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Oil palm expansion in Cameroon: Insights into sustainability opportunities and challenges in Africa

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ABSTRACT

Oil palm production expanded 1.2 million hectares in sub-Saharan Africa since 1990, with expansion accelerating in several heavily forested countries since 2000. Despite a narrative of expansion driven by multinational corporations, we provide evidence of a dynamic non-industrial oil palm production sector linked to a burgeoning informal milling enterprise. Surveys were conducted with oil palm farmers in Cameroon (n = 546), the third largest palm oil producer on the continent with the greatest amount of deforestation due to recent expansion, to determine who is expanding into forest. Seventy-three percent of survey respondents reported clearing forest, the magnitude of which was explained by differences in milling strategies and supply chain integration. Large-scale, non-industrial producers played a disproportionate role in deforestation, many of which were engaged in informal supply chains through the use of non-industrial mills. Farms associated with more clearing tended to use high-yielding seedlings. Even the highest yielding farms, however, averaged only 7.7 tons fresh fruit bunches (FFBs) ha^{-1} yr^{-1}, well below the potential 20 tons FFBs ha^{-1} yr^{-1} yield for Cameroon. We also found a strong relationship between deforestation and land claims. Most farms claimed ownership of their land, although only 5% had official land titles. Conservation challenges in the region arise from land tenure laws that incentivize forest clearing. This study sheds light on the role of informal supply chains in deforestation and highlights the need for strict implementation and enforcement of land use zoning policies.

1. Introduction

1.1. Oil palm expansion in Africa

Oil palm expansion has come under intense scrutiny in recent years owing to its role in tropical deforestation (Carlson et al., 2012; Henders et al., 2015; Gaveau et al., 2016). Although concentrated in Southeast Asia, oil palm production expanded by 1.2 million hectares (ha) in sub-Saharan Africa between 1990 and 2017, with expansion accelerating in several heavily forested countries since 2000 (FAO, 2016; Ordway et al., 2017). Large tracts of unconverted land, an abundance of rural labor and growing domestic demands for palm oil signal potential production growth in the region (Feintrenie, 2014; Rival and Levang, 2014; Byerlee et al., 2017). Despite observed increases in production and demand, it remains unclear which actors are engaged in oil palm expansion in Africa. A recent spotlight on the role of multinational corporations in oil palm expansion globally has led to a narrative emphasizing their role in oil palm expansion in Africa (e.g., Greenpeace International, 2012; Sayer et al., 2012; Carrasco et al., 2014). Yet evidence from existing oil palm production systems in Africa and an expanding medium-scale producer class suggest this narrative is an oversimplification (Rival and Levang, 2014; Nkongho et al., 2014a; Jayne et al., 2014). This paper presents a case-study analysis of oil palm expansion in Cameroon, with two goals: 1) to identify which actors are engaged in non-industrial oil palm cultivation (i.e., small- and medium-scale plantations less than 1000 ha); and 2) to determine what type of farms are expanding at the expense of forest.

An estimated 1.37 billion ha of remaining land suitable for oil palm cultivation is concentrated in 12 tropical countries, with over half already allocated to other uses including protected areas (Pirker et al., 2016). The largest area of suitable land in Africa is located in the Congo Basin. Agricultural production increases across sub-Saharan Africa have primarily been characterized by area expansion rather than yield improvements (Fisher, 2010; Deininger and Byerlee, 2011). This is also

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true of oil palm cultivation (Byerlee et al., 2017). Ten palm oil producing countries in Africa, including Cameroon, are engaged in the Africa Palm Oil Initiative (APOI) under the Tropical Forest Alliance 2020. In response to ambitious palm oil development plans in these countries, the APOI aims to guide the design and implementation of a set of regional principles that will reduce deforestation, encourage smallholder production, and improve livelihoods while promoting socio-economic growth (TFA, 2017). As a result, national principles and action plans are actively being developed in several countries. These efforts highlight the importance of policy in guiding the sector's potential role in both economic development and environmental impacts.

Most policies addressing oil palm expansion to date have targeted industrial-scale practices through supply-chain governance. These include the Roundtable on Sustainable Palm Oil (RSPO) and zero-deforestation corporate commitments. Incorporating non-industrial producers in these agreements and agendas has proven difficult, particularly in developing countries with large areas of remaining forest where economic benefits from resource extraction and extensive land use present direct tradeoffs with forest conservation (Vermeulen and Goad, 2006; Brown and Zarin, 2013). Thus, it is unlikely these approaches will be entirely transferable to sub-Saharan Africa where non-industrial oil palm producers, loosely defined as smallholders, manage far greater total land area than industrial producers. In business operations management, value chain analysis focuses on identifying operations that add utility, value or competitive advantage. Kaplinsky and Morris (2001) emphasize the need to understand all links in the chain, and all activities in each link, to formulate appropriate policies without undermining particularly threatened parties, for example poor, informal operators. A limited understanding of what characterizes "smallholder" oil palm producers and their interaction with industrial-scale production in Africa inhibits the development of appropriate policy.

Industrial-scale oil palm plantations in Africa are comprised of public and private enterprises greater than 1000 ha (Cotula et al., 2009). In contrast, a wide range of definitions exist for smallholders, or non-industrial producers. The RSPO defines a smallholder oil palm farmer as one who relies on family members for labor and cultivates less than 50 ha (RSPO, 2017). Additionally, agriculture is considered to be the main source of income for these farmers. Yet differences in socioeconomic vulnerability, supply chain integration and land use decision-making between a producer cultivating 1 and 50 ha of oil palm can be vast. This heterogeneity among actors engaged in non-industrial oil palm production and its influence on expansion is poorly documented in the literature.

Sub-Saharan African "smallholder" farms are often characterized by their small size, low yields, and limited commercialization (Collier and Dercon, 2014). Differences in access to information, materials, and markets, however, can lead to a variety of production strategies that in turn influence land use decisions and development outcomes (Woodhouse, 2010; Rist et al., 2010). Farm structure provides a concept for characterizing these differences. Farm structure is defined as the arrangement of agricultural holdings including the number and size of farms, ownership and control of resources, the managerial, technological and capital requirements, and the market and institutional arrangements under which a farmer buys and sells (Ruthenberg, 1971; Tweeten, 1984; Knutson et al., 1995; Stanton, 1991).

Recent trends in agricultural investment and expansion across Africa indicate fundamental changes in farm structure that likely influence the oil palm sector. Jayne et al. (2014) provide evidence of more rapid growth in medium-scale agricultural systems compared to small- and large-scale production, where medium-scale refers to 5–100 ha farms. These authors also highlight that increasing agricultural investment by wealthy African nationals is outpacing both foreign and smaller scale land acquisition. Although this type of investment is not new, several studies suggest that rural land capture by national elites and a growing urban middle class is on the rise (Cotula et al., 2009; German et al., 2013; Sitko and Jayne, 2014). At the same time a new generation of African entrepreneurs is emerging, linked to a network of national and pan-African organizations (McDade and Spring, 2005).

1.2. Focus of the study

This study seeks to discern the diverse actors involved in non-industrial oil palm production in sub-Saharan Africa, and identify whether those differences influence the likelihood of deforestation due to oil palm expansion. It does so through a case-study analysis of Cameroon − the third highest palm oil producing country in Africa, with significant remaining forest cover.

Based on field surveys and key informant interviews in 2014 and 2015, three themes emerged which we explore in this study. First, the development of oil palm production in Africa presents a major sustainability challenge, particularly in regions with high forest cover. With the exception of Gabon, all countries engaged in the APOI rank in the bottom 25th percentile on human development indicators (UNDP, 2017). Countries at this level of economic development rely heavily on resource extraction and land for agricultural expansion. Even where environmental sustainability is a strategic goal, it is a lower ranking priority than poverty alleviation and economic growth. Secondly, a dynamic non-industrial palm oil supply chain, intricately linked to diverse milling techniques, sets Africa apart from the export-oriented formal markets associated with oil palm cultivation in Southeast Asia. Thirdly, land tenure complexities underpin many dimensions of land use decision-making.

Following an overview of palm oil production and the policy landscape in Cameroon, we describe the data and methods used in this study. To identify who is engaged in oil palm cultivation, we first examine farm structure variations. In doing so, we describe the relationship between the palm oil supply chain and different milling strategies. Next, we explore how differences in farm structure are associated with deforestation. We conclude by discussing sustainability challenges and opportunities associated with oil palm expansion relevant to both Cameroon and other producing regions of Africa.

1.3. The case of Cameroon

Originally from West and Central Africa, oil palm cultivation in sub-Saharan Africa takes place at a variety of scales, from wild harvesting to "smallholder", non-industrial farms to industrial plantations. Given recent growth in its oil palm sector, Cameroon provides a useful location to explore questions related to expansion and farm structure. Oil palm was first planted commercially in Cameroon in 1907 in some of the earliest oil palm plantations in Africa (Hoyle and Levang, 2012). Six agro-industrial companies (hereafter referred to as industrial producers) currently operate in Cameroon and produce over half of the country's palm oil. The five top-producing companies—three privately held and two publicly owned—have all been present in Cameroon for over four decades, prior to the global surge in oil palm expansion.

In the 1970s, 90% of oil palm land area was managed by agro-industries, with non-industrial producers accounting for only 10% (Nkongho, 2015). As of 2012, the area cultivated by non-industrial producers constituted approximately 70% of oil palm land area, having increased by 570% since the 1970s (Hoyle and Levang, 2012). An estimated 17% of expansion in Cameroon between 1989 and 2013 came from forest conversion, more than any other top producing country in Africa (Vijay et al., 2016). Similar to many other West and Central African countries, customary and statutory land tenure systems in Cameroon create a complex legal pluralism under which land users operate (Oyono, 2009). As a result of Cameroon's Land Ordinance Laws passed in 1974, the state administers national lands belonging to Cameroonian citizens, and claims ownership of unregistered, un-titled public lands (Assembe-Mvondo et al., 2014). Any lands occupied or used after 1974 require demonstration of use in the form of a draft