



# Land markets, Property rights, and Deforestation: Insights from Indonesia

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**Summary.** — We examine the emergence of land markets and their effects on forest land appropriation by farm households in Jambi Province, Sumatra, using micro-level data covering land use and land transactions for a period of more than 20 years (1992–2015). Based on a theoretical model of land acquisition by a heterogeneous farming population, different hypotheses are developed and empirically tested. Farm households involved in forest land appropriation differ from those involved in land market purchases in terms of migration status and other socioeconomic characteristics. In principle, these differences provide opportunities for market-induced deforestation. However, the appropriated forest land is not extensively traded, which we attribute to the lack of *de jure* property right protection and the resulting undervaluation in the market. While the *de facto* property right protection under customary law provides sufficient security within the village community, the sense of external tenure security is low when the land cannot be formally titled. Clearing forests for trading in the land market is, therefore, financially less lucrative for farm households than engaging in own cultivation of plantation crops, such as oil palm and rubber. We conclude that land markets did not have significant effects on deforestation. On the other hand, the emergence of land markets alone has also not been able to deter forest appropriation by local farm households.

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## 1. INTRODUCTION

Population and income growth tend to increase the demand for agricultural land (Hertel, Ramankutty, & Baldos, 2014; Platteau, 1996). In the absence of robust institutions, the resulting land scarcity instigates conversion of forest land, especially in the global South (Bhattarai & Hammig, 2001). Agriculture is one of the most important drivers of deforestation worldwide, becoming a major environmental concern and the target of global policy initiatives (Gibbs *et al.*, 2010; Kissinger, Herold, & De Sy, 2012; Phelps, Carrasco, Webb, Koh, & Pascual, 2013; Püzl & Rametsteiner, 2002).

While deforestation in developing countries is primarily driven by rising demand for agricultural and forestry products (World Bank, 2007), micro-level determinants and institutional factors, such as the role of land markets, remain under-examined. Farm households in developing countries access land through different pathways, including inheritance and inter-vivo transfers, community membership, appropriation of forest land, market transactions, and occasionally coercive or non-coercive state interventions (de Janvry & Sadoulet, 2001). Increasing land scarcity could potentially lead to a shift from common property to individual property rights regimes with land market transactions becoming more prominent for households to acquire cultivable land (Fitzpatrick, 2006; Platteau, 1996). While some argue that markets could be an efficient mechanism to allocate land to its most productive use (Wallace & Williamson, 2006; Zimmerman & Carter, 1999), others contend that institutional constraints could suppress economically and socially desirable outcomes (Deininger & Jin, 2008; Deininger, Jin, & Nagarajan, 2009; Holden, Otsuka, & Place, 2009).

There exists a large body of literature analyzing the conceptual relationship between land market development and forest conservation (e.g., Barbier, 2001; Bhattarai & Hammig, 2001; Geist & Lambin, 2002). There are also several studies that investigated farm households' participation in land markets in developing countries (e.g., Deininger & Jin, 2008; Deininger, Zegarra, & Lavadenz, 2003; Deininger *et al.*, 2009). However, surprisingly little empirical evidence exists about the effect of land market development on deforestation. This effect is not straightforward to predict, because the emergence of land markets often coincides with the emergence of private property rights, and the effect of private property rights on deforestation itself is not unambiguous (Alston, Libecap, & Schneider, 1996; Araujo, Bonjean, Combes, Motel, & Reis, 2009; Godoy, Kirby, & Wilkie, 2001; Liscow, 2013; Place & Otsuka, 2001). Stronger property rights and tenure security could prompt landholders to discount the future less, thus being more likely to realize long-term benefits of forests as opposed to short-term benefits from land conversion. However, stronger property rights could also increase incentives to invest in productive activities such as cash crops (Fenske, 2011; Grimm & Klasen, 2015; Lawry *et al.*, 2016). A

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recent meta-analysis indicated a negative association between land tenure security and the rate of deforestation (Robinson, Holland, & Naughton-Treves, 2014). But the role of land markets was not explicitly considered. Similarly, while many micro-level empirical studies have attempted to examine the drivers of land-use change across the globe (Meyfroidt, Lambin, Erb, & Hertel, 2013), the potential of land markets — an emerging pathway of importance for farm households to access cultivable land in forest fringes — has not been addressed. We address this research gap by examining different land acquisition options for farm households in Indonesia, and the institutional factors that incentivize selection of market participation as opposed to direct appropriation of forest land.

Indonesia, like many other tropical countries, has experienced a rapid depletion of forest resources in favor of a fast expanding export-oriented agrarian sector (MoF, 2009; Barraclough, 2013; FAO, 2010; Margono *et al.*, 2012). A major share of deforestation is caused by large plantation and mining companies. During 2000–10, companies were responsible for an estimated 88% of the total area deforested in the country, while land conversion by farm households only accounted for 11% (Lee *et al.*, 2014). Nevertheless, the decentralized activities by farm households are much more difficult to monitor and regulate and hence become a critical challenge for forest conservation (Indrarto *et al.*, 2012). Land markets in Indonesia are largely informal, with land transactions often lacking proper documentation and registration. This makes it difficult to generate data on land transactions at meso- and macro-levels.

Here, we use micro-level survey data to examine the links between the emergence of land markets and forest land appropriation, the two major pathways of land acquisition for farm households in Indonesia. We examine determinants of land acquisition through markets *versus* forest land appropriation and possible connections between these two pathways. We also analyze the role of land property rights. We use the term “forest land appropriation” in a broad sense, referring to state-owned forest as well as forest owned by village communities under customary law. Furthermore, we use the term “deforestation” to refer to the act of clearing forest land regardless of land ownership. The term “land market transaction” is used here for any voluntary purchase or sale of land in exchange for money. Land rental agreements are not included, because tenants usually do not make longer-term land-use decisions, such as clearing forest or establishing plantation crops. Most land market transactions involve signing a civil agreement of ownership transfer with village officials as key witnesses; this can occur with or without formal land titles, as is explained in more detail below.

The data for this research were collected in Jambi Province, Sumatra, and include details on land-use changes and land market transactions by local households over a period of more than 20 years (1992–2015). Jambi Province provides a typical example for the deforestation process in Indonesia, as the local land use has undergone significant changes during the last few decades, including the conversion of primary forests to rubber agroforests, and later to intensive rubber and oil palm plantations (Wilcove, Giam, Edwards, Fisher, & Koh, 2013). About 43% of the 2.7 million hectares of primary forest standing in 1990 were lost in the province by 2010 (Margono *et al.*, 2012). While different private and public companies are producing palm oil in Jambi on large landholdings, farm households still dominate much of the rubber sector and are also involved in oil palm cultivation to a significant extent (Euler, Schwarze, Siregar, & Qaim, 2016; Gatto, Wollni, & Qaim, 2015).

The next section provides background information about Indonesia’s evolving land governance system and Sumatra’s socio-demographic heterogeneity. The conceptual framework is presented in Section 3, leading to concrete hypotheses that are tested empirically in subsequent sections. Data sources and empirical methods are described in Sections 4 and 5. Empirical results are presented and discussed in Section 6, whereas Section 7 concludes.

## 2. LAND GOVERNANCE IN INDONESIA

### (a) *Evolution of land governance since the 1960s*

During the Dutch colonial rule and the early independence era, land governance in Indonesia was based on indigenous customary tenure (*adat*), which varied between different regions of the country (Szczepanski, 2002). One of the most important land governance legislations during the post-independence era was the Basic Agrarian Law (BAL), which was enacted in 1960 and later complemented by a number of other laws, regulations, and decrees (Susanti & Budidarsono, 2014). While the BAL was primarily aimed at unifying the different land laws into a single system, it conditionally recognized customary rights of rural communities. A significant shift in land governance occurred under the “New Order Regime” (1967–98). Specifically, legislations enabling forestry and mining leases were enacted, including the Forestry Law of 1967, which set the framework for forest management for the following three decades. The Forestry Law entailed a disenfranchising of the rural population from forest resources, and *adat* institutions were overlooked (Haverfield, 1999). Around 70% of the country’s territory was delegated as state forest land (*kawasan hutan*) under the jurisdiction of the Ministry of Forestry (Indrarto *et al.*, 2012; Susanti & Budidarsono, 2014). *Kawasan hutan* also included many unregistered plots that were already used by local people for agricultural cultivation when the Forestry Law was enacted. The government also did not recognize land rights of farm households over forest plots that were illegally converted after 1967. However, even without formal recognition, local farm households continued to clear forest land for crop production, claiming *de facto* ownership rights (Johnson & Nelson, 2004; Peluso, 2005). There exists a strong conviction by farm households that such *de facto* tenure is secure within the village community (Resosudarmo *et al.*, 2013).

Market transactions of land hardly occurred in many parts of rural Indonesia till the 1980s, partly due to the fact that only a small share of the total land was formally titled. In 1981, the Indonesian government introduced the National Agrarian Operation Project (PRONA), a program to reduce transaction costs involved in land titling. However, by the end of the 20th century only less than 20% of all registrable plots (about 10% in rural areas) had actually been titled (Fitzpatrick, 1997; Slaats, Rajagukguk, Elmiyah, & Safik, 2009). From the early-1990s, the government intensified its efforts to develop a reliable land titling system over non-forest land. PRONA was largely replaced by the Land Administration Project (LAP), financially supported by the World Bank and the Australian Government. The objective of LAP is to title all agrarian land in Indonesia by 2020 (Thorburn, 2004).

At present, two ways of obtaining formal titles are possible for agrarian land: (i) *systematic* titling, where usually a large number of contiguous plots across different users can be registered at a subsidized rate, and (ii) *sporadic* titling, where a

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