law issues relating to competing land claims by palm oil plantations and Indigenous communities. CSOs have documented more than 120 such conflicts between Indigenous communities and plantation companies inside state forests in Central Kalimantan alone (SaveOurBorneo, 2017). Without more equitable agrarian reforms, the OMP initiative and the Omnibus Law may be used to further dispossess local communities and legalize land grabs on an ever-expanding scale. In order for the OMP initiative to realise its potential as a tool for fostering transparency in environmental governance, the GoI would also need to develop a real-time open-access information system covering the status, location and extent of forest release resulting from the legalization of illegal plantations. Such an initiative would encourage public participation and capitalise on the monitoring capacities of environmental CSOs. Without such initiatives to strengthen public oversight and regulate the palm oil sector, the pathways for legalising deforestation and illegal plantations are likely to further undermine sustainable industry standards, contribute to land use conflict, and erode state capacity by creating opportunities for personal enrichment among state officials.

6. Conclusions

The high prevalence of illegality in Indonesia's palm oil industry has critically undermined attempts at regulating production while creating a particular set of problems for environmental governance. This study has shown how the OMP initiative has sought to expose these issues by

rendering visible the illegal encroachment of palm oil plantations into Indonesia's state forests, creating new governance challenges. Palm oil stakeholders have responded to this enhanced transparency by proposing diverse initiatives to advance their interests. CSOs have identified an opportunity to address both illegal encroachment into state forests and inequality in land access by proposing an expanded implementation of social forestry and other agrarian reforms. Conversely, large plantation owners have tried to negotiate land amnesties that confer legality on their illegal operations while avoiding harsh punitive measures in the form of taxes and fines. Yet the biggest challenge remains addressing palm oil illegality by better balancing its environmental impacts with the long-term, socio-ecological and economic benefits of land legality.

Taking the case of Central Kalimantan, our study has partly filled an information deficit that represents an ongoing obstacle to effective palm oil governance. Our assessment of the spatial dimensions of illegal plantations in Central Kalimantan used high-resolution spatial data supported by on-the-ground validation to reveal that smallholder farmers play a relatively minor role in expanding illegally into state forest lands when compared with large plantation companies. Large plantation companies are able to invest not only in extensive plantations but also in industrial machinery to extend illegally into forest lands. Their influence over policy makers and state officials, as evidenced in the Omnibus Law, reinforces their hegemony over the palm oil industry and their legal impunity for transgressions of industry standards.

The extent and nature of illegal palm oil in Central Kalimantan is likely replicated in other palm oil-producing provinces in Indonesia. In policy terms, our findings suggest that environmental legislation and the Omnibus Law need to be reoriented to include greater scrutiny of, and punitive actions against, the illegal expansion of large plantations. There is a very real risk that efforts to meet ISPO standards will result in the reclassification of forest land in order to establish legality, thereby perversely driving forest loss rather than improving environmental standards. Indeed, this outcome seems likely as GoI agencies, the palm oil industry and CSOs experience fatigue with a long running and increasingly intransigent problem. Discursive blurrings of the boundaries between legality and illegality only add to the layers of obfuscation that perpetuate and amplify the problem of illegal land use and ownership in the current context of Indonesia's decentralized, complex system of environmental governance.

By assessing our findings of illegal palm oil cultivation in the context of four governance scenarios, we illustrated the range of choices available to those attempting to balance the environmental, economic and social costs and benefits of illegal palm oil plantations. Our focus on the situation in the Indonesian province of Central Kalimantan allowed an in-depth assessment based on both quantitative and qualitative data. However, our approach and findings are likely to be relevant not only for other parts of Indonesia but also for many low and middle-income countries, where there are competing pressures on natural resources. Our work shows that generating accurate spatial data is a crucial first step in responding to illegality. However how these data are used and prioritised in governance, particularly in terms of land use classification and zoning, ultimately shapes who and what benefits from making illegality visible.

Funding

Rini Astuti, Michelle Ann Miller and David Taylor would like to acknowledge that this publication benefited from the financial support of the Ministry of Education, Singapore, under its Social Science Research Council (SSRC) grant "Sustainable Governance of the Transboundary Environmental Commons in Southeast Asia" (MOE2016-SSRTG-068). Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not reflect the views of the Ministry of Education, Singapore.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.landusepol.2021.105942.

References

Alika, R. (2019). Jokowi Teken Inpres Rencana Aksi Nasional Sawit Berkelanjutan. ⟨https://katadata.co.id/berita/2019/11/27/jokowi-teken-inpres-rencana-aksi-nasional-sawit-berkelanjutan⟩.

Araya, A.L., 2019. The politics of dispossession in the Honduran palm oil industry: a case study of the Bajo Aguán. J. Rural Stud. https://doi.org/10.1016/J.JRURSTUD.2019.01.015.

Astuti, R., 2020. Fixing flammable Forest: the scalar politics of peatland governance and restoration in Indonesia. Asia Pac. Viewp. 61 (2), 283–300. https://doi.org/10.1111/apv.12267.

Astuti, R., 2021. Governing the ungovernable: the politics of disciplining pulpwood and palm oil plantations in Indonesia's tropical peatland. Geoforum 124, 381–391. https://doi.org/10.1016/j.geoforum.2021.03.004.

Astuti, R., McGregor, A., 2015. Responding to the green economy: How REDD+ and the One Map Initiative are transforming forest governance in Indonesia. Third World Q. 36 (12), 2273–2293. https://doi.org/10.1080/01436597.2015.1082422.

Astuti, R., McGregor, A., 2017. Indigenous land claims or green grabs? Inclusions and exclusions within forest carbon politics in Indonesia. J. Peasant Stud. 44 (2), 445–466. https://doi.org/10.1080/03066150.2016.1197908.

Attah, N.E., 2013. Possession by dispossession: interrogating the new wave of land grabbing in Nigeria. J. Land Rural Stud. 1 (2), 213–228. https://doi.org/10.1177/2321024913513385.

Bakhtiar, I., Suradireja, D., Santoso, H., & Saputra, W. (2019). Hutan kita bersawit: Gagasan penyelesaian untuk perkebunan kelapa sawit dalam kawasan hutan. KEHATI.

BPK. (2019). Pemeriksaan dengan tujuan tertentu atas perizinan, sertifikasi dan implementasi pengelolaan perkebunan kelapa sawit berkelanjutan serta kesesuaiannya dengan kebijakan dan ketentuan internasional. Badan Pemeriksa Keuangan.

Burgess, R., Hansen, M., Olken, B.A., Potapov, P., Sieber, S., 2012. The political economy of deforestation in the tropics*. Q. J. Econ. 127 (4), 1707–1754. https://doi.org/10.1093/qje/qjs034.

Cardona, A.J.P. (2019). Researchers urge sustainability as palm oil tightens its grip on Latin America. Mongabay Environmental News. ⟨https://news.mongabay.com/2019/11/researchers-urge-sustainability-as-palm-oil-tightens-its-grip-on-latin-america/⟩.

Carmody, P., Taylor, D., 2016. Globalization, land grabbing, and the present-day colonial state in uganda: ecolonization and its impacts. J. Environ. Dev. 25 (1), 100–126. https://doi.org/10.1177/1070496515622017.

Daemeter Consulting. (2015). Indonesian oil palm smallholder farmers: A typology of organizational models, needs, and investment opportunities. Daemeter Consulting.

Dauvergne, P., 2018. The global politics of the business of "sustainable" palm oil. Glob. Environ. Polit. 18 (2), 34–52.

DJP. (2019). Statistik Perkebunan Indonesia Komoditas Kelapa Sawit 2017–2019. ⟨https://drive.google.com/file/d/1rlmMNUbPM99DA-Ywo-Prv3cmPnWoFUUp/view?usp=sharing&usp=embed_facebook⟩.

Eyes on the Forest. (2021). Omnibus Law bukan legalisasi otomatis untuk perkebunan sawit ilegal: Investigasi EoF pada kebun sawit ilegal dan penjualan tandan buah ilegal di Riau. ⟨https://www.eyesontheforest.or.id/reports/omnibus-law-bukan-legalisasi-otomatis-untuk-perkebunan-sawit-ilegal⟩.

Fitzherbert, E.B., Struebig, M.J., Morel, A., Danielsen, F., Brühl, C.A., Donald, P.F., Phalan, B., 2008. How will oil palm expansion affect biodiversity? Trends Ecol. Evol. 23 (10), 538–545. https://doi.org/10.1016/j.tree.2008.06.012.

Glinskis, E., Gutierrez-Velez, V., 2019. Quantifying and understanding land cover changes by large and small oil palm expansion regimes in the Peruvian Amazon. Land Use Policy 80, 95–106. https://doi.org/10.1016/J.LANDUSEPOL.2018.09.032.

Hamilton-Hart, N., 2015. Multilevel (mis)governance of palm oil production. Aust. J. Int. Aff. 69 (2), 164–184. https://doi.org/10.1080/10357718.2014.978738.

Hidayat, N.K., Offermans, A., Glasbergen, P., 2018. Sustainable palm oil as a public responsibility? On the governance capacity of Indonesian Standard for Sustainable Palm Oil (ISPO). Agric. Hum. Values 35 (1), 223–242. https://doi.org/10.1007/s10460-017-9816-6.

Jelsma, I., Schoneveld, G.C., Zoomers, A., van Westen, A.C.M., 2017. Unpacking Indonesia's independent oil palm smallholders: an actor-disaggregated approach to identifying environmental and social performance challenges. Land Use Policy 69, 281–297. https://doi.org/10.1016/j.landusepol.2017.08.012.

Kartodihardjo, H., Ariati, N., Abdullah, M., 2019. Kebijakan pencegahan korupsi sektor sumber daya alam melalui pendekatan institusional dan struktural. Integritas: J. Antik. 5 (2–2), 33–47. https://doi.org/10.32697/integritas.v5i2-2.

KPK. (2016). Kajian sistem pengelolaan komoditas kelapa sawit. Komisi Pemberantasan Korupsi.
KPK. (2019). Oil palm cover in Indonesia: An analysis of satellite imagery from 2014—2016. KPK, LAPAN, Badan Informasi Geospatial, Kementrian Pertanian Republik Indonesia.
Li, T.M., 2000. Articulating indigenous identity in indonesia: resource politics and the tribal slot. Comp. Stud. Soc. Hist. 42 (1), 149–179.
McCarthy, J.F. (2004). Changing to Gray: Decentralization and the Emergence of Volatile Socio-Legal Configurations in Central Kalimantan, Indonesia. World Development, 32(7), 1199–1223. https://doi.org/10.1016/j.worlddev.2004.02.002.
McCarthy, J.F., 2011. The limits of legality: State governance and resource control in Indonesia. In The State and Illegality in Indonesia. KITLV Press, pp. 89–106.
McCarthy, J.F., Gillespie, P., Zen, Z., 2012. Swimming upstream: local Indonesian production networks in "globalized" palm oil production. World Dev. 40 (3), 555–569. https://doi.org/10.1016/j.worlddev.2011.07.012.
Miller, M.A., 2021. Market-based commons: social agroforestry, fire mitigation strategies, and green supply chains in Indonesia's peatlands. Trans. Inst. Br. Geogr. 1–15. https://doi.org/10.1111/tran.12472.
Neo, P. (2020). COVID-19 palm oil depression: Indonesia sees volumes fall drastically for country's top export commodity. Foodnavigator-Asia.Com. ⟨https://www.foodnavigator-asia.com/Article/2020/04/28/COVID-19-palm-oil-depression-Indonesia-sees-volumes-fall-drastically-for-country-s-top-export-commodity⟩.
Nugraha, I. (2019). Bagaimana Implementasi Inpres Moratorium Izin Kebun Sawit? Ini Kajian Sawit Watch. Mongabay Environmental News. ⟨https://www.mongabay.co.id/2019/07/30/bagaimana-implementasi-inpres-moratorium-izin-kebun-sawit-ini-kajian-sawit-watch/⟩.
Nugroho, Y., & Hikmat, A. (2017). An insider's view of e-governance under Jokowi: Political promise or technocratic vision. In Digital Indonesia: Connectivity and Divergence. ISEAS-Yusof Ishak Institute.
Partzsch, L., 2021. European Union's proxy accountability for tropical deforestation. Environmental Politics 30, 600–621. https://doi.org/10.1080/09644016.2020.1793618.
Peluso, N.L., Vandergeest, P., 2001. Genealogies of the political forest and customary rights in Indonesia, Malaysia, and Thailand. J. Asian Stud. 60 (3), 761–812. https://doi.org/10.2307/2700109.
Potter, L., 2016. How can the people's sovereignty be achieved in the oil palm sector? Is the plantation model shifting in favour of smallholders. Land Dev. Indones. Search. people's Sover. 315–342.
Pramudya, E.P., Hospes, O., Termeer, C.J.A.M., 2018. The disciplining of illegal palm oil plantations in Sumatra. Third World Q. 39 (5), 920–940. https://doi.org/10.1080/01436597.2017.1401462.
Purnomo, H., Okarda, B., Dewayani, A.A., Ali, M., Achdiawan, R., Kartodihardjo, H., Pacheco, P., Juniwaty, K.S., 2018. Reducing forest and land fires through good palm oil value chain governance. For. Policy Econ. 91, 94–106. https://doi.org/10.1016/j.forpol.2017.12.014.
Purnomo, H., Okarda, B., Shantiko, B., Achdiawan, R., Dermawan, A., Kartodihardjo, H., Dewayani, A.A., 2019. Forest and land fires, toxic haze and local politics in Indonesia. Int. For. Rev. 21 (4), 486–500. https://doi.org/10.1505/146554819827906799.
Purnomo, H., Shantiko, B., Sitorus, S., Gunawan, H., Achdiawan, R., Kartodihardjo, H., Dewayani, A.A., 2017. Fire economy and actor network of forest and land fires in Indonesia. For. Policy Econ. 78, 21–31. https://doi.org/10.1016/j.forpol.2017.01.001.
Resosudarmo, I.A.P., 2004. Closer to people and trees: will decentralisation work for the people and the forests of Indonesia? Eur. J. Dev. Res. 16 (1), 110–132. https://doi.org/10.1080/09578810410001688761.
Robbins, P., 2019. Political Ecology: A Critical Introduction. John Wiley & Sons.
SaveOurBorneo. (2017). Konflik Agraria di Kalimantan Tengah (sebuah catatan-1). Save Our Borneo. ⟨https://saveourborneo.org/konflik-agraria-di-kalimantan-tengah/⟩.
Sayidah, N., Assagaf, A., 2019. Tax amnesty from the perspective of tax official. Cogent Bus. Manag. 6 (1), 1659909 https://doi.org/10.1080/23311975.2019.1659909.
Schoneveld, G.C., Ekowati, D., Andrianto, A., Haar, S. van der, 2019a. Modeling peat- and forestland conversion by oil palm smallholders in Indonesian Borneo. Environ. Res. Lett. 14 (1), 014006 https://doi.org/10.1088/1748-9326/aaf044.
Schoneveld, G.C., van der Haar, S., Ekowati, D., Andrianto, A., Komarudin, H., Okarda, B., Jelsma, I., Pacheco, P., 2019b. Certification, good agricultural practice and smallholder heterogeneity: differentiated pathways for resolving compliance gaps in the Indonesian oil palm sector. Glob. Environ. Change 57, 101933. https://doi.org/10.1016/j.gloenvcha.2019.101933.
Setiawan, E.N., Maryudi, A., Purwanto, R.H., Lele, G., 2016. Opposing interests in the legalization of non-procedural forest conversion to oil palm in Central Kalimantan, Indonesia. Land Use Policy 58, 472–481. https://doi.org/10.1016/j.landusepol.2016.08.003.
Setkab. (2017). Presiden: Reforma Agraria dan Perhutanan Sosial Hadir untuk Pemerataan Ekonomi. Sekretariat Kabinet Republik Indonesia. ⟨https://setkab.go.id/presiden-reforma-agraria-dan-perhutanan-sosial-hadir-untuk-pemerataan-ekonomi/⟩.
Setkab. (2020, February 6). Rapat Terbatas mengenai Kebijakan Satu Peta, 6 Februari 2020, di Kantor Presiden, Provinsi DKI Jakarta. Sekretariat Kabinet Republik Indonesia. ⟨https://setkab.go.id/rapat-terbatas-mengenai-kebijakan-satu-peta-6-februari-2020-di-kantor-presiden-provinsi-dki-jakarta/⟩.
Shahab, N. (2016). Indonesia: One Map Policy. Open Government Partnership. ⟨https://www.opengovpartnership.org/documents/case-study-indonesia-one-map-policy/⟩.
Sharma, S.K., Baral, H., Laumonier, Y., Okarda, B., Komarudin, H., Purnomo, H., Pacheco, P., 2018. An analysis of multiple ecosystem services under future oil palm expansion scenarios in Central and West Kalimantan, Indonesia. Center Int. For. Res. https://doi.org/10.17528/cifor/006953.
Siscawati, M. (2012). Social movements and scientific forestry: Examining the community forestry movement in Indonesia. University of Washington.
Sumarga, E., Hein, L., Hooijer, A., Vernimmen, R., 2016. Hydrological and economic effects of oil palm cultivation in Indonesian peatlands. Ecol. Soc. 21 (2) art52. ⟨https://www.jstor.org/stable/26270398⟩.
Tan, Z.D., Carrasco, L.R., Sutikno, S., Taylor, D., In press, Peatland restoration as an affordable nature-based climate solution with fire reduction and biodiversity co-benefits Environmental Research Letters.
Thorburn, C.C., Kull, C.A., 2015. Peatlands and plantations in Sumatra, Indonesia: complex realities for resource governance, rural development and climate change mitigation. Asia Pac. Viewp. 56 (1), 153–168. https://doi.org/10.1111/apv.12045.
Tong, S.L.T. (2021). Blind spot in palm policy raises deforestation risk in Malaysia, report says. Mongabay Environmental News. ⟨https://news.mongabay.com/2021/07/blind-spot-in-palm-policy-raises-deforestation-risk-in-malaysia-report-says/⟩.
TUK Indonesia. (2018). Kuasa taipan kelapa sawit Indonesia. Transparansi Untuk Keadilan Indonesia.
Varkkey, H., 2013. Patronage politics, plantation fires and transboundary haze. Environ. Hazards 12 (3–4), 200–217. https://doi.org/10.1080/17477891.2012.759524.
Wakker, E. (2014). Indonesia: Illegalities in Forest Clearance for Large-Scale Commercial Plantations. Aidenvironment Asia.
Wibowo, L.R., Hakim, I., Komarudin, H., Kurniasari, D.R., Wicaksono, D., Okarda, B., 2019. Penyelesaian tenurial perkebunan kelapa sawit di kawasan hutan untuk kepastian investasi dan keadilan. Center Int. For. Res. https://doi.org/10.17528/cifor/007337.