Journal of Environmental Management 203 (2017) 457–466

Contents lists available at ScienceDirect

Journal of Environmental Management

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

Review

The global palm oil sector must change to save biodiversity and improve food security in the tropics

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ARTICLE INFO

Article history:
Received 2 March 2017
Received in revised form
7 August 2017
Accepted 10 August 2017
Available online 22 August 2017

Keywords:
Conservation
Smallholding
Plantation
Certification
Biodiversity
Poverty

ABSTRACT

Most palm oil currently available in global markets is sourced from certified large-scale plantations. Comparatively little is sourced from (typically uncertified) smallholders. We argue that sourcing sustainable palm oil should not be determined by commercial certification alone and that the certification process should be revisited. There are so-far unrecognized benefits of sourcing palm oil from smallholders that should be considered if genuine biodiversity conservation is to be a foundation of 'environmentally sustainable' palm oil production. Despite a lack of certification, smallholder production is often more biodiversity-friendly than certified production from large-scale plantations. Sourcing palm oil from smallholders also alleviates poverty among rural farmers, promoting better conservation outcomes. Yet, certification schemes – the current measure of 'sustainability' – are financially accessible only for large-scale plantations that operate as profit-driven monocultures. Industrial palm oil is expanding rapidly in regions with weak environmental laws and enforcement. This warrants the development of an alternative certification scheme for smallholders. Greater attention should be directed to deforestation-free palm oil production in smallholdings, where production is less likely to cause large scale biodiversity loss. These small-scale farmlands in which palm oil is mixed with other crops should be considered by retailers and consumers who are interested in promoting sustainable palm oil production. Simultaneously, plantation companies should be required to make their existing production landscapes more compatible with enhanced biodiversity conservation.

Contents

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http://dx.doi.org/10.1016/j.jenvman.2017.08.021
0301-4797/

1. Introduction

Palm oil has become a major international commodity and its demand remains consistently high (Sayer et al., 2012; Pirker et al., 2016). Palm oil is a key ingredient in a wide range of products such as food, cosmetics, soap, pharmaceuticals and biofuel for motor vehicles. Most global consumption of crude palm oil is from large-scale monoculture plantations and this is triggered by the increasing global demand, particularly from emerging economies such China, India (Wilcove and Koh, 2010) and European Union countries (Kremen et al., 2012; Villela et al., 2014) (Fig. 1). By 2050 demand is forecast to be 240 million tonnes per year, nearly twice what it was in 2009 (Corley, 2009).

Palm oil is returning to tropical Africa and being widely established in Latin America as a large-scale commodity crop (Butler and Laurance, 2008; Norris et al., 2010; Gutiérrez-Vélez et al., 2011; Villela et al., 2014), with major negative consequences for biodiversity and food security in these regions (Vijay et al., 2016; Lees et al., 2015; Hughes, 2017). To meet increasing demand, the area of land dedicated to palm oil production in producer countries in Southeast Asia such as Malaysia has increased steadily between 2008 and 2014 (Fig. 2). This situation is replicated elsewhere in the world (Vijay et al., 2016). Palm oil establishment in these areas has resulted in widespread deforestation (Gutiérrez-Vélez et al., 2011; Wicke et al., 2011).

It is unlikely that large-scale palm oil production can go hand in hand with biodiversity conservation (Fitzherbert et al., 2008; Koh and Wilcove, 2008; Edwards et al., 2010; Varkkey, 2012; Lee et al., 2014; Azhar et al., 2015a), especially if palm oil agricultural practices are not modified (Azhar et al., 2015a). Segregation of production lands for palm oil and conservation areas for biodiversity in palm oil producing countries, in line with land-sparing strategies (Fischer et al., 2008), has overshadowed an important fact that both forest and open-area species of fauna can sometimes be found in agricultural landscapes (Fischer et al., 2008; Phalan et al., 2011; Tscharntke et al., 2012; Kremen, 2015; Dislich et al., 2015). Certified palm oil growers are required to implement conservation actions (i.e. wildlife-friendly farming measures) that can promote biodiversity (SPOTT, 2017a,b). Crop yields have increased in most producing countries, but the area under agriculture did not decline (Rudel et al., 2009), which is consistent with our argument with respect to land-sparing. This pattern casts doubts on the ability to spare land under agricultural intensification, at least through a reduction in agricultural areas. The finding of Rudel et al. (2009) confirms Jevons Paradox (Lobell et al., 2013) but refutes Borlaug hypothesis (Lobell et al., 2013). Strong demand for agricultural commodities during the current era of globalizing markets has stimulated growers to cultivate more land even though levels of crop production have increased per hectare (Lobell et al., 2013).

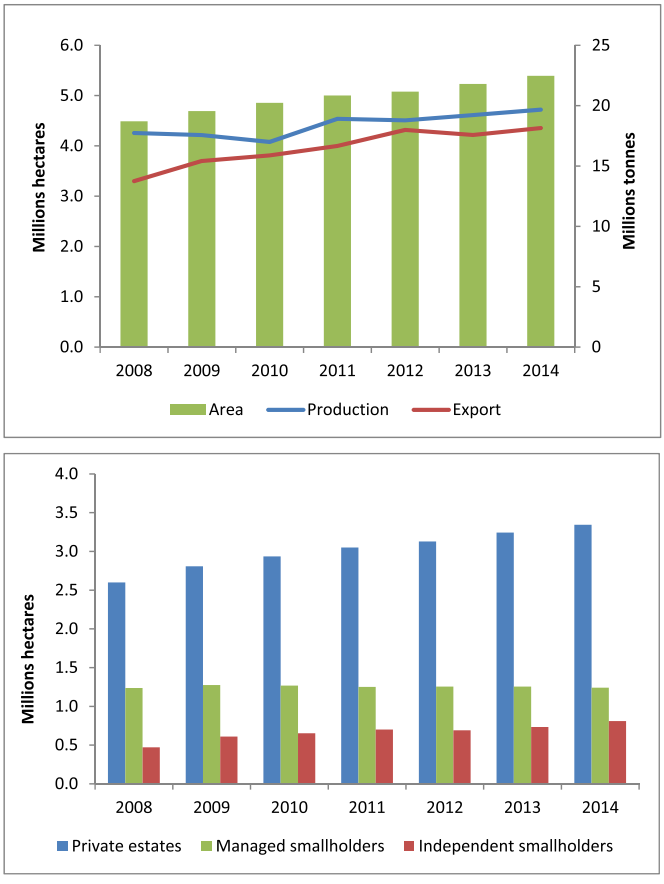

Fig. 1. Planted area of palm oil (millions hectares), palm oil production, and palm oil export in Malaysia (millions of tonnes), 2008–2014 (top). Ownership distribution of palm oil planted area (millions of hectares) in Malaysia, 2008–2014 (bottom). Data from MPOB (2016).

Palm oil production landscapes comprise both homogenous habitats (i.e. monoculture plantations and smallholdings) and heterogeneous habitats (i.e. polyculture smallholdings) (Azhar et al., 2015a,b). Monoculture plantations are highly homogenized and known to be more susceptible to ecological disturbances than agroforestry plantations or diversified farming systems (Lugo, 1997; Kremen, 2015). Conventional agricultural intensification tends to disrupt beneficial functions of biodiversity such as pest control and nutrient cycling (Tscharntke et al., 2012). Levels of biodiversity in large-scale palm oil plantations is impoverished in comparison to natural forests (Koh and Wilcove, 2008; Turner and Foster, 2009; Edwards et al., 2010; Azhar et al., 2011; Gillespie et al., 2012; Gilroy et al., 2015). By contrast, levels of biodiversity in smallholdings is higher than large-scale palm oil plantation monocultures (Azhar et al., 2013, 2014a, 2014b), and smallholdings can contribute substantially to biodiversity conservation (Azhar et al., 2015a, 2015b; Teuscher et al., 2015).

Given that 40% of the world palm oil production is from smallholdings, certification could unlock the potential of smallholdings for environmentally sustainable palm oil production and enhanced food security (Tscharntke et al., 2012; Oilworld, 2015; SPOTT, 2017a,b). Policies promoting large-scale monoculture palm oil plantations should be reassessed because of land use conflicts and negative ecological impacts (Gerber, 2011). Palm oil production has become controversial at a global level because it causes serious environmental and social problems such as destruction of tropical forests, climate change, and threats to smallholder livelihoods (Oosterveer, 2015). In contrast, smallholder systems may provide the best strategy to reconcile palm oil production and biodiversity conservation.

Consumer markets for palm oil have unwittingly overlooked or undermined smallholding systems of palm oil production as important sources of sustainable palm oil in producing countries (Oosterveer et al., 2014; Brandi et al., 2015; Castellanos-Navarrete and Jansen, 2016). The analysis of the biodiversity impact of this form of large-scale monoculture system has been deficient, and there has been insufficient investigation of the potential for sustainable palm oil from smallholders. We discuss how to meet the growing demand for palm oil without destroying large tracts of native forest and causing biodiversity loss in producing countries. This paper guides industry and conservation stakeholders, of both consumer and producer countries, through each of the problems