Forest Policy and Economics 92 (2018) 148–159

Contents lists available at ScienceDirect

Forest Policy and Economics

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

Palm oil intensification and expansion in Indonesia and Malaysia: Environmental and socio-political factors influencing policy

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ARTICLE INFO

Keywords:
Palm oil
Intensification
Expansion
Malaysia
Indonesia
Jevons paradox

ABSTRACT

Intensification and expansion are two essential tenets of commercial agriculture. This paper analyses trends of intensification and expansion at the national level, particularly in the oil palm sector in Indonesia and Malaysia. Despite similar starting points and also comparable rates of increasing productivity and profit in this sector, both countries have developed almost opposite trajectories of land use. While both intensification and expansion has occurred in these countries, national indicators show that Malaysia has largely pursued intensification while Indonesia has overwhelmingly favoured expansion. Using the framework of the Jevons paradox, this paper contributes to the existing literature by arguing how and why political and social factors, rather than technology and market incentives, can better account for the differences between yield and land use efficiency in Indonesia and Malaysia today. The paper argues that expansion in Malaysia has been curtailed by the Malaysian government's pledge to maintain at least 50% forest cover in the late 1990s, coupled with a government supported corporate strategy of establishing plantations in Indonesia. Indonesia has made no such pledge, leading to expansionist policies focused on market creation and production goals with limited incentives for technology-driven intensification. It also notes however that in recent years, new socio-political developments in both countries may yet change this clear dichotomy of opposing land use strategies between these two countries, namely Sarawak's recent autonomous tendencies over land use and Indonesia's new leadership and international No Deforestation Peat and Exploitation (NDPE) commitments.

1. Introduction

Intensification and expansion are two essential tenets of commercial agriculture. Intensification is defined as an increase in the productivity of land measured by the real value of agricultural output per hectare, or in other words, yield increase. Expansion can be simply defined as the increase in the area of land used for crops, often involving the conversion of forests or other land use types (Byerlee et al., 2014). At the plantation and grower level, intensification and expansion are often two-pronged, complementary strategies. This paper analyses trends of intensification and expansion in the interlinked oil palm sector in Indonesia and Malaysia. Indonesia and Malaysia today produce approximately 85% of global crude palm oil (CPO). Despite similar starting points and also comparable rates of increasing productivity and profit in this sector, both countries have developed almost opposite trajectories of land use. While both intensification and expansion has occurred in these countries, national indicators show that Malaysia has largely pursued intensification while Indonesia has overwhelmingly favoured expansion. Part of the explanation for this divergence is the nature of the "oil palm complex" identified by Cramb and McCarthy (2016), where capital mobility, i.e. the relative ease of access to Indonesian land and labour enjoyed by Malaysian companies, accounts for recent patterns of expansion.

Using the framework of the Jevons paradox, this paper contributes to the existing literature by arguing how and why political and social factors, rather than technology and market incentives, can better account for the differences between yield and land use efficiency in Indonesia and Malaysia today. The research mapping method was adopted to assess the recent research literature, classify the types of intensification and expansionist measures in both states, and then map them against the economic assumptions that underpin the Jevons paradox. The paper firstly argues that expansion in Malaysia has been curtailed by the Malaysian government's pledge to maintain at least 50% forest cover in the late 1990s, coupled with a government

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https://doi.org/10.1016/j.forpol.2018.05.002
Received 14 September 2017; Received in revised form 30 April 2018; Accepted 1 May 2018

Table 1
Factors causing Intensification and Expansion.

Factors	Definition/Details	Short-Term	Long-Term
Technology-driven	Technical change and advancement in a crop	More output on land per unit of input	land saving/intensification (Alcott, 2005)
Market-driven	Shift in product mix to higher value crops due to new market opportunities, like the high prices of certain commodities	Raises economic productivity and profit on land, providing incentives to expand the area of land available for cultivation or exploitation	land expansion - Jevons paradox (Alcott, 2005)
Human-driven political and social incentives (Malaysia)	Forest cover pledge, intensification policies to work within pledge limitations	capital mobility to Indonesia (driving expansion there)	land saving/intensification in Malaysia
Human-driven political and social disincentives (Indonesia)	No forest commitments, expansionist policies focused on market creation and production goals	limited incentives for technology-driven intensification	land expansion in Indonesia

supported corporate strategy of establishing plantations in Indonesia. Indonesia has made no such pledge, leading to expansionist policies focused on market creation and production goals with limited incentives for technology-driven intensification. It then goes on to note that in recent years, new socio-political developments in both countries may yet change this clear dichotomy of opposing land use strategies between these two countries, namely Sarawak's recent autonomous tendencies over land use and Indonesia's new leadership and international No Deforestation Peat and Exploitation (NDPE) commitments. It concludes that the key economic principles of the Jevons paradox largely still hold; and human manifestations of the paradox, driven by complex social and political factors, makes production more efficient and enables consumers to buy more palm oil. As transboundary haze and deforestation linked to this sector continues to be major concerns in the region, efforts must continue in both countries to decrease incentives for expansion and vice versa.

1.1. Conceptual framework

In the late nineteenth century, the economist William Stanley Jevons analysed the use of coal, and he found that each increment of additional efficiency in coal extraction and utilization, enabled by technological advances, was met with an increment of additional coal extracted and consumed (Czech, 2006). The paradox foresees that resource usage rises due to increasing demand since technological advancement results in increased efficiency of production and resources usage process and leads prices to decline (Ulucak and Bilgili, 2018). The point of the paradox is that, as long as economic growth is the goal, technological progress will result in increased consumption rather than biodiversity conservation. The paradox seems to be reproduced in coal, mining, forestry, energy, and other sectors, and Nelson and Vucetich (2012) have studied the human tendency to manifest the Jevons paradox. Technology increases the efficiency of resource exploitation, but it does not determine how people should exercise that ability and efficiency. An example from the US in the 1970s shows that technology and economic incentives led to more efficient home heating and insulation, but rather than using less energy, people built larger houses because heating became more affordable (Nelson and Vucetich, 2012).

Byerlee et al. (2014), Villoria et al. (2013) find that while intuitively we tend to think that intensification would be the best way to conserve natural ecosystems from agricultural encroachment, under certain circumstances intensification can drive expansion as well. They see intensification as either a technology-driven or market-driven process. Technology-driven intensification occurs when technical change in a crop allows more output on land per unit of input, and has been proven to be generally land saving. Market-driven intensification in turn results from a shift in product mix to higher value crops due to new market opportunities, like the high prices of certain commodities. Market-driven intensification raises economic productivity and profit on the land, and therefore provides incentives to expand the area of land available for cultivation or exploitation, giving rise to a form of the Jevons paradox (Alcott, 2005).

It has been argued that the increase of oil palm prices in the 1980s encouraged a shift from other crops to oil palm in Southeast Asia, and the resulting profits have been a major driver of deforestation (Byerlee et al., 2014). This does not explain why the rate of deforestation related to oil palm after the 1980s increased more rapidly in Indonesia than in Malaysia. A previous study by Miyamoto et al. (2014) presented evidence that deforestation in Malaysia for oil palm expansion had slowed down in the mid-1980s, but notes that further research is necessary in order to understand the underlying causes for this. Thus, using the framework of the Jevons paradox, this paper contributes to the existing literature by focusing on the human tendency to manifest the Jevons paradox, arguing how and why political and social factors, rather than technology and market incentives, can better account for the differences between yield and land use efficiency in Indonesia and Malaysia today. The paper argues that expansion in Malaysia has been curtailed by the Malaysian government's pledge to maintain at least 50% forest cover in the late 1990s, coupled with capital mobility enabling Malaysian companies to exploit opportunities in neighbouring Indonesia, with the same overall result for land use and conservation. Indonesia has made no such pledge, leading to expansionist policies focused on market creation and production goals with limited incentives for technology-driven intensification (Table 1).

1.2. Method

This paper uses a research mapping method, as the most appropriate method to assess the existing intellectual terrain, as well as to specify research questions that contribute to the existing body of knowledge on forestry and plantations in tropical Southeast Asia (Tranfield et al., 2003). Systematic reviews are typically applied in fields and disciplines favouring positivist and quantitative approaches. Since this study is interpretive and qualitative, research mapping is found to be more appropriate than systematic review methods, as this study does not involve numerical aggregation or meta-analysis (Tranfield et al., 2003).

We assess a sample of recently published studies on the political economy of palm oil and land use policy based on general database searches using keywords such as “palm oil”, “intensification” and “expansion”. We found that some key studies related to Indonesia and Malaysia were not retrieved in this way, and so we manually browsed recent issues of influential journals such as *The Journal of Peasant Studies*, *Land Use Policy* and *Forest Policy and Economics*. National media, government and corporate sources from Indonesia and Malaysia were used to fill some of the informational and data gaps that we identified in the literature.

Jorgensen and Gobster (2010) developed a three-step strategy to identify their study sample. We did not replicate precisely this semi-systematic approach, but we used aspects of their method to build our own sample of literature pertaining to comparative processes of palm oil intensification and expansion. Similar to the approach used by Jorgensen and Gobster, we assess the recent research literature and classify the types of intensification and expansionist measures that are found in Indonesia and Malaysia, mapping them against the economic