

Division of the Commons and Access to Land on The Frontier : Lessons from The Colonial Legacy in The Democratic Republic of Congo.

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Abstract

What is the importance of colonial policies in shaping today's land tenure institutions and inequalities in access to land ? This paper sheds light on this question by analyzing "paysannat", a colonial intervention in the Belgian Congo attempting to push the evolution of the tenure system from communal toward private property rights. In the context of forced cultivation of cash crops, the Colony imposed the privatization of collectively owned land (forests or fallows) to individual farmers in some villages. Using spatial discontinuities of the implementation of paysannat and a unique combination of contemporary household survey data, geographic data, as well as historic data from both colonial records and contemporary oral history surveys, this paper shows that paysannat had a persistent impact on local land institutions through its impact on the privatization of collective land. We find that paysannat was successful in pushing toward the individualization of the commons, and that it had important distribution consequences between the clanic groups.

Key words: colonization, agricultural policies, economic history, land rights, commons, Democratic Republic of Congo

JEL classification: N37, O12, P14, P16

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"One of the objectives of African history, once it freed itself from an over dependence on sources in colonial archives, was to look at African history from an African viewpoint with sources rooted in Africa."

Merrick Psnansky, Inaugural address, University of Ghana 1969

1 Introduction

There is now clear evidence that History matters for economic development, and a growing interest in understanding why and through which channels historical events can have such a long term influence (Nunn, 2009; Banerjee and Duflo, 2014). In particular, a growing body of work investigate empirically the impact of colonialism on former colonies' development. The objective of this literature is to unveil historical dependencies and understand the importance of institutions set up during colonization in explaining today's development outcomes. Tackling this issue raises several difficulties: it is often difficult to uncover the full development trajectory since colonization, to identify causal impacts, and understanding the mechanisms that link colonial interventions to today's outcomes can be challenging.

In seminal papers, Acemoglu et al. (2002, 2000); La Porta et al. (1997); Engerman and Sokoloff (1994) provided the first empirical evidence that the colonial rule can have a lasting impact on colonized countries. The main channel they supported was the persistence of initial institutions: changes in institutions that were introduced by the colonizers persisted even after those countries became independent. While La Porta et al. (1997); Engerman and Sokoloff (1994) focused on the importance of the identity of the colonizer, while Acemoglu et al. (2000, 2002) focused on the characteristics of the colonized countries. He was the first to provide a strong identification strategy: he instruments current domestic institutions by settlers mortality, and indentifies the impact of institutions on income, relying on the assumption that settlers mortality affects today's income only through its impact on institutions. These first papers paved the way for other studies at the macro and country levels.

More recently, a few empirical studies have focused on limited geographic areas and a particular colonial rule to investigate the influence of colonization on today's outcomes (Banerjee and Iyer, 2005; Iyer, 2010; Dell, 2008; Huillery, 2009, 2011). The advantage of this seemingly narrow focus have been underlined by Cogneau and Dupraz (2015): when comparing more homogenous areas it is easier to understand precisely what differed between them and identify the exact channels through which colonial rules shaped long term development. Those studies provide detailed information about the trajectory of the region of interest and strong empirical evidence. For example, Banerjee and Iyer (2005) examine differences in revenue collection across districts in colonial India: in some district, revenues were collected directly from the farmers while in others the collection was performed by local landlords. They find

that landlords districts have lower levels of health, education, and agricultural technology than their non-landlord counterpart and use the date of conquest as an instrument for the type of revenue collection that was experienced to argue that the impact is causal. [Dell \(2008\)](#) uses a regression discontinuity strategy to identify the long term impacts of the forced labour mining system "mita" in Peru. She finds that mita districts have lower levels of consumption, and argues that the transmission channel is that wealth was more concentrated in mita districts which led to lower levels of provision of public goods (education and roads). [Huillery \(2009\)](#) shows that colonial public investments are an important determinant of current regional inequalities in West-Africa, because of the persistence of early colonial investments. To identify the effect of colonial public investments on current outcomes, she takes advantage of spatial discontinuities of colonial investments.

The motivation of this paper is to examine the importance of colonial history in explaining today's land institutions and inequalities in access to land between households of different clanic groups, and shed some light on the consequences of the privatization of customary land. Access to land is critical in Africa where a large share of the population depends on agriculture for its subsistence, and is regulated by a complicated combination of customary institutions and legal arrangements. The evolution of customary land institutions and the effects of the privatization of the commons have been the subject of a vast literature ([Boserup, 1983](#); [Baland and Platteau, 1996, 1998](#); [Ostrom, 2014](#); [Goldstein et al., 2015](#); [Goldstein and Udry, 2008](#); [Weitzman, 1974](#)). However, few studies focus on the possible distributional effects of such privatization ([Baland et al., 2009](#)). Following ([Banerjee and Iyer, 2005](#); [Dell, 2008](#); [Huillery, 2009, 2011](#)), we focus on a specific colonial rule in a specific region. The policy of interest was implemented by the Belgian Colony during the second quarter of the 20th century, and led to the privatization of parts of the common land. We examine the effects of this policy in the Equateur Province in the North West of the Democratic Republic of Congo. Paysannat aimed to target most villages in the region, but was only implemented in a subset of them. These geographical variations in colonial interventions help us understand differences in access to land and the agrarian structure today, and we explore how these differences also lead to different development outcomes. To study this question, this paper uses a first-hand household-level data set and a detailed village survey of oral history and current and past land institutions that we collected between 2013 and 2015. We complemented and confirmed the oral history data by collecting colonial history record data from the Ministry of Foreign Affairs in Brussels. The advantage of this approach is that it allows us to identify precisely the effect of this rule and examine the channels in detail.

In 1885 King Leopold was granted control of most of the Congo Basin and created the Congo Free State. Its large territory was then still largely unexplored, so his priorities were to take control of the vast territory and to generate financial resources to fund this expensive undertaking ([Piet, 2013](#)). The land legislation was designed to serve these two objectives: the first

decree published in 1885 declared most of the Congolese land to be "vacant" and hence to belong to the King, and a heavy taxation in kind was imposed to collect ivory, wild rubber, and copal. The ill-treatment of indigenous people soon triggered international protests, and together with the state's financial difficulties led Belgium to annex the country as a colony in 1908. The Parliament attempted to reform the land legislation but its grounding principles remained unchanged: throughout the period, the primary objective of the land legislation remained to allow the appropriation of the "vacant" land and the exploitation of its resources for the benefit of the colonial administration, missions, and European companies. By granting huge land concessions and helping with the recruitment of local labor, the state supported the development of mining industries as well as large scale agricultural production by commercial companies. The agricultural policy focused on the forced cultivation of cash crops (such as cotton, cocoa, rice or palm oil) by smallholder farmers in their villages. Commercial companies were granted large monopolies over entire regions, and farmers were forced to cultivate cash crops and to sell their production to the monopolist at state-fixed prices under the "compulsory cultivation scheme". This coercive system led to an increase in exportation but failed to improve living standards and the declining soil fertility soon became a pressing issue in rural areas. In the 1930's, a new agricultural policy called "Paysannat" was proposed and tested to increase indigenous production and improve living standards. The idea was to modernize production and support the emergence of a class of small entrepreneurs by distributing communal land to individual farmers and promoting the "rationalization" of cultivation practices. Crops, rotations, and the duration of fallows were defined by a state agronomist to maximize production. Cotton companies, who were at the origin of its inception, pushed for the development of the scheme, in which they saw a way to increase production and motivate farmers. In 1949, the colony decided to expand the scheme to 500.000 farmers and their families in several regions as part of the Ten Year Plan. However, colonial administrators faced severe operational and logistical difficulties during prospection and implementation: transportation was difficult, customary land rights were poorly understood, village chiefs were uncooperative, and the administrators lacked the human and financial resources to expand the scheme at this pace. The land surveys, which were theoretically mandatory to conduct, were often conducted in a hurry. After 5 years, the colony realized that many issues had to be solved and decided to slow down the expansion of the scheme. By 1960 they had involved less than half of the number of villages they had initially planned to reach. Some villages therefore continued to cultivate cash crops under the traditional "compulsory cultivation scheme" (that was now called the "education scheme"), while others participated in Paysannat where they also cultivated cash crops.

My strategy is to use the spatial distribution of Paysannat to study its influence on subsequent development trajectories. We compare villages who grew cash crops along the roads and were imposed land distributions related to paysannat to village who grew cash crops

to study how it influenced the evolution and distribution of property rights in the villages. The main empirical challenge is therefore that of selection: did colonial administrators chose to implement Paysannat in some villages and not in others because they had systematically different characteristics? In particular, since we are are intersted in the effects of privatization, were paysannat villages chosen for being already more privatized, closer to commercial areas, and experienced more pressure on the land ? There is no evidence that this was the case. In fact, the paysannat villages should have been chosen for opposite reasons: the instructions given to territorial administrators were to chose villages where collective land was still available in sufficient quantity to be divided among all the households in the village, and preference was to set it up in villages were the common forest was large enough so that one block could be identified to carry out the division. If anything, that meant chosing villages were less privatization had already ocured and where clanic claims on the land were not too strong. In practice, since territorial administrators were constrained to set up paysannat in some specific administrative Secteurs, they were often unable to find villages that matched these ideal criteria, but nevertheless chose villages were land pressure was reasonably low. Using geographic and survey data, we also show the location of paysannat villages is not correlated with geographic characteristics such as accessibility or distance to commercial urban centers during colonization. Appart from selection, another important question is whether the fact that a village had been involved in Paysannat led to different development policies after Independence and different patterns of investments. We will show that there is not evidence that this was the case.

First, we run a simple OLS comparing village level outcomes in villages which grew cash crops (in this region, mainly cotton and rice) and experienced a land distribution during colonization to villages who, because of historical reasons and the slow down in the expansion of the policy didn't take part in land distribution. Those regressions include a fixed effect at the administrative Secteur level to account for differences in geographic and colonial administrator's and indigenous chiefs characteristics, as well as geographic controls. We show that paysannat villages have less "commons", or collective forest, so in that sense paysannat succeeded in pushing toward more privatization. At the same time, it also seems to be more difficult for migrants from the village to come back and get access to land. Older generations of strangers in the village seem less integrated in the local institutions. Second, we examine the distributional consequences of this privatization of the commons by the Belgian Colony. We establish that there are strong inequalities in access to land between the different clanic groups within a village, and we give evidence that part of these differences can be explained by the presence of Paysannat. To test the robustness of our results and to control for possible endogeneity in the choice of the villages for the agricultural policy, we then follow a nearest neighbor's approach: we construct pairs of villages which are geographical neighbors across administrative borders of a territory, but which happened to have different agricultural

policies (with or without a policy to push toward the individualization of land rights).

The remainder of the paper proceeds as follows. Section 2 presents background on the history of the land tenure system and agricultural policies in Congo since the beginning of colonization. Section 3 describes our experimental strategy and data. Section 5.1 presents the results and explores some explanations and section 6 concludes.

2 Historical Background

The process by which the Congo became a Belgian colony was long. King Leopold was eager to participate in the colonial scramble for Africa, and spent decades sponsoring expeditions in the central African region through his International African Association. He convinced the European community that he was involved in philanthropic and humanitarian work, and promised them that he would not tax trade. The colonization of the country began just after the Berlin Conference in 1885, when he was granted control of most of the Congo Basin and created the Congo Free State. Its large territory was then still largely unexplored. His priority was to take control of the vast territory, and to generate financial resources. The land legislation was designed to serve these two objectives. Soon, most of the Congolese land was declared to belong to the king, and a heavy taxation in kind was imposed (Boelaert, 1956). When the Belgian Parliament took over the country in 1908, they reformed the land legislation but its grounding principles remained unchanged (Piet, 2013; WorldBank/UN-Habitat, 2016; Mugangu Mataboro, 2016). Throughout the period, the primary objective of the land legislation remained to allow the appropriation of the "vacant" land and the exploitation of its resources for the benefit of the colonial administration, missions, and European companies. Much of the present land law is still either a legacy from or a reaction to the land law system established by the Belgians (Piet, 2013; WorldBank/UN-Habitat, 2016; Mugangu Mataboro, 2016). The agricultural policy, on the other hand, focused on the forced cultivation of cash crops with limited success. In the 1940's, a new agricultural policy was tested to encourage the evolution of customary land right to private property rights and encourage the emergence of a class of small entrepreneurs, with limited success but lasting consequences.

2.1 Pre-colonial institutions, land tenure and agriculture

Before exploration and colonization began in the region, several ethnic groups speaking Bantu languages had been living in the Congo Basin forests for four millenia. They formed complex societies that shared common traditions and food systems, as well as social and political institutions. They had already experienced the rise and fall of several chiefdoms and forms of power, as well as the arrival of the Atlantic trade near the Congo river, as described by

Vansina (1990). Customary land rights were complex, variable, and poorly understood by the colonizer (Piet, 2013).

Political institutions in the region were very decentralized and best characterized by a tension between the desire for local autonomy and the need for security. Three groups are critical to understand their social and political organization: the clan, the village, and the district. The clan ¹ was a large household establishment organized around an actual or perceived common ancestor. Several clans lived together in a settlement called a village in which the founding clan had a prominent role. Villages often bore the name of the supposedly ancestral founder of the elder clan in the village. A district was a network of allied neighboring villages, which retained autonomy but occupied of precise position in a hierarchy, from the elder village to the newest. They came together mainly when they were attacked from outside, and conflicts within districts were settled through mediation by the leader of the elder village. Sometimes, fractions of a clan could split up to form a new settlement in new lands in response to impoverishment of soils and games or to social events such as attempts to enforce autocracy. The movement of men between clans and villages was also relatively flexible. Population densities were low and allowed creation of a relatively stable equilibrium, punctuated by wars and the expansion of some ethnic groups.

On the eve of the colonial conquest, districts, villages and clans formed a complex and structured network of communication and exchange in the Congo Basin. Farming had been well established, and surplus was traded along the many rivers. The agricultural process was similar among the different ethnic groups ²: farmers practiced shifting cultivation and used slash and burn techniques with a strong gender division of tasks. Typically, men took charge of the clearing of forest or savanna and of the burning of the remains, while women took over for planting, cutting weeds, and harvesting. This gender division of labor allowed men to devote time to fishing and hunting that brought diversity to the diet. When soil fertility started to decline, farmers moved to a new plot of land. When fertility started to decline in the village or fields became too far from the village dwellings, the clan or village could move further. Many villages were semi-nomadic and moved at irregular intervals to occupy new land or reoccupy land they had left fallow for decades. The indigenous land tenure institutions were therefore very flexible. Land rights were not static and incorporated the fact that agriculture was complemented in large parts by fishing, hunting, and gathering (Salacuse, 1985; Piet, 2015). The land belonged to the lineage groups (or clans) through their ancestors. Its allocation was under the authority of a "land chief", while the members of the clan who cultivated it had usufruct rights to the land. Population density was still low and allowed cultivators to leave the land fallow for very long periods of time. Colonization violently disrupted this pattern.

¹"Etuka" in local languages, also referred to as "House" in Vansina's terminology.

²Except for some ethnic groups which specialized rather in fishing or hunting and gathering such as the pygmies

2.2 Predatory System under King Leopold

In 1885 the Berlin Conference created the Congo free state, a property of Leopold II King of the Belgian. The first decree he passed regulated land ownership ³: all "vacant" land was considered to be the property of the state in either its public or private domain, while land occupied by indigenous populations could continue to be governed by the customary system⁴. State land was withdrawn from customary law and governed by written legislation inspired from European legal concepts. A land registration system was created, and European enterprises, missions, or colonists could obtain grants or concessions in the private domain of the state. The land to be obtained was surveyed, delimited, and registered before a title was issued. This decree effectively meant the expropriation of the majority of the Congolese land (Piet, 2013). Even if the legislation formally recognized customary land rights, in practice the administration denied them and considered vacant all the land that was not currently formally occupied by settlements. It was based on an illusion: many scholars consider that no land was completely vacant at that point and that all of it was claimed by one indigenous group or another (Vinck, 2011; Salacuse, 1985). The land legislation provided both a way to attract investments, and a source of revenue to fund colonization, but land occupied by indigenous populations was not subject to registration and titling, putting them in a very weak position.

Between 1891 and 1893, the colonial administration promulgated two further decrees stating that the state had exclusive rights to the produce of the domanial lands that provided the legal basis for the exploitation of the resources. A heavy taxation in kind was imposed on the Congolese farmers to generate revenue: the population was forced to collect ever increasing quantities of ivory, and later wild rubber and copal. This forced farmers to spend a large share of their time away from their fields and often abandon them. It eventually led to the exhaustion of the wild rubber reserves and to international indignation. In 1905, an international commission led by British diplomat Roger Casement published a report that underlined the abuses and atrocities committed by the administration. The report pointed to the land legislation as one of the main causes of the abuses and as a threat to future development of the indigenous communities (EIC, 1905). Between 1885 and 1908, it is estimated that the area over which Leopold II made grants and concessions covered more than 27 million hectares, out of a total land area of 234 million hectares (Salacuse, 1985).

³Decree of July 1, 1885, Article 2: "No one has a right to occupy vacant land without legal title, nor to dispossess indigenous people from the land they occupy. All vacant land must be considered to belong to the state."

⁴Decree of September 7, 1886, Article 2: "lands occupied by the native population, under the authority of their chiefs, shall continue to be governed by local customs and usages"

2.3 Colonization, continuities, and forced cultivation

In 1908, following intense diplomatic pressure and financial difficulties, the Belgian Parliament took control of the Congo Free State and created the Belgian Congo. The new colony put an end to the rubber system, and attempted to reform the land legislation without changing its fundamental principles, and introduced forced cultivation.

After the annexation, many of the concessions were renegotiated, but new ones were also granted. New legislation aimed to define more precisely what land could be considered "vacant" and how local communities should be compensated.⁵ In 1935, a new decree defined the procedures to be followed by territorial administrators before ceding domanial land⁶: a survey investigating the vacancy of the land and the customary land claims had to be conducted, compensation were calculated based on that, and local chiefs had to be involved in the determination of the boundaries. It was long, but provided the concession holder with legal certainty. However, this proved very challenging in practice and local administrators lacked the time and resources to implement the decree. The demarcation of the land was not only difficult because of the lack of financial and human resources, but also made difficult by the transitory nature of many of the villages who were reported to disappear after having been demarcated. The presumption also remained that all the land was vacant unless local populations could provide convincing evidence that it was not. In practice, villagers had no bargaining power and all they could do was to hope to receive a small compensation. The administration relied on village chiefs (also called "capitas") to negotiate the terms of the arrangement. Those chiefs were often appointed by the state and replaced when not obedient, and they received the compensation directly when there was one. This policy had a broad impact in the region: thousands of hectares of land were given in concession, creating much resentment among local populations. While population was sparse and land seemed abundant, good arable land was not, and labor even less. After commercial concessions took possession of large swathes of land, they set up mining activities or plantations of cocoa, rubber, or palm tree. Those required labor resources that they tried to satisfy locally, and indigenous people were hired, often by force, for meager salaries. As of 1944, a total of twelve million hectares are thought to have be controlled by European companies or individuals.

The new colonial administration also expressed worries about the low agricultural production by the indigenous population. In 1917, they introduced the Compulsory Cultivation Scheme⁷ to promote indigenous production of cash crops and increase exports. The administration

⁵Several decrees passed in 1906 and 1909-1910 aimed to define more precisely the term "vacant" and to require investigations and compensations about the rights of the indigenous communities. A new definition of vacant was introduced "Land which the indigenous people cultivate or exploit in whichever way, in conformity with customs and local practices".

⁶Decree of May 31, 1935

⁷Decree of the 20 February 1917

decided which quantities of which cash crops should be produced in each village, and farmers were obliged to grow crops and sell their production to a monopolist. Although the Colonial Charter prohibited the use of forced labor, it was a coercive scheme, closely monitored by state agents. Although exports of agricultural products improved, the system proved very unpopular and the benefits for commercial companies were made at the expense of the local populations. Low production or disobedience were sanctioned by fines and imprisonment. The scheme increased the leverage chiefs had over their villages, and systematically undervalued the role of women in agricultural production. While it was theoretically limited to 60 days per year, in practice crops like cotton required many more days to be cultivated and it limited the time farmers could devote to hunting or fishing. It further tied farmers to their land and worsened the soil fertility issues associated with more sedentary villages and monocultures, and the rural exodus accelerated (Likaka, 1997). The scheme was widely criticized in particular by the International Labor Office, but even if it was renamed to be called "educational scheme", it continued with very little change until the independence of the country in 1960.

District administrators were responsible for the supervision of the scheme, but the operational tasks were led by the territorial agents. Since 1933, the Districts were the intermediate level between the colonial and provincial governments on the one hand and the territorial agents and indigenous chiefs on the other hand (De Clerck, 2006). The role of the District Commissioner was wide-ranging: he had important judiciary responsibilities (both as the judge of the district and because he was overseeing the indigenous tribunals), he played a key role in the attribution of Land Concessions to foreign companies and determining levels of taxation, and he had to oversee the work of territorial agents and in particular the creation of "chefferies" and "secteur" and the appointment of their chiefs. Since 1912, the territoire was the basic unit of the administrative division of the country, and the lowest administrative level led by a Belgian expatriate. He was in charge of maintaining public order, collecting the taxes, lead infrastructure investments etc. He was also entrusted with conducting surveys about indigenous organization in order to create the aforementioned "chefferies" or "secteur", a lower administrative level led by indigenous chiefs. Relationships between district and territorial administrators were not always easy, and the implementation of paysannat was no exception (De Clerck, 2006).

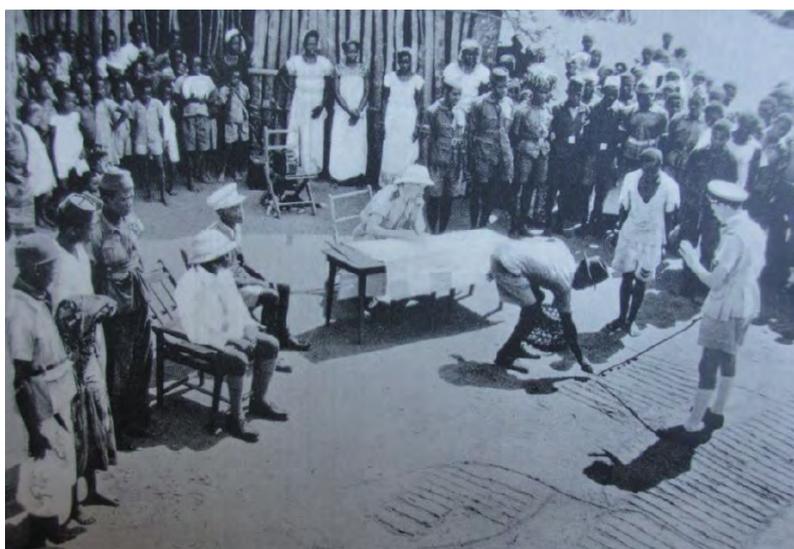
2.4 The introduction of Paysannat: a new approach to agricultural policies and land issues

Between 1940 and 1960 a new ambitious agricultural policy was developed and implemented, the "paysannat indigène" (hereafter paysannat). The starting point for this scheme was the recognition that the compulsory cultivation scheme as it was failed to improve the situation in the countryside and to stop the rural exodus. Agricultural productivity remained very low

and declining soil fertility had become a pressing concern (Likaka, 1997).

The core idea of Paysannat was to reorganize and modernize the indigenous agriculture based on a scientific approach. The objectives were twofold: first, the colony aimed to create a class of small farmers owning their land and selling their produce on the regional and national market. Second, they aimed to push the evolution of collective land tenure towards a system of private property rights. Families were grouped around a homogeneous block and were assigned plots on land that traditionally belonged to their clan. Rotation of crops and duration of fallows were determined by the state agronomists to ensure the preservation of the soil fertility. On their individual plots, they were asked to produce cash crops (cotton most of the time), sometimes perennial crops (hevea or palm trees), and food crops for their own consumption (cassava, maize, and groundnuts)(Piet, 2015). In practice, it meant the distribution of collective land to individuals.

Figure 1: Land allotments for Paysannat, from Piet (2015)



The hope was that customary land would become privatized over time, even if official documents avoided to mention it through fear of fueling the contentious land issue. In the propaganda, they instead insisted that the scheme would provide villagers with a way to protect their village land from being declared vacant and given into concession to a foreign company (Piet, 2015). This argument was meant to help convince them to voluntarily participate in the scheme. However, local populations lacked enthusiasm and perceived it as the continuation or at best an extension of the compulsory cultivation scheme. The territorial agents had to resort once more to coercion to expand it. ⁸

The scheme started at a very small scale as an experiment conducted by the National Institute

⁸This perception is very visible in the local names that were given to the scheme "kasangisa", meaning "being forced, coerced" in Katanga.

for Agronomic Research with one family in 1936. At the beginning of the 1940's, European Cotton Companies became very interested in the scheme as a way to improve soil fertility and proposed to help extend it in a combined effort with the colonial administration. Cotton companies saw it as a way to safeguard and increase production of cotton which farmers were forced to sell to them at fixed prices. In 1948, the systematic extension of the scheme became a key objective of the Ten Year Plan for social and economic development. It was decided that 500.000 farmers with their families would be allotted their own plots of land under the program between 1949 and 1959.⁹ The paysannat expanded quickly in Kasai, Orientale Province, and in Katanga and Equateur. By 1955, 150.000 families had already been assigned a plot under the scheme.

However, implementation turned out to be an extremely difficult task. District administrators were responsible for the implementation of the scheme, but the operational tasks were conducted by the territorial agents who led a small team of agronomists and assistants. They had to cover large areas in very difficult transport conditions to prospect suitable land, study the local customary rights in each village, and distribute the land within a short period of time.¹⁰ The prospection was meant to identify land suitable for agriculture (with a preference for forests), and the land survey was meant to establish to which villages and which clans the land belonged to. In practice, there were insufficient numbers of "political specialists" to conduct this delicate work, and their lack of diplomatic skills led to misunderstandings and sometimes conflicts with local chiefs. In many instances they tried to convince villages to give parts of their land to neighboring villages, to move the villages to areas with more untouched forest, and failed to recognize which clans owned the land. They were often very authoritative with local chiefs, despite instructions from district commissioners. We will provide more detailed information about the selection of the villages in section 3. In 1955, acknowledging there were many implementation issues, the administration decided to slow down the expansion in order to "learn from past experience and to adjust when necessary". In 1959, they had reached 210.000 farmers and their families: less than half of the objective, but a significant share of the population.

2.5 Post-independence trajectories

The Paysannat program was swept away immediately after Congo gained independence in 1960, after achieving only limited success despite the large resources devoted to it ([Salacuse, 1985](#)). Incentives to invest remained limited for small holder farmers since their access to mar-

⁹"Etude paysannats indigenes" , In African Archives Brussels, A21 (749) - Agriculture Indigene, 1934-55, dossier 7.0.c : Paysannats indigenes, 1954-56.

¹⁰"Compte-rendu de la reunion tenue le 5 mai 1952 Ã Itipo relative au Paysannat dans les territoires du District de l'Equateur", In AAB, GG 17051 - Equateur AGRI-AIMO, Paysannat Indigène, Programme Plan Décennal.

kets was constrained by state-fixed prices and monopolies. Despite localized success-stories, there was no evidence of increased living standards or significant increases in indigenous productivity. Aggregate production of cotton however had flourished and in 1960, the Democratic Republic of Congo was one of the largest cotton producers in Africa. But production fell dramatically after the Independence of the country, and the crisis of this sector worsened after the "Zairianisation" of the country launched by Mobutu Sese Seko in 1972 and the nationalization of foreign companies.¹¹

The land tenure system remained the same after Independence. Despite attempts to make a full inventory of the land under grants or concessions and to redetermine their status,¹² in practice few changes were made to the existing concessions and to the law, and the view that the land was plundered by foreign interests spread. Four types of land holdings were still recognized: land belonging to the states, concessions (for limited periods of time), individual registered land rights (for companies or individuals) and land governed by customary law ([WorldBank/UN-Habitat, 2016](#)). Under Mobutu, in a movement to end the privileges of foreign interests obtained during the colonial period, an amendment to the Constitution was voted in 1971¹³ and a new General Property Law was enacted in 1973¹⁴ that still prevails today. The general principle is that all the land belongs to the state, and that the land can only be given in concessions to companies or individuals who can not claim "ownership" of it, but only "rights of enjoyment". Concessions can be "perpetual" for nationals, or for limited periods of time for foreigners, and those rights have to be registered as previously. In practice, most of the existing contracts were transferred into the new system. While since the beginning of colonization it had not been clear who the customary land belonged to, the new law declared the land occupied by indigenous population to be part of the domanial land, over which communities hold "rights of enjoyment". Article 387 of the 1973 Law stipulated that such rights of enjoyment were to be regulated by an presidential ordinance, which still has not been enacted as of today ([WorldBank/UN-Habitat, 2016](#)). While the law did not change anything in practice, it cast doubt about the future status of this type of land which constitutes most of the country's land. Will it be turned into concessions ? Into collective or individual property rights? In the mean time, land chiefs remain crucial actors locally even

¹¹"Zairianisation" was a nationalist political process launched in 1973 by president Mobutu, by which, among other changes, agricultural businesses that belonged to foreigners were transferred to citizens of the DRC. In many cases, the new owners did not continue to farm the land they received and many plantations were abandoned.

¹²Ganjika Law, 1960: the state "retakes the full and free disposition of all land, forest and mining rights conceded or granted prior to June 30, 1960."

¹³Law No. 71-008 of December 31, 1971 amending the Constitution" The Zairian land (sol) and subsoil, as well as their natural products, shall belong to the State. The law shall fix the conditions for their assignment and concession, for their retaking and retrocession. However, the retaking or the retrocession in case of non-development (non mise en valeur) shall not give rise to the payment of any indemnity."

¹⁴Law no. 73-021 of July 20 "Law Providing for a General System of Property, Land and Immovable System, and Securities System" (Loi Portant Regime General des Biens, Regime Foncier et Immobilier, et Regime des Suretes.)

if they are not mentioned anywhere in the law.

After Independence, rural population densities increased and the perception of growing land pressure emerged, to which farmers reacted gradually by seeking security on their land holdings. Three types of tenure can now be distinguished in the villages: traditional customary rights, semi-formal land rights, and legal concessions ([WorldBank/UN-Habitat, 2016](#)).

First, as in many other countries in Sub Saharan Africa, traditional customary rights evolved dynamically toward more individualization and transferability of rights in response to increased land pressure and years of commercialization in agriculture introduced in colonial times ([Platteau, 1996](#)). Qualitative and quantitative data collected in the region evidenced that families or households now tend to have exclusive rights of use over parts of the land of their clan while part of it remains collectively owned by families, clans, or villages. Sales and lending of land have started to emerge although they are limited, and direct inheritance between fathers and sons is now widespread. Forest that has not been cultivated for a very long time (also called primary forest or "ngunda" in local languages) are partly divided between clans or families, but are still frequently common land regulated by the village or groupement chief. Families from the village usually have a right to open fields in this new land, and the clearing of the field often gives them the right to appropriate the land and sometimes pass it to their descendants. The collective belief is that all the landholdings of a family are fields that have once been opened and cultivated in the forest by their direct ancestors, which justifies their claim on it. The only other way to obtain new land in a village is to buy it from another farmer.

Second, an increasing number of farmers attempted to obtain some documentation to claim their rights on the fields they had obtained through customary practice or by buying it from local land chiefs in or outside their village: those documents do not have any legal basis, but they provide some security locally since they are usually signed by land chiefs and local administrators. However, the farmers who hold them would not have any legal protection and would lose their land if someone secured a concession on them.

Last, some small farmers managed to obtain legally registered titles for land outside their village where they set up small farms, but they still constitute a minority. Many commercial companies still own concessions over large areas in what used to be village land.

Coming back to land distributed for Paysannat during the last 10 years of colonization, it seems to have been often passed within the families who received them from one generation to the next. Today, villages where Paysannat was implemented in the Equateur Province still remember where the blocks of land were on which they cultivated cash crops. They remember which clan received parcels of land in this period, and the owners are often still the descendants of those who first received them. Some families even consider it as a "collective

family plots” and are reluctant to split it among themselves. Because those land distributions took place in a context of coercion and violence, they were often interpreted as mandatory as opposed to voluntary. Families therefore perceive that they have very strong rights on them, and they are now part of the collective oral memory.

3 Data and summary statistics

This paper uses a first-hand dataset collected between 2012 and 2015 in the Equateur Province as part of a randomized experiment conducted on a World Bank funded agricultural project called "PARRSA" (see appendix for more details). Using this data, we construct treatment and outcome variables at the village and household level for our analysis.

3.1 Data

3.1.1 Household level data

The data used in this paper is first hand data collected in 192 villages in the Equateur Province in DRC. The 192 villages in the sample were selected across the region by the PARRSA team for their accessibility by road in each of the 9 territories involved in the project, and were surveyed three times between 2012 and 2015.

In 2012, we visited the 192 villages and in each of them a group of 4 to 5 people was selected to answer a community level questionnaire as well as an indirect household survey about 20 randomly chosen households. The group of informants was composed of knowledgeable people in the village, including the chief of the village, the director of the school, the director of the dispensary, and other notables, depending on availability. At the village level, we collected information about external interventions, agricultural practices, institutions and conflict resolution, infrastructure, access to markets, common land, and the land market. We also conducted a full population census, from which we randomly drew 20 households. We then collected basic household characteristics related to agriculture, demographics, and poverty through an indirect survey from the same group of informants (by asking information about easily observable characteristics).

In 2013, a subsample of 92 villages were visited in relation to the experiment and we collected detailed household and plot level data about agricultural inputs and production. We surveyed 22 households per village : 12 with a detailed questionnaire, and 10 with a shorter questionnaire focused on program take-up and information.

In 2014 and 2015, we visited the same 12 households in 92 villages for which that we surveyed with a long questionnaire in 2013, as well as 6 households drawn from the households surveyed with a short questionnaires in 2013. We also added households drawn from a list of the fraternity of the household heads (a maximum of 10 such "brothers" per village) to study inequalities in access to land, inheritance rules, and diffusion of technology within families. We exclude them from the sample for this paper since the selection may be different from the rest of the sample. We also surveyed 12 households per village in an additional 100 villages. The survey covered

a wide range of topics ranging from agricultural inputs and production, nutrition and health, intrahousehold decision making, external interventions, conflicts, credit and labor sharing arrangements, networks, and access to land. We also collected detailed information about the composition of households and the clan affiliations of each member, as well as a history of the arrival of the household in the village. For all these households, men and women were interviewed separately, and two women were interviewed in polygamous households (In case of polygamous households with more than 2 women, the first wife and a randomly selected other wife were selected). Because of the length and complexity of the survey, we visited households twice : a first wave was conducted between June and July 2014, and a second wave was conducted between November 2014 and March 2015.

This quantitative data was complemented by a series of qualitative interviews conducted between 2011 and 2016 in several villages, to deepen our understanding of several key issues such as production choices as well as land institutions and access to the collective forests.

In this paper, we restrict the sample in two ways : first, we exclude the villages who have not yet been created before Independence (8 were created during Mobutu's rule and 4 were created shortly after Independence), since they have not experienced paysannat and can not be compared to villages that experienced it. Second, we exclude from the sample households who are village chiefs, households who are part of the "brothers" sample described above, as well as households who received a gift for helping use to collect rainfall data.

3.1.2 Oral history data and colonial history record data

An original feature of this paper is the use oral history data from a community survey we conducted systematically in the same 192 villages between 2014 and 2015. In each village, a group of 4 to 5 people was selected to answer a community level questionnaire and detail the history of the village. The group was composed of knowledgeable people in the village, including the chief of the village, the director of the school, the director of the health center, and other notables (clan leaders or elderly people). This in depth village survey provides information about the history of village since colonization, the migration waves to and from the village, the forced cultivation of cash crops, and historical land distributions. It also details the current situation by providing detailed data about the institutions that govern access to land and other natural resources available in the village, recent governmental and non governmental projects, as well as recent conflicts and how they were settled. This data was complemented and confirmed using historical record data collected from the "Archives Africaines" at the Ministry of Foreign Affairs in Belgium, as well as contemporary research on paysannat by historians (Piet, 2015). Those records contain detailed information about the implementation of the scheme and the difficulties encountered.

There are several justifications for the use of oral history data as a primary source of information, complemented with colonial administrative data. First, Belgian colonial records are often incomplete and biased (Likaka, 1997, 2009). Colonial administrative data was built by colonial agents and in particular territorial administrators. The incentive for them was to provide the best possible picture of the work they were doing in order to be promoted, in particular when they were posted in such hostile and remote regions as Equateur. Their work was very hard to monitor, and they often underestimated the reluctance of villagers to participate in cotton cultivation and in Paysannat, and overestimated the success of their undertakings (Likaka, 1997). The names of the villages were often wrongly recorded, and the colonial maps of the region are very unreliable (Piet, 2015). Moreover, African societies have long favored oral tradition. Likaka's work showed that oral based history can be used to reconstruct the history of cotton production in the region and how the villagers resisted it. In fact, I found out about Paysannat in the first place while conducting qualitative work while villagers were telling me about the different types of land in the village, and they pinpointed Paysannat fields as being very different from the others because they had been distributed by the Belgians. If dates collected this way don't seem very reliable, villagers remember distinctly the key events in the history of their country (colonization, independence, the rise of Mobutu, Zairianisation, and the more recent civil wars) and they are very confident when trying to locate village events within this framework. The oral history I reconstructed this way allowed the creation of historical variables that I use in the analysis such as cultivation of cotton and distributions of land related to Paysannat. Of course, oral history data may also have its own biases. Many villages have been involved in Paysannat for a very short time, and the limited resources of territorial administrators implies that some of them may only have been visited a couple of times. In those cases, it is unlikely that it had any impact on the village life and that people still remember it today. The colonial intervention variables constructed this way should therefore be interpreted as reflecting only interventions they were sufficiently intense. Colonial records were used to confirm that territorial administrators indeed reported the implementation of paysannat in the same areas, even if it did not allow to check for each of the village what exactly had been done. It gives us confidence that our oral history variables are sufficiently reliable.

"It is no consolation to be told by others that, because there are no written sources, no past can be recovered, as if living traces of that past were not part and parcel of daily life."

Vansina, Paths in the rainforest, p.xi

3.1.3 Geographic data

The geographic data we use in this paper comes from various sources. Geographic data for the village geographic locations and borders comes from the village surveys described above. Port and markets names were collected in our village surveys and localized using geonames. Data on roads and administrative borders comes from the Ministry of Infrastructure. Finally, data on forest cover comes from [Hansen et al. \(2013\)](#). Distances from villages to key locations were computed using ARC-GIS network analysis tools, in order to identify the nearest location (among the list of ports or commercial urban areas, administrative capitals in the region) and calculate the distance to these locations by road.

3.1.4 Information about clanic affiliations

One piece of information that is critical in this paper is the clanic affiliations of households. In each household, we asked the household head and his wife to tell us the name of the clan that each member of his household belongs to. In most cases, his children were affiliated to his own clan but his wife was still considered a member of the clan of her own father. In parallel, we conducted the community survey with village leaders and drew a list of all the clans living in the villages. After doing this, we would go through the history of the village and ask for each period of time whether any immigrants settled in the village, and to which clan they corresponded in the list. Among the clans who arrived after the creation of the village (thereafter "foundation clan"), we often realized that the village leaders had not listed some of them in the list of clans. When this happened, we asked why: if they had simply forgotten them, we would add them to the list. If they had not listed them for a good reason, we added a comment but did not add them to the list of village clans. The most common story was that they simply did not know the name of the clan of this family, because they did not have any voice and representation at the village level. It was common for those clan to have been "adopted" by one of the local clans of the village, although it seemed to indicate a very different condition from being an autochtone. We then matched the clans declared by households with those listed by the villages using fuzzy matching techniques based on names, and divide them into five categories : the foundation clans (the clan of the household's head matches one the clans listed by the village leaders as one who took part in the creation of the village), the local clans (the clan of the household's head matches one of the clans listed by the village leaders, but not there at the creation of the village), women's foundation clans (the clan of the household's head is not identified in the village, but the clan of one of the wives of the household's head was matched with one of the foundation clans in the village), women's local clans (the clan of the household's head is not identified in the village, but the clan of one of the wives of the household's head was matched with one of the local clans in

the village), and marginal clans. We call marginal clans all the clans who were not listed by the village leaders : they represent 23% on average of all the households living in the villages we surveyed, and encompass the clans who were identified in a different village, those who gave us the name of one of the villages in the region, and those whose clan name could not be found either in the village clan list, in the list of villages in the region, or in the list of clans from all the villages we surveyed. It is very reasonable to assume that we would be able to match almost all of them with clans in other villages if we had the full list of all clans in the region. We call them "marginal" because they are not represented at the village level, even if they may have been adopted by a local clan. We could also call them "migrants" or "newcomers" but we are reluctant to do so since some of them have been in the village a long time, and other households recently moved to the village but were originally autochtones so they migrated recently but have full access to their clan.

3.2 Background: the Equateur Province

The provinces of the Democratic Republic of the Congo are divided into 26 districts (see Map 2, that closely resemble the districts that existed during colonization. These in turn are divided into 192 territories. During colonial rule, districts were led by a district commissioner who supervised territorial agents which was the lowest administrative level held by Belgian agents (De Clerck, 2006)¹⁵. In this paper we study three districts ¹⁶ in the North of the Equateur Province, that are divided into 9 territories. As far as we can tell from approximate and low resolution colonial maps, the delimitations of the districts changed very little after 1940 and only two changes had been made until Independence in 1960: the name of "Bomboma" district had been changed for "Kungu", and "Banzville" district had been split into two districts named "Businga" and "Banzville". By 2015, the borders of the districts were still very close to the colonial borders of the colonial districts in 1960 even if "Banzville" district changed name during Zairianisation to become "Yakoma".

The Equateur Province is a remote region in the Congo Basin Forests, with extensive slash and burn agriculture, high levels of food insecurity and extreme poverty, and arguably severe constraints to economic development in other sectors (Herdeschee et al., 2012). The main cash crop that was produced there as part of the compulsory cultivation scheme during colonization was cotton, but rice, cocoa and palm oil were also important in parts of the region. Cotton production started falling after Independence, and the agricultural sector was further dislocated during the Zairianisation. The region includes many historical plantations of hevea, cocoa or palm trees that are still abandoned or function at the smallest capacities. Some of them resumed functioning in recent years, but there are still many cases of conflicts with local villages and previous belgian and congolese owners of plantations who all claim property of the land (WWF, 2015). Infrastructure was poorly maintained after Independence and its condition degraded until they finally collapsed during the Congo Wars (1996-2003). Inadequate infrastructure for the transport of agricultural products is still a key constraint (Herdeschee et al., 2012). In this context, households rely mostly on subsistence smallholder agriculture through shifting cultivation of staples ¹⁷, as well as gathering of forest products, fishing and hunting. While agricultural potential is believed to be large, road density is very low, commercialization is hampered by long distances from farm to market, and most farmers don't have access to improved varieties or technologies. Traditional slash and burn clearing methods are still used, and generally the only capital inputs used are hand held tools.

¹⁵In 2015, a reform of the territorial organization turned the districts into 26 provinces, but the borders remained very close to the borders of the districts in 2015 and remained very close to the colonial district borders.

¹⁶Nord-Ubangi, Sud-Ubangi, and Mongala

¹⁷maize, rice, groundnuts, cassava, soybeans, cowpeas, yam, plantain

3.3 Village characteristics

Villages are characterized by a large heterogeneity in terms of demographic and geographic characteristics, but also access to land and natural resources. Tables 1 to 12 as well as figures 4 and 5 present summary statistics of those characteristics.

Consistent with the previously described historical settlement patterns in the region, most of the villages in our sample were formed before or during colonization (table ??). Only a few were created later, usually the result of a preexisting village growing too large to be administered properly and being split into two parts by the administration. The population of the villages varies widely. There are on average 287 households per villages, but it ranges between 13 and 2500. Population density varies widely between 4.46 inhabitants per square kilometer to 378. The ngwaka, ngbandi, budja, and mbanja are the 5 dominant ethnic groups in the region. As evidenced by figure ??, most villages are dominated by one principal ethnic group, while only a few are composed of several ethnic groups who cohabit under the same chief. There are on average 5.8 clans per village, even if a minority is composed by only one clan. Typically, the clans are relatively balanced and only one third of the households belong to the most numerous clan on average.

As evidenced by table 2, villages differ in terms of geographic characteristics. In terms of access to markets, the distance to the nearest port is 55 kilometers on average, from 0 to a maximum of 300. Distance to the nearest local market is very small, 6 kilometers on average, because there are several local markets along the roads. In terms of access to resources, access to forest at the village level varies widely as evidenced by figure ??: first, the area of the village varies widely with some village land spanning over very large areas; and vegetation is much denser in the South and East of the region, while the North-West is characterized by forest-savanna mosaic.

Finally, land formalization varies both between and within villages. As described in section 2, farmers in the region barely own any legally recognized titles on their land, nor do the villages. In practice, land is managed by the chief of the groupement and the chief of the village. To protect their rights, some farmers obtain semi-formal documents to secure their land. In our sample, those semi-formal titles have been issued or signed either by the Groupement chief or the Secteur chiefs, or they are documents they issued when they bought the land. We also found evidence of 81 cases where farmers claim to own a "Paysannat document" (see table 6. The share of people owning documents varies widely from one village to another: Table 5 shows that on average 13% of the households surveyed declare owning at least a document on one of their fields. Additionally, 19% report owning land in paysannat (a very small share of which is associated with a document). While traditionally land chiefs were in charge of allocating and managing the clan or family land, today 26% of the households claim that

there is no such land chief regulating their access to land (table 7). 20% say that they are the land chief for their families, and almost 50% name either their elder brother, uncle, father or grand-father.

Commons:

Households cultivated 2.79 hectares on average in 2014, with an average of 4.3 cultivated plots and they owned 6 additional fallow plots. While half of their fields cultivated in 2014 came from land that was already cultivated the year before, a large share came from land that was left fallow and 4% came from a conversion from primary forest to agriculture. The main crops cultivated in the region are maize, groundnut, cassava and rice.

Finally, table 4 presents statistics about the clanic affiliations of households in our sample. We asked the household head and his wife to tell us the name of the clan that each member of the family belongs to, and we then matched this name with the list of clans mentioned by the village leaders in the community questionnaire. We find that 52% of the households in our sample belong to one of the foundation clans, 20% belong to a men's local clan (ie the clan of the household's head has been identified in the village), 2.7% belong to a women's foundation clans (one of the wives of the household's head is from a foundation clan in the village), 1.8% are from a women's local clan (one of the wives of the household's head is from a local clan in the village), 9.7% of the households clans were identified in another village, and 13.6% could not be identified. In total, we therefore have 22% of households from a marginal clan. Compared to the households from one of the foundation clan, those households report much less often that they own land in paysannat, they seem to have more fields with a document, and cultivate a smaller area in 2014. They also report much more often being worried to lose at least one of their fields. Finally, they report less often that they have access to collective lands, whether at the village or family level.

4 Empirical Strategy

4.1 Exogeneity : what we learn from historical records

In this paper, we aim to compare villages of a given Secteur in which land was distributed to individual households for paysannat to villages in the same Secteur in which these distributions did not take place although they were cultivating cash crops as well. A key methodological question is whether they differ in systematic ways: were the villages chosen based on specific characteristics that can also explain why they differ today? We discuss this hypothesis and argue that it is unlikely. Many villages were therefore not part of Paysannat not because they were not deemed suitable or had different characteristics, but simply because of the accident of history. A second important question is whether being part of paysannat may have triggered a differentiated treatment by subsequent administrations in the provision of public policies. Again, we find no evidence that this is the case.

As described earlier, villages were identified by territorial agents and their team. However, they were constrained to intervene in a list of Territoires and Secteurs that had been chosen for paysannat (they chose areas where agricultural potential was high, and deforestation rates were worrying or where the quality of the soil had become a concern for the colonial administrators). The historical records evidence that paysannats were set up in the territoires of Kungu, Gemena, Budjala, Bumba and Bosobolo. In those administrative areas, the territorial agents had to prospect the land, conduct land tenure surveys to understand the land tenure in the area, and attribute the land to individual households within the customary boundaries of their own clan or family. To the extent possible, they had to ensure that the land attributed to each household was fertile, and that customary chiefs were willing to participate ¹⁸.

Prospection and land surveys were costly and labor intensive. In practice, they often identified several blocks of land in the forests or in fallows, and reallocated land between clans or villages. Understanding customary right was an immensely complex task : there were several levels (clan, families) and types of rights ¹⁹. Moreover, Territorial Administrators and Agronomists were not popular, so the population was reluctant to participate ²⁰. The difficulty in obtaining reliable information is evidenced by the many cases in which colonial agents were often mistaken even in the identification of the village chief (Likaka, 1997). A report about the implementation issues faced in the implementation of Paysannat in the Equateur

¹⁸”Le paysannat indigène, Annexe lettre 99 21/77 99/2357/11.D/18 bis du 3 avril 1953. Rapport destiné À la Conférence CCTA sur le bien être rural. Laurencq Marques”, In African Archives Brussels, AGRI 80 Dossier 1

¹⁹

²⁰”L’agriculture dans les perspectives d’avenir, Lebughe Pierre, Ingénieur agronome congolais”, In African Archives Brussels, AGRI 748, Dossier 5

region ²¹ mentions their frustration and their difficulty to even identify village names because they had to rely on local interlocutors who sometimes disagreed or tried to mislead them (Likaka, 1997). Based on this, it is easy to imagine how difficult it was for them to conduct the so-called survey of existing customary rights, and to identify a block of land that would be suitable for Paysannat. They did their best to find suitable blocks of land with the limited information they had, near the roads. When they thought that pressure on land was too high in one area and found land that looked "vacant" further away, they did not hesitate to relocate the villages. The construction of roads was also extended in this period to reach the villages growing cotton. After independence, the road network did not improve but rather slowly fell apart, and all the villages we are studying are along these colonial roads so they were comparable at the time of independence in terms of accessibility by road.

When the expansion of the scheme was abruptly slowed in 1954 to focus on improving monitoring of existing Paysannats, administrators were in the middle of their prospection and had to slow down the expansion. One of the concerns of the upper levels of administration was that villages were chosen before a full prospection of the region was conducted, and without a full investigation of customary rights. They were therefore chosen without full information about which villages were more suitable in a given Secteur, and they could not complete work in all the villages they had first identified. Even if they had had full information on the villages, the instructions were to identify villages with fertile collective land available, in order to increase production of cash crops. Whenever possible, they tried to find collective forests to divide it between households. This means that these villages should have had less land pressure, lower levels of privatization, and less population pressure than those they did not choose in the first place (Platteau, 1996; Boserup, 1965, 1983).

One question is therefore why how they chose the villages where they started? One plausible hypothesis is that administrators were inclined to start in villages where they had a better relationship with chiefs. The relationships between colonial administrators and the local population were based on the use of threat and violence, and in this context the "voluntary" participation of the villages became in practice a forced participation (Likaka, 1997; Piet, 2015). Administrators relied on local chiefs for the collection of taxes and the supervision of cotton production, and they did not hesitate to punish or replace them if they were not cooperative. However, the villages were not given complete information about what the policy involved: the administration avoided on purpose mentioning that they would try to modify the land tenure system when they presented the scheme, and instead insisted on the improvement of agricultural techniques and standard of living. In that sense, it is hard to imagine how the local elite would have been able to distinguish the scheme from the existing compulsory

²¹"Compte-rendu de la réunion tenue le 5 mai 1952 à Itipo relative au Paysannat dans les territoires du District de l'Equateur", In African Archives Brussels, GG 17051 - Equateur AGRI-AIMO, Paysannat Indigène, Programme Plan Décennal.

cultivation scheme. The propaganda also insisted that they would be less subject to arbitrary expropriation by commercial companies, so villages relatively closer to a concession may have been more to this argument.

Finally, I found no evidence so far that chiefs complacent with paysannat were given other kinds of advantages such as better access to school or other investments that could have had a long term impact, or that Post-Independence policies took the location of Paysannat into account when making investment decisions after the Independence of the country in 1960. The paysannat scheme was associated with social interventions (health centers and schools) at the level of the Secteur, but this part of the program was very late to start and there is no evidence that villages without paysannat in the same secteur were excluded from it.

4.2 Paysannat in our sample, village level

In our sample, 104 villages report having experienced forced definitive distributions of land related to cash crops implemented by the Belgian Colony. By definitive we mean that they were understood by villagers as being a permanent attribution of a block of land, and not simply a temporary allocation for the duration of the cultivation period. Among those 104 villages, the distribution was done in a single year in 41 villages while in 63 villages the administrative the division was done more progressively.

The data from community level interviews also shows that many villages where land distributions were not imposed for paysannat experienced several other types of land allocation for cash crops. In cotton producing villages for example, it was common that the village chief (helped by agents from cotton companies) would reserve one block of land for cotton cultivation for the whole village. He would then allocate parcels of land to individual households for forced cultivation for a few years. In most cases, the land was used for a few years of cash crop cultivation followed by subsistence crops before being returned to the community. In some of these villages, the families decided to divide these blocks of land between those who used it for cotton - a privatization decided by the villagers. In other villages, these blocks of land are still considered as common village land, and managed in various ways. Finally, in some villages cotton was cultivated on the plots that households chose freely.

When constructing village level treatment variables, we only considered as "paysannat" villages where land was distributed with the intention of being definitive. It means that we will compare them to villages where the privatization of the land used for cotton or cash crop cultivation sometimes also occurred spontaneously. In paysannat villages, the fact that the distribution was intended to be definitive does not necessarily mean that it was. We found several examples of villages who decided to reallocate the land between households, where previous owners of the land took back control over (another indication that the land was

not always given to the right clans), or where it was reestablished as collective village land managed by the village chief.

Interviews with village elders also revealed the violent way in which cash crops were cultivated in all villages, and the violent way in which common land was divided, or village were moved. When we asked who in the village benefited from the distributions, they virtually always replied that every household head received the same area of land and that it was mandatory for every person in the village to participate (since they then had to sell their production to the monopoly at state-fixed prices). The interviews also reveal small differences within villages in the area attributed to single or married men, and don't mention the fate of divorced women or widows. Finally, it reveals heterogeneity between villages in the total area that was distributed ²²

²²Example of comments from village leaders about the forced cultivation of cotton and the distribution of land : "Selon l'enquêté tous les ménages pour chaque clan ont participé à la culture du coton car ils étaient forcés et personne ne pouvait résister" ; "Pour la culture du coton à cette époque, tout le monde devrait le faire c'était obligatoire et la répartition des terres était obligatoire." ;"Pendant l'époque des belges, ils étaient forcés par les autorités belges de quitter et de s'installer ici pour cultiver le coton et d'être à la proximité de la route. A cette époque tous les clans ont participé à la culture du coton, la distribution des terres était définitive, tous les clans ont bénéficié de cette distribution et après l'arrêt de la culture de coton ces terres sont restées propriété des familles qui les avaient recues."

4.3 Baseline characteristics and balance tests

To further investigate how villages differed in terms of observable characteristics before Independence, we use all the Pre-Independence characteristics we have about the villages in our sample and conduct simple balance tests. Table 16 confirms that paysannat villages don't seem to have had different characteristics. We also put the villages on a map of the region to examine their geographic distribution.

First, they had the same number of clans at foundation, which could indicate there is not difference in population pressure at the time of colonization. Second, there is no statistically significant difference in the distance to the nearest commercial town nearest river, the distance to the nearest port along the roads (the location of ports has not changed since Independence). All of these variables give an idea of access to markets, whose proximity could mean more pressure on the land. Finally, we compare distances to the administrative capitals to which the village belongs. Sometimes, a village can be very close to a commercial town but because of the administrative borders he depends on an administrative capital that is far away. We find that distance to Secteur and Territoire capitals are not statistically different (again, the local of administrative capitals does not seem to have changed since Independence). All the villages in our sample are located on a dirt road that connects these administrative towns. However, they seem to differ in terms of distance to the district capital. This could indicate that territorial agents tried to chose villages that were closer to the District Capital so they could show their progress to their superiors more easily when they would visit. We don't think this is evidence of any difference in terms of access to markets. In the rest of the paper, we will control for this variable to account for this difference.

Maps 8 9 and 10 show the geographic distribution of paysannat villages. From the maps, it is clear that paysannat villages are present in all vegetation types in the region, and most secteurs have both paysannat as well as non paysannat in close distance. The (dirt) road network in the region is very limited and in a bad state but all villages in our sample are along a road and paysannat villages don't look obviously advantaged nor disadvantaged.

4.4 Empirical Strategy

First, we run a simple OLS comparing village level outcomes in villages which grew cash crops (in this region, mainly cotton and rice) and experienced a land distribution during colonization to villages who, because of historical reasons and the slow down in the expansion of the policy didn't take part in land distribution. Those regressions include a fixed effect at the administrative Secteur level to account for differences in geographic and colonial administrator's and indigenous chiefs characteristics, as well as a set of controls for geographic

characteristics that have not changed over time. For this analysis, the critical hypothesis is that paysannat villages were not chosen for having higher levels of privatization.

Second, we investigate the heterogeneity of the impact between households from different clanic groups in the villages. In this part, a new exogeneity issue will need to be considered: since we are going to compare households from different clanic groups within a secteur, a key assumption is that the different types of clanic groups are comparable in paysannat and non paysannat villages for a given period of arrival of the family in the village. We argue this assumption is not problematic.

Finally, to test the robustness of our results and to control for possible endogeneity in the choice of the villages for the agricultural policy, we follow a nearest neighbor's approach: we construct pairs of villages which are geographical neighbors across administrative borders of a territory, but which happened to have different agricultural policies (with or without a policy to push toward the individualization of land rights). On all our observed geographical variables, these villages look very similar, and we assume that such neighboring villages would be similar in other unobservable variables as well.

5 Empirical Results

The aim of this section is to study the differences in contemporary land institutions and inequalities between villages with and without Paysannat. First, we show that paysannat villages have less "commons", or collective forest, so in that sense paysannat succeeded in pushing toward more privatization. At the same time, it also seems to be more difficult for migrants from the village to come back and get access to land. Older generations of strangers in the village also seem less integrated in the local institutions. Second, we examine the distributional consequences of this privatization of the commons by the Belgian Colony. We establish that there are strong inequalities in access to land between the different clanic groups within a village, and we give evidence that part of these differences can be explained by the presence of Paysannat.

5.1 Results: Impact at the village level

Table 17 to 21 report the results of the OLS regressions at the village level. In all regressions, Secteur fixed effects and geographic control variables are included.

5.1.1 Impact on collective forests

Table 17 shows the impact of paysannat on village level outcomes related to natural resources. The coefficient on a dummy indicating whether there exists land in primary forest that belongs to the village and is collective (column 1) is negative but not significant. However, the nearest collective primary forest is almost 2 km further away in paysannat villages compared to non paysannat villages (column 2), and villages leaders are 15% more likely to consider that the shortage of forest is an issue in the present, a strong and significant difference (column 3). They are also more likely to be concerned that there will be shortages of forest in the near future, but the difference is not significant (column 4). These results seem to indicate (as will be further confirmed in the next section) that paysannat succeeded in pushing toward more privatization of the forests near the village centers. Even if a large share of villages still report there is some forest in their villages, there is also a high level of awareness that the frontier is close, and the forests are relatively far from the village dwellings (4.9 kilometers on average). One key question is therefore whether this is the mechanical consequence of the division of the land that occurred during colonization, or whether this is the result of individualization processes or increased pressure from migration that occurred later.

5.1.2 Impact on the clan composition of the village and population

In tables 17 to 21 we show the results of regressions on the clan composition of the villages to investigate whether paysannat led to differentiated patterns of migration and settlement. We do not find any differences in the share of marginal clans²³, local clans, or foundation clans between paysannat villages and others. One category of clan is less represented in paysannat villages : households heads whose wife is from a founding clan in the village. This could suggest that it is harder for those women to come back to their village with their husband (the village of their father) and get access to land for their family. In tables 20 and 21, we differentiate the households by the period of arrival in the village of their own family. We call "newcomers" households whose family arrived in a village this generation or the previous one (for example their brother, their father, or their uncle moved to the village). We call households whose families have been in the village for more than two generations "oldcomers". We find that there are on average 4% less newcomers from local clans and 5% more marginal newcomers in paysannat villages. The newcomers for local clans are households who have family in the village but had migrated elsewhere or come to join a member of their family. One interpretation of this result could be that it is more difficult for family members of local clans to get access to land in the village because there is less collective land. Moreover, the fact that there are more marginal oldcomers (households whose family has been in the village

²³Marginal clans : remember that is how we decided to call clans who are not recognized by village leaders but are present in the village

for 2 or more generations but are not recognized by village leaders) could mean either that there was more migration in the past, or that the migrants following independence were less likely to have been formerly recognized by their host village. Since there are not more local oldcomers, the second interpretation seems more likely. Overall, these results suggest that paysannat succeeded in privatizing the commons but also seems to have led to tighter land ownership pattern, in the sense that it secured access for local clans but made it more difficult for others.

5.2 Results at the household level

Table 22 to ?? report the results of OLS regressions at the household level. In all regressions, Secteur fixed effects and geographic control variables are included, and the reference category are the households from Founding Clans.

5.2.1 Characteristics of the fields at the household level

Tables 22 and 23 shows the difference in ownership of Paysannat land and documented land by the households depending on the clan they belong to, as well as insecurity about land rights. We find strong differences in ownership of these types of land between marginal clans and founding clans, as well as between households where the wife is from a founding clan. The difference with other local clans is negative but not significant. Unsuprisingly, village founders have benefited more from paysannat, and this advantage has been passed on to the next generations. As evidenced by the first column, households from marginal clans are much less likely to belong to a family who owns land in Paysannat. They are also more likely to own land in fallow that has a document, have a higher share of plots with a document cultivated in 2014, and are more likely to cultivate at least one plot with a document in 2014. Finally, both local clans, whether founders or simply locals, have lower levels of insecurity over their fallows and fields in cultivation, as evidenced by columns 5 and 6. By differentiating by period of arrival in the village, table 23 reveals that these results are driven primarily by newcomers for marginal clans, even if insecurity on the fallows seems to be slightly higher among oldcomer marginals. It also reveals that local clans who came back recently experience a similar situation : they are more likely to have documents on their fields or to own paysannat, but they express much more confidence over their land rights than marginal clans. The fact that newcomers own more documents is likely to reflect the fact that they have to negotiate with individual farmers or with village chiefs to gain access to arable land. It probably becomes more and more common to require a written document as pressure on the land increases, and its more common to seek a document when you don't have customary rights on the land you obtain. It can also reflect the fact that newcomers

seek more protection from village chiefs or other administrative officials to prevent disputes as they can not rely on their clan to protect their rights.

Tables 24 and 25 show that there is a strong persistence of ownership of Paysannat rights over time and that paysannat explains a large part of the differences in documentation. Local clans are the clanic groups who still benefit from Paysannat land the most: in villages where oral history reports occurrence of Paysannat related land distributions, 23% more households from local clans report owning land in Paysannat compared to non-founding local clans in other villages. Marginal clans are only 10% more likely to have land in Paysannat in treatment villages compared to non treatment villages. Founders are almost 20% more likely to report owning paysannat in treated villages, but they are also 8% more likely than marginal clans to do so even when their villages was not treated. This result reflects the fact that land distributions for plantations of spontaneous land distributions after cotton cultivation also took place in non paysannat villages as described in Section 2. When a block of land was reserved for cotton, even when it was not attributed to specific households during colonization, there are many cases where the farmers decided to share the land between themselves after the end of cotton cultivation. This table also suggests a very different pattern of land documentation in villages with and without Paysannat : in non-treated villages, local clans (whether founding or not) are less likely than marginal clans to have documents on their fallows or on the fields they cultivate. Founding clans, on the other hand, are more likely to do so. This suggests that it is more difficult for marginal clans to access and secure land in treated villages. This is further evidenced by column 5: marginal clans are 7.6% more likely of feeling insecure about some of their fallows in treated villages compared to marginal clans in non-treated villages, while local clans are not. Table 25 shows that this pattern is true for both marginal clans who settled in the village a long time ago and those who arrived recently. These result further point to more privatization and tigher land claims in paysannat villages.

5.2.2 Characteristics of the land portfolio, household level

Tables 26 to 29 show the results of a simple regression on the land portfolio of the households in our sample (land cultivated or owned by households). Table 26 shows that marginal clans have on average 2.4 less fallow plots than founding and local clans, and that own on average 2.4 less fallow plots than founding clans and 2 plots less than local clans. The total area they cultivated in 2014 is also 0.3 hectares smaller for marginal clans compared to founders. Table 26 also reveals that households who live with the clan of the wife of the households head own less fallow plots. Table 29 shows that this pattern is the same for marginal clans irrespective of the period of arrival of their family in the village. There is also no statistically significant difference between newcomers from local clans and oldcomers from local clans. It confirms that access to land seems to be much more difficult for clans that are not recognized

by village institutions, and for women, while local founders who have stayed in the village are those who have the largest land portfolio. Interestingly, households who settle in the village of the wife seem to have a large share of their plots in the primary forest, suggesting that they have access not their family land but rather to collective forest.

Tables 28 and 29 show that paysannat led to smaller number of plots cultivated per household, a smaller area cultivated, and a smaller number of fallows for most groups. The two exceptions are the oldcomers from marginal or local clans, whose situation is comparable in paysannat and non paysannat villages. All other groups have less fallows, cultivate less plots and smaller areas in paysannat than non paysannat villages.

5.2.3 Distributional impact

We expect that the distribution of collective land, if it leads to a reallocation of the land between the local clans, can lead to a lesser level of inequalities in the village which may end up benefit everyone by promoting better management of the resources ([Baland et al., 2009](#)). However, our results suggest that, while the differences between local clans may be lower in paysannat villages, land rights also seem to be tighter and less flexible, and it seems more difficult for strangers to access land. Overall, our results point toward more pressure on the resources.

6 Conclusion

This paper studies one specific colonial intervention, Paysannat, which impacts the customary land tenure system. It shows that this led translated to sustained land privatization, and had strong distributional implications?. This papers uses a first hand dataset with household and village oral history data to investigate this question, and takes advantage of the arbitrary geographical distribution of those interventions. It suggests that land rights are very persistent over time and that Paysannat had a lasting impact on land access depending on clanic affiliation. In future work, I will explore explore whether there is evidence that they led to differences in the sustainability of the management of natural resources and the regulation of conflicts.

References

- Acemoglu, Daron, Simon Johnson, and James A. Robinson**, “The Colonial Origins of Comparative Development: An Empirical Investigation,” June 2000.
- , – , and – , “Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution,” *The Quarterly Journal of Economics*, November 2002, 117 (4), 1231–1294.
- Baland, J.-M. and J.-P. Platteau**, “Division of the Commons: A Partial Assessment of the New Institutional Economics of Land Rights,” *American Journal of Agricultural Economics*, August 1998, 80 (3), 644–650.
- Baland, Jean-Marie and Jean-Philippe Platteau**, *Halting Degradation of Natural Resources: Is There a Role for Rural Communities?*, Food & Agriculture Org., 1996. Google-Books-ID: JSMOllcGHxIC.
- , **Kjetil Bjorvatn, and others**, “On the distributive impact of privatizing the commons: the case of renewable resources,” Technical Report, Citeseer 2009.
- Banerjee, Abhijit and Esther Duflo**, “Under the Thumb of History? Political Institutions and the Scope for Action,” Working Paper 19848, National Bureau of Economic Research January 2014.
- and **Lakshmi Iyer**, “History, Institutions, and Economic Performance: The Legacy of Colonial Land Tenure Systems in India,” *American Economic Review*, September 2005, 95 (4), 1190–1213.
- Boelaert, E**, “L’Etat indépendant et les terres indigènes,” 1956.
- Boserup, Ester**, *The conditions of agricultural growth: The economics of agrarian change under population pressure*, Transaction Publishers, 1965.
- , “The impact of scarcity and plenty on development,” *The Journal of Interdisciplinary History*, 1983, 14 (2), 383–407. 00044.
- Clerck, Louis De**, “L’administration coloniale belge sur le terrain au Congo (1908-1960) et au Ruanda-Urundi (1925-1962),” in “Annuaire d’Histoire administrative européenne,” Vol. 18 2006.
- Cogneau, Denis and Yannick Dupraz**, “Institutions historiques et développement économique en Afrique,” *Histoire & mesure*, June 2015, XXX (1), 103–134.
- Dell, Melissa**, “The mining mita, explaining institutional persistence,” *Mimeogr. MIT*, 2008.

- EIC**, “Bulletin Officiel,” Technical Report 152, Etat Indépendant du Congo 1905.
- Engerman, Stanley L. and Kenneth L. Sokoloff**, “Factor Endowments: Institutions, and Differential Paths of Growth Among New World Economies: A View from Economic Historians of the United States,” Working Paper 66, National Bureau of Economic Research December 1994.
- Goldstein, Markus and Christopher Udry**, “The Profits of Power: Land Rights and Agricultural Investment in Ghana,” *Journal of Political Economy*, December 2008, *116* (6), 981–1022.
- , **Kenneth Hounbedji, Florence Kondylis, Michael O’Sullivan, and Harris Selod**, “Formalizing Rural Land Rights in West Africa,” *Development Research*, 2015.
- Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Komareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend**, “High-Resolution Global Maps of 21st-Century Forest Cover Change,” *Science*, November 2013, *342* (6160), 850–853.
- Herdeschee, Johannes, Kai-Alexander Kaiser, and Daniel Mukoko Samba**, *Resilience d’un Geant Africain: Accélérer la Croissance et Promouvoir l’emploi en République Démocratique du Congo, Volume I Synthèse, contexte historique et macroéconomique*, Kinshasa: MEDIASPAUL, 2012.
- Huillery, Elise**, “History Matters: The Long-Term Impact of Colonial Public Investments in French West Africa,” *American Economic Journal: Applied Economics*, March 2009, *1* (2), 176–215.
- , “The Impact of European Settlement within French West Africa: Did Pre-colonial Prosperous Areas Fall Behind?,” *Journal of African Economies*, March 2011, *20* (2), 263–311.
- Iyer, Lakshmi**, “Direct versus Indirect Colonial Rule in India: Long-Term Consequences,” *Review of Economics and Statistics*, June 2010, *92* (4), 693–713.
- Likaka, Osumaka**, *Rural society and cotton in colonial Zaire*, Madison, Wis: University of Wisconsin Press, 1997.
- , *Naming colonialism: history and collective memory in the Congo, 1870-1960 Africa and the diaspora: history, politics, culture*, Madison, Wis: University of Wisconsin Press, 2009.
- Mataboro, Severin Mugangu**, “Revue historique du secteur foncier en République Démocratique du Congo,” Technical Report 2016.

- Nunn, Nathan**, “The Importance of History for Economic Development,” *Annual Review of Economics*, September 2009, 1 (1), 65–92.
- Ostrom, Elinor**, “Collective action and the evolution of social norms,” *Journal of Natural Resources Policy Research*, October 2014, 6 (4), 235–252.
- Piet, Clément**, “The land tenure system in the Congo, 1885-1960. Actors, motivations and consequences,” in “Colonial Exploitation and Economic Development, The Belgian Congo and the Netherlands Indies Compared,” frankema, ewout and frans buelens ed., London: Routledge, 2013, pp. 88–108.
- , “Agricultural development in the Belgian Congo: the origins, implementation and impact of the indigenous peasantry scheme, 1920-1960,” August 2015.
- Platteau, Jean-Philippe**, “The Evolutionary Theory of Land Rights as Applied to Sub-Saharan Africa: A Critical Assessment,” *Development and Change*, January 1996, 27 (1), 29–86.
- Porta, Rafael La, Florencio Lopez-De-Silanes, Andrei Shleifer, and Robert W. Vishny**, “Legal Determinants of External Finance,” *The Journal of Finance*, 1997, 52 (3), 1131–1150.
- Salacuse, Jeswald W.**, *The National Land Law System of Zaire*, Land Tenure Center, University of Wisconsin-Madison, 1985.
- Vansina, Jan**, *Paths in the rainforests: toward a history of political tradition in equatorial Africa*, Madison, Wis: University of Wisconsin Press, 1990.
- Vinck, Honoré**, *Conflits fonciers au Congo belge opinions congolaises: texte intégral d’une enquête de 1954*, Bruxelles: Académie royale des sciences d’outre-mer, 2011. OCLC: 949794234.
- Weitzman, Martin L**, “Free access vs private ownership as alternative systems for managing common property,” *Journal of Economic Theory*, June 1974, 8 (2), 225–234.
- WorldBank/UN-Habitat**, “Revue du Secteur Foncier en République Démocratique du Congo,” Technical Report 2016.
- WWF**, “Etude sur l’identification et la localisation des anciennes plantations industrielles de palmier à huile inactives ou abandonnées dans les Provinces de Bas-Congo, Bandundu, Equateur et Orientale,” Technical Report, République Démocratique du Congo June 2015.

Tables, maps and Summary Statistics

Maps

Figure 4: Map : Ethnic groups in the sample

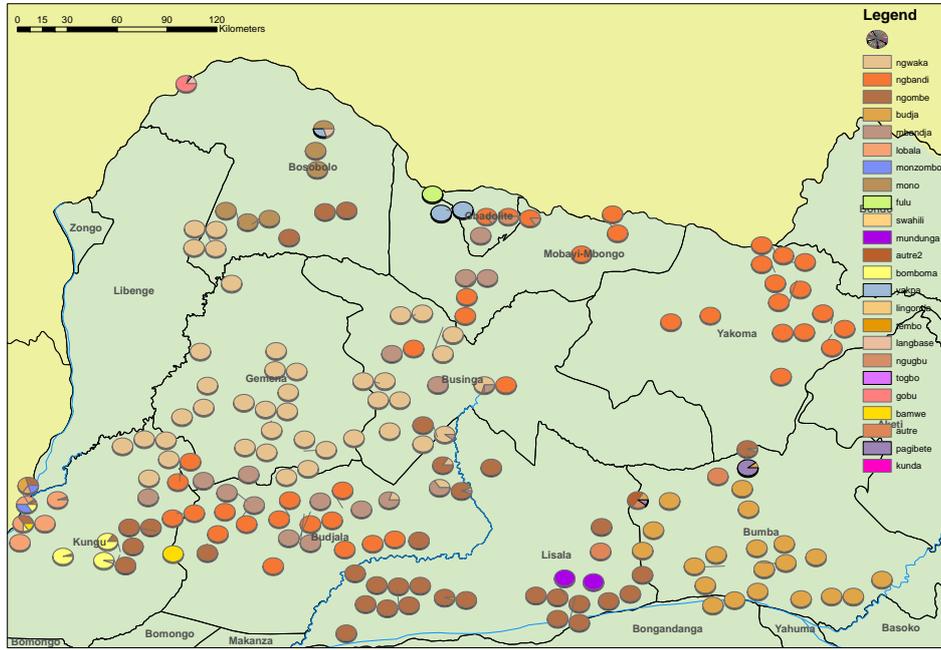


Figure 5: Map : Forest Cover in the Equateur Province

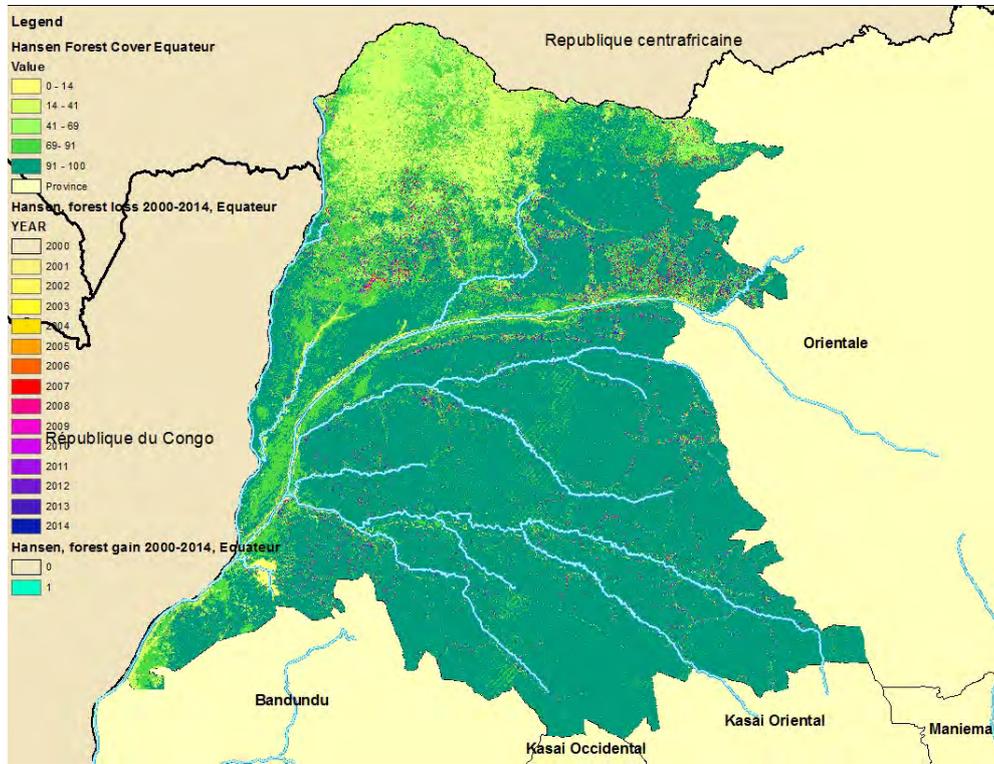


Figure 6: Map : Cotton cultivation during Belgian colonization



Figure 7: Map : Cotton cultivation during Belgian colonization and forest cover

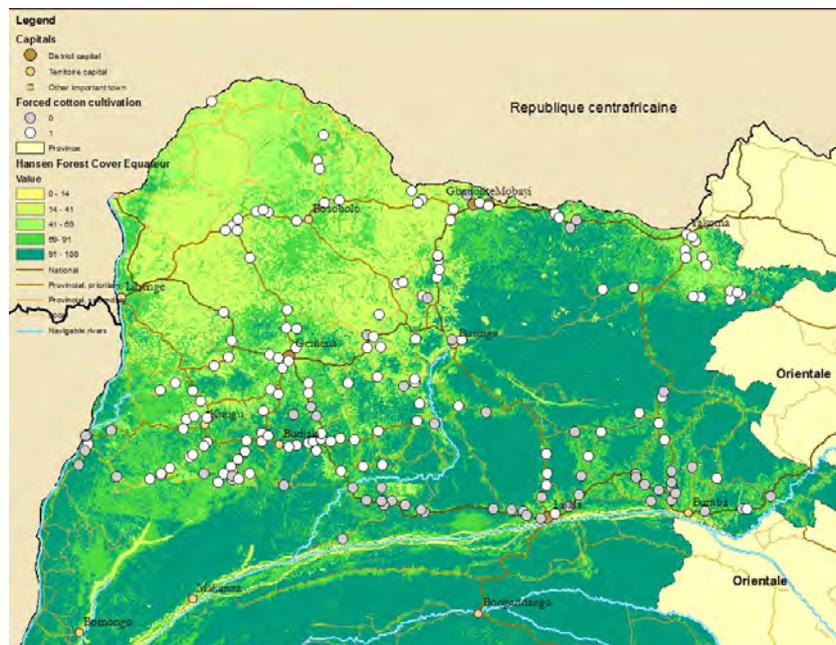


Figure 8: Map : Definitive land distributions during Belgian colonization and administrative borders

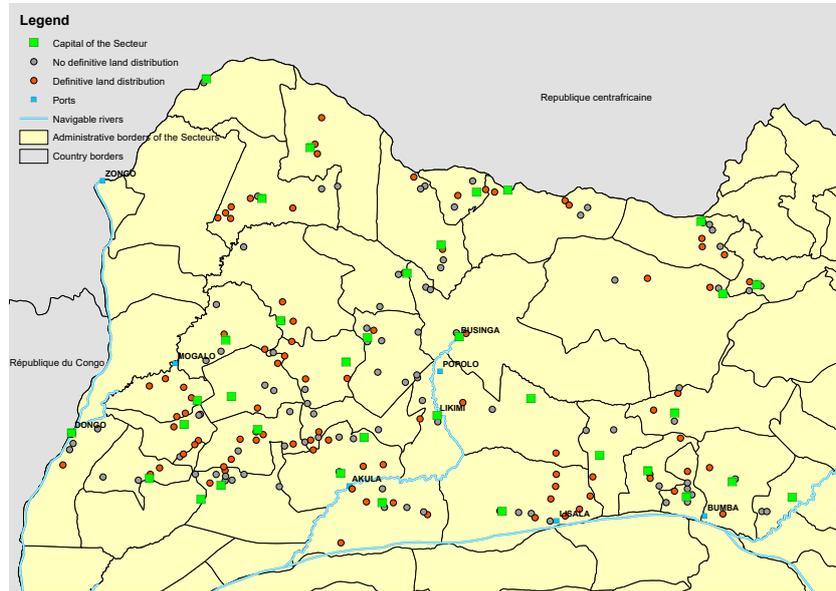


Figure 9: Map : Definitive land distributions during Belgian colonization and roads

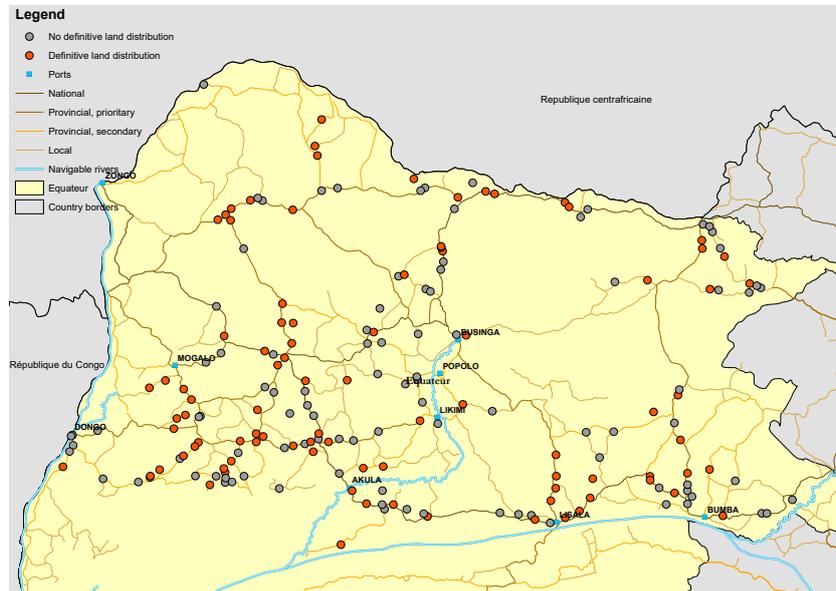
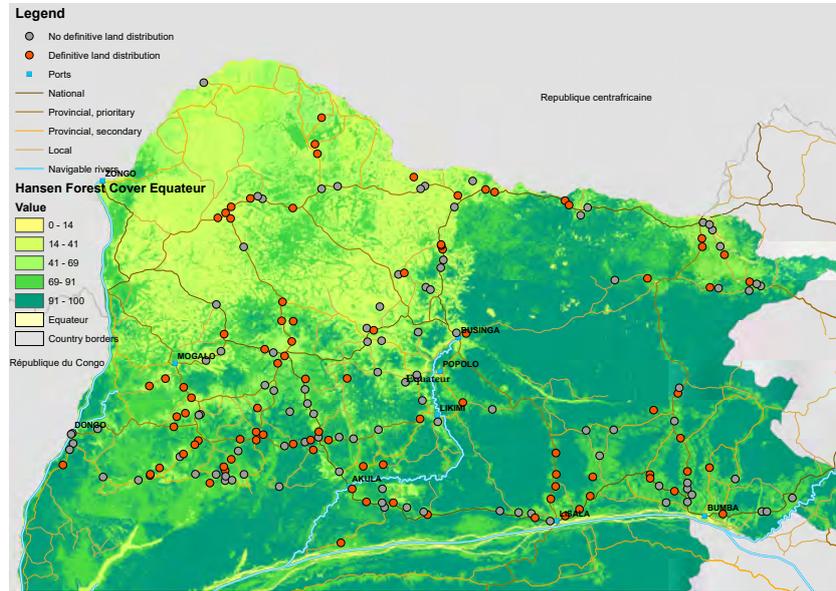


Figure 10: Map : Definitive land distributions during Belgian colonization and forest cover



Summary Statistics

Table 1: Creation of the village

	Freq	Pct
Before colonization	138	71.88
During colonization	42	21.88
Mobutu	8	4.17
Between independence and Mobutu	4	2.08
Total	192	100.00

Table 2: Summary Statistics : demographic and geographic characteristics of the villages in 2014

	Mean	SD	25th	Median	75th	Min	Max	N
<i>Population</i>								
Number of households	307	357	120	120	350	13	2500	174
Number of individuals	2785	3067	919	919	3432	160	18000	179
Number of men	755	991	200	200	855	41	6800	175
Number of women	999	1219	270	270	1250	40	7000	175
Number of children	1048	1233	318	318	1304	45	7700	175
<i>Ethnic composition</i>								
Number of clans	5.62	3.07	4.00	4.00	7.00	1.00	15.00	177
Share of the largest clan	0.35	0.18	0.25	0.25	0.40	0.10	1.00	175
Number of ethnic groups	1.25	0.69	1.00	1.00	1.00	1.00	5.00	174
Share main ethnic group	0.96	0.14	1.00	1.00	1.00	0.00	1.00	174
<i>Geographic characteristics</i>								
Forest cover (km sq)	54	58	16	16	66	0.33	306	173
Nearest river (km)	65	47	27	27	94	0.04	194	178
Nearest port (km)	96	63	47	47	128	2.96	256	178
Capital of the district (km)	117	63	69	69	164	0.26	287	178
Capital of the Territoire (km)	58	40	27	27	77	1.54	191	178
Capital of the Secteur (km)	25	21	7	7	38	0.00	92	178

Note: Distances are based on computations made by the authors using the geographic location of the villages and capital in ArcGIS to compute the nearest path along the road network. Forest cover is calculated based on Landsat images from Hansen Global Forest Watch dataset and village borders drawn by the author based on village surveys.

Table 3: Summary Statistics : clanic groups

	Other clan	Foundation clan	Total
Own clan/brother identified in the village	18.3	53.5	71.9
Clan of the wife in the village	1.6	2.7	4.3
Clan identified in a different village	9.3	0.0	9.3
Clan could not be identified/unknown	14.6	0.0	14.6
Total	43.8	56.2	100.0

Table 4: Summary Statistics : clanic groups

	Oldcomer	Newcomer	Total
Own clan/brother identified in the village	65.4	6.6	72.0
Clan of the wife in the village	2.4	1.8	4.2
Clan identified in a different village	5.7	3.6	9.3
Clan could not be identified/unknown	8.1	6.4	14.5
Total	81.6	18.4	100.0

Table 5: Summary Statistics : characteristics of the land

	All		By Clan Group			
	Mean		Founding	Men's	Women's	Marginal
<i>Land Formalization</i>						
Family owns Paysannat	3413	0.19	0.23	0.19	0.08	0.12
Owns at least one documented field	2309	0.12	0.11	0.10	0.10	0.14
Documented field in 2014	3466	0.13	0.12	0.14	0.13	0.15
% fields in 2014 with a document	3466	0.07	0.06	0.08	0.07	0.10
Worried about losing a field	2306	0.07	0.06	0.05	0.10	0.10
<i>Fields cultivated in 2014</i>						
Number of plots cultivated in 2014	3479	4.31	4.43	4.36	3.97	4.09
Total area cultivated in 2014	3459	2.75	2.80	2.81	2.60	2.65
% fields from long fallow in 2014	3340	0.41	0.41	0.43	0.40	0.39
% fields from short fallow	3340	0.40	0.40	0.38	0.40	0.41
% Conversion primary forest in 2014	3476	0.04	0.05	0.04	0.04	0.04
Dummy conversion primary forest in 2014	3476	0.15	0.16	0.15	0.16	0.14
<i>Fields cultivated in 2014</i>						
Number of plots cultivated in 2014	2676	4.34	4.50	4.41	4.04	4.01
Total area cultivated in 2014	2657	2.78	2.84	2.95	2.75	2.57
sh_conversion_lastyear_a14	2675	0.17	0.17	0.18	0.15	0.17
sh_forest_lastyear_a14	2675	0.17	0.17	0.18	0.15	0.17
sh_cultivated_a14	2674	0.53	0.53	0.54	0.52	0.52
Dummy conversion primary forest in 2014	2675	0.15	0.15	0.15	0.14	0.14
<i>Fields cultivated in 2014</i>						
Number of plots cultivated in 2014	2676	4.34	4.50	4.41	4.04	4.01
Total area cultivated in 2014	2657	2.78	2.84	2.95	2.75	2.57
sh_conversion_lastyear_a14	2675	0.17	0.17	0.18	0.15	0.17
% Conversion from forest in 2014	2675	0.17	0.17	0.18	0.15	0.17
% Already cultivated in 2014	2674	0.53	0.53	0.54	0.52	0.52
Dummy conversion primary forest in 2014	2675	0.15	0.15	0.15	0.14	0.14
<i>Fields cultivated in 2014</i>						
Number of plots cultivated in 2014	2676	4.34	4.50	4.41	4.04	4.01
Total area cultivated in 2014	2657	2.78	2.84	2.95	2.75	2.57
sh_conversion_lastyear_a14	462675	0.17	0.17	0.18	0.15	0.17
% Conversion from forest in 2014	2675	0.17	0.17	0.18	0.15	0.17
% Already cultivated in 2014	2674	0.53	0.53	0.54	0.52	0.52
Dummy conversion primary forest in 2014	2675	0.15	0.15	0.15	0.14	0.14

Table 6: Summary Statistics : Place of issuance of the land documents in the village for fields cultivated in 2014

	Freq	Pct
Groupement Chief	536	43.47
Secteur Chief	147	11.92
Paysannat title	91	7.38
Certificate of sale	459	37.23
Total	1233	100.00

Table 7: Summary Statistics : Who is the land chief for your household ?

	Freq	Pct
No land chief	49	25.65
Household head	38	19.90
The father of the Household Head	31	16.23
The uncle of the Household Head	29	15.18
The elder brother of the Household Head	18	9.42
The grandfather of the Household Head	12	6.28
Other	6	3.14
A relative of the wife	4	2.09
Nephew of the Household Head	3	1.57
A Cousin or brother of the Household Head	1	0.52
Total	191	100.00

Table 8: Summary Statistics : knowledge and access to collective land

	All		By Clan Group			
	Mean		Founding	Men's	Women's	Marginal
<i>Collective primary forest or savanna</i>						
Declares this type of land exists	2645	0.62	0.62	0.62	0.55	0.61
Authorization to open a field (free)	2645	0.55	0.58	0.54	0.44	0.50
Has already opened a field there	2566	0.26	0.27	0.27	0.22	0.23
<i>Collective secondary forest or old plantation</i>						
Declares this type of land exists	2645	0.12	0.12	0.12	0.11	0.13
Authorization to open a field without paying	2641	0.07	0.08	0.08	0.07	0.07
Has already opened a field there	2581	0.03	0.03	0.03	0.04	0.04
<i>primary forest or savanna, other village</i>						
Declares this type of land exists	2638	0.07	0.07	0.06	0.09	0.07
Authorization to open a field (free)	2637	0.03	0.03	0.03	0.06	0.03
Has already opened a field there	2619	0.02	0.01	0.02	0.02	0.02
<i>Collective primary forest or savanna, clan</i>						
Declares this type of land exists	2645	0.20	0.22	0.20	0.16	0.16
Authorization to open a field (free)	2645	0.19	0.20	0.19	0.15	0.15
Has already opened a field there	2618	0.10	0.11	0.11	0.06	0.09
<i>Collective family land, uncultivated</i>						
Declares this type of land exists	2645	0.23	0.25	0.23	0.19	0.19
Authorization to open a field	2643	0.21	0.23	0.22	0.19	0.18
Has already opened a field there	2610	0.14	0.15	0.17	0.11	0.12
<i>Land that belongs to the family</i>						
Declares this type of land exists	2642	0.55	0.62	0.53	0.40	0.44
This land can not be individualized	1446	0.96	0.96	0.96	0.98	0.96

Table 9: Summary Statistics : Access to collective village primary forest or savana

	All		By Clan Group			
	Mean		Founding	Men's	Women's	Marginal
<i>Reason for not opening a field</i>						
Physically too demanding	2646	0.00	0.00	0.00	0.00	0.01
Too far	2646	0.01	0.00	0.01	0.02	0.01
Enough Family land	2646	0.01	0.01	0.01	0.03	0.02
Protect family land	2646	0.00	0.00	0.00	0.00	0.00
No money to pay for labour	2646	0.00	0.00	0.00	0.00	0.00
No money to pay authorization	2646	0.01	0.00	0.00	0.00	0.02
Other	2646	0.00	0.00	0.00	0.00	0.01
<i>Reason for opening a field</i>						
Land is more fertile	2645	0.13	0.14	0.13	0.12	0.13
Increase arable family land	2645	0.07	0.08	0.06	0.05	0.06
Increase duration of fallows	2645	0.02	0.02	0.02	0.03	0.02
Ensure enough land for children	2645	0.05	0.06	0.07	0.03	0.02
Mimic ancestors	2645	0.01	0.01	0.01	0.00	0.01
Reduce risks of divagation	2645	0.00	0.00	0.00	0.02	0.01
Be closer to campement for fishing/hunting	2645	0.01	0.00	0.01	0.00	0.00
Some crops need this type of land	2645	0.08	0.08	0.09	0.08	0.06
Other	2645	0.01	0.01	0.01	0.02	0.01
<i>Transmission of fields opened there</i>						
Transfer to children	664	0.86	0.86	0.90	0.83	0.86
Lend	664	0.79	0.79	0.86	0.74	0.76
Rent	664	0.72	0.74	0.78	0.70	0.64
Sell	662	0.35	0.35	0.34	0.52	0.34
Only autochtones can do it	2645	0.01	0.00	0.00	0.01	0.02
Only some clans can do it	2645	0.00	0.00	0.00	0.01	0.00
Only possible when chief decides	2645	0.03	0.03	0.03	0.02	0.03
Other	2645	0.01	0.01	0.01	0.00	0.01

Table 10: Summary Statistics : Who took the decision to give this land to your clan

	Freq	Pct
Appropriation by an ancestor	26	72.22
Families	5	13.89
Kapita	2	5.56
Notables	2	5.56
Other	1	2.78
Total	36	100.00

Table 11: Summary Statistics : When was the decision to give this land to your clan

	Freq	Pct
During Colonization	16	44.44
Before colonization	8	22.22
Independence-Mobutu	6	16.67
Mobutu	5	13.89
After Mobutu	1	2.78
Total	36	100.00

Table 12: Summary Statistics : Summary Statistics : Transmission of land from one generation to the other

	All		By Clan Group			
		Mean	Founding	Men's	Women's	Marginal
<i>Transmission of land to children</i>						
Already given some for cultivation	2643	0.20	0.21	0.20	0.12	0.19
Already lent some for cultivation	2643	0.16	0.15	0.18	0.13	0.16
Already given some for futur cultivation	2643	0.09	0.10	0.10	0.05	0.06
Decided after-death sharing of land	2621	0.14	0.15	0.15	0.07	0.13
<i>Children who already got some land</i>						
All boys and girls	2643	0.02	0.02	0.02	0.01	0.02
Only the eldest boy	2643	0.10	0.11	0.09	0.06	0.10
All boys	2643	0.06	0.06	0.07	0.04	0.07
Part of the boys	2643	0.12	0.11	0.14	0.08	0.11
Some of the boys and girls	2643	0.03	0.03	0.03	0.04	0.02
All the girls	2643	0.00	0.00	0.00	0.00	0.00
Part of the girls	2643	0.01	0.01	0.01	0.01	0.01

Table 13: Summary Statistics : Land distribution during Colonization

	Freq	Pct
Definitive Distribution, progressive	63	35.00
Definitive distribution, one	41	22.78
Temporary allocation, progressive	37	20.56
Temporary allocation, one	23	12.78
No Distribution	14	7.78
No cash crops	2	1.11
Total	180	100.00

Table 14: Summary Statistics : Mean of obtention of the fields in paysannat

	Freq	Pct
Inherited	483	35.83
Clearing of a family field	294	21.81
Confiage, family	173	12.83
Clearing	113	8.38
Confiage, other	96	7.12
Bought	55	4.08
Other	54	4.01
Rented	45	3.34
Confiage, wife's family	19	1.41
Given by the wife's family	16	1.19
Total	1348	100.00

Table 15: Summary Statistics : Forest cover and loss from satellite data

	Mean	SD	25th	Median	75th	Min	Max	N
<i>Area in 2000 (km)</i>								
Primary Forest	6.75	9.71	0.50	0.50	8.93	0.00	57.08	173.00
Secondary Forest	2.88	2.85	0.84	0.84	3.98	0.00	20.74	173.00
<i>Area Deforested 2000 14 (km)</i>								
Primary Forest	-8.63	10.07	-12.52	-12.52	-1.70	-67.25	0.00	171.00
Secondary Forest	-20.05	11.48	-28.07	-28.07	-11.36	-55.68	0.00	172.00

Balance Test of pre-Independence Characteristics

Table 16: Balance tests : Characteristics of the villages before independence

	N	Paysannat	No Paysannat	Diff No P - P	S.E.
<i>Preindependence characteristics</i>					
Number of clans at foundation	179	3.7	3.8	0.11	0.38
Distance to nearest commercial town (km)	178	75.9	84.8	8.89	8.63
Nearest river (km)	178	68.0	61.8	-6.25	7.14
Nearest port (km)	178	94.0	98.7	4.73	9.50
Capital of the Secteur (km)	178	24.6	25.6	1.01	3.22
Capital of the Territoire (km)	178	55.0	62.6	7.64	6.03
Capital of the district (km)	178	109.1	126.9	17.71*	9.45

Source: The distances are computed with Arc GIS based on the geographic information collected in the village surveys as well as road data provided by the Ministry of Infrastructure. The distances to the ports and administrative capitals are computed using the shortest path along the roads. The distance to the river is computed using the direct distance to the rivers irrespective of roads.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Regressions at the Village Level

Tables : Collective land in the village

Table 17: Collective Primary forest, OLS with secteur fixed effect

	(1)	(2)	(3)	(4)
	PF	Dist	Shortage Forest now	Shortage futur
Paysannat	-0.018 (0.080)	1.961** (0.978)	0.157** (0.076)	0.110 (0.082)
Geo Control Vars	Yes	Yes	Yes	Yes
Observations	176	120	153	151
Mean	0.70	4.90	0.14	0.23

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Tables : Forest Cover in the Village

Table 18: Forest Cover in the village in 2000, OLS with secteur fixed effect

	(1)	(2)	(3)	(4)
	PF	SF	Deforestation PF	Deforestation SF
Paysannat	-1.305 (1.506)	0.446 (0.456)	-1.115 (1.403)	0.061 (1.104)
Geo Control Vars	Yes	Yes	Yes	Yes
Observations	171	171	169	170
Mean	6.79	2.56	-7.87	-20.31

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Tables : Characteristics of the clans in the village

Table 19: Composition of the clans in the village, OLS with secteur fixed effect

	(1) Marginal	(2) Local Men	(3) Founding Men	(4) Local Women	(5) Founding Women
Paysannat	0.036 (0.038)	-0.039 (0.043)	0.010 (0.052)	0.010 (0.007)	-0.018* (0.010)
Geo Control Vars	Yes	Yes	Yes	Yes	Yes
Observations	176	176	176	176	176
Mean	0.24	0.17	0.55	0.01	0.03

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 20: Composition of the clans in the village, OLS with secteur fixed effect

	(1) Newcomer Local	(2) Newcomer Marginal	(3) Oldcomer Local	(4) Oldcomer Marginal
Paysannat	-0.041* (0.021)	-0.015 (0.024)	0.006 (0.042)	0.050* (0.026)
Geo Control Vars	Yes	Yes	Yes	Yes
Observations	176	176	176	176
Mean	0.08	0.10	0.68	0.14

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 21: Composition of the clans in the village, OLS with secteur fixed effect

	(1) Newcomer M Not founder	(2) Newcomer M Founder	(3) Newcomer Marginal	(4) Oldcomer M Not founder	(5) Oldcomer M Founder	(6) Oldcomer Marginal	(7) Women Founder	(8) Women Not founder
Paysannat	-0.020* (0.011)	-0.013 (0.012)	-0.015 (0.024)	-0.020 (0.042)	0.026 (0.051)	0.050* (0.026)	0.010 (0.007)	-0.018* (0.010)
Geo Control Vars	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	176	176	176	176	176	176	176	176
Mean	0.02	0.04	0.10	0.15	0.50	0.14	0.01	0.03

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Regressions at the Household Level

Tables : Land documents and insecurity over land rights, Household Level

Table 22: Land formalization and documents, OLS with secteur fixed effect

	(1)	(2)	(3)	(4)	(5)	(6)
	Paysannat	Document Fallow	Document Field	%Document Field	Insecurity Fallows	Insecurity Fields
Marginal clan	-0.073*** (0.018)	0.032* (0.019)	0.047*** (0.016)	0.041*** (0.010)	0.033** (0.016)	0.033** (0.015)
Men local clan	-0.010 (0.021)	-0.020 (0.021)	0.004 (0.018)	0.006 (0.012)	0.002 (0.018)	0.017 (0.016)
Women from local clan	-0.053 (0.058)	-0.005 (0.056)	0.026 (0.051)	0.009 (0.033)	0.011 (0.048)	0.058 (0.043)
Women F clan	-0.101** (0.045)	-0.025 (0.046)	0.024 (0.039)	0.010 (0.026)	0.046 (0.039)	0.037 (0.036)
Geo Control Vars	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2534	1554	2574	2574	1552	1564
Mean	0.09	0.11	0.13	0.08	0.06	0.08

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The variable about which titles households own on their fallows is only available in a subsample of villages

Table 23: Land formalization and documents, OLS with secteur fixed effect

	(1) Paysannat	(2) Document Fallow	(3) Document Field	(4) %Document Field	(5) Insecurity Fallows	(6) Insecurity Fields
Marginal clan	-0.024 (0.022)	0.008 (0.024)	0.011 (0.020)	0.018 (0.013)	0.013 (0.021)	0.000 (0.019)
Marginal newcomer	-0.143*** (0.030)	0.067** (0.032)	0.094*** (0.026)	0.061*** (0.017)	0.038 (0.027)	0.074*** (0.024)
Men local clan	-0.001 (0.022)	-0.028 (0.023)	-0.006 (0.019)	-0.001 (0.013)	0.002 (0.019)	0.015 (0.018)
Local newcomer not F	-0.156*** (0.050)	0.089* (0.051)	0.071 (0.044)	0.054* (0.029)	-0.007 (0.043)	0.015 (0.039)
Women from local clan	-0.064 (0.075)	-0.010 (0.070)	0.008 (0.066)	0.006 (0.043)	0.038 (0.059)	0.017 (0.054)
Local newcomer F	-0.134*** (0.037)	0.064 (0.040)	0.012 (0.033)	0.030 (0.021)	-0.037 (0.034)	-0.032 (0.031)
Women F clan	-0.067 (0.059)	-0.016 (0.060)	0.035 (0.053)	0.018 (0.034)	-0.032 (0.050)	0.037 (0.047)
Local newcomer not F W	0.005 (0.114)	0.018 (0.114)	0.044 (0.101)	0.012 (0.065)	-0.087 (0.096)	0.102 (0.088)
Local newcomer F W	-0.109 (0.088)	-0.001 (0.092)	-0.005 (0.078)	-0.003 (0.050)	0.191** (0.078)	-0.003 (0.071)
Geo Control Vars	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2533	1521	2538	2538	1519	1533
Mean	0.09	0.11	0.13	0.08	0.06	0.08

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The variable about which titles households own on their fallows is only available in a subsample of villages

Table 24: Land formalization and documents, OLS with secteur fixed effect

	(1)	(2)	(3)	(4)	(5)	(6)
	Paysannat	Document Fallow	Document Field	%Document Field	Insecurity Fallows	Insecurity Fields
Paysannat	0.136*** (0.021)	0.045* (0.024)	-0.015 (0.019)	-0.011 (0.013)	-0.002 (0.021)	-0.007 (0.019)
Marginal clan	-0.085*** (0.028)	0.110*** (0.031)	0.097*** (0.025)	0.074*** (0.016)	-0.014 (0.026)	0.009 (0.024)
Marginal clan x P	0.010 (0.036)	-0.125*** (0.039)	-0.083** (0.032)	-0.056*** (0.021)	0.076** (0.033)	0.038 (0.030)
Men local clan	-0.091*** (0.030)	0.019 (0.030)	-0.014 (0.027)	-0.005 (0.017)	0.000 (0.026)	0.022 (0.023)
Men local clan x P	0.170*** (0.040)	-0.072* (0.043)	0.033 (0.036)	0.018 (0.023)	0.002 (0.036)	-0.013 (0.033)
Women from local clan	-0.101 (0.104)	0.100 (0.116)	0.084 (0.094)	0.073 (0.061)	-0.053 (0.098)	-0.027 (0.090)
Women from local clan x P	0.044 (0.124)	-0.150 (0.133)	-0.080 (0.112)	-0.090 (0.073)	0.086 (0.113)	0.112 (0.103)
Women F clan	-0.050 (0.058)	-0.033 (0.061)	0.021 (0.052)	-0.011 (0.034)	0.089* (0.051)	0.059 (0.046)
Women F clan x P	-0.093 (0.090)	0.038 (0.093)	0.005 (0.080)	0.048 (0.052)	-0.106 (0.079)	-0.061 (0.073)
Geo Control Vars	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2534	1554	2574	2574	1552	1564
Mean	0.09	0.11	0.13	0.08	0.06	0.08

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The variable about which titles households own on their fallows is only available in a subsample of villages

Table 25: Land formalization and documents, OLS with secteur fixed effect

	(1)	(2)	(3)	(4)	(5)	(6)
	Paysannat	Document Fallow	Document Field	%Document Field	Insecurity Fallows	Insecurity Fields
Paysannat	0.138*** (0.022)	0.059** (0.026)	-0.008 (0.020)	-0.004 (0.013)	0.008 (0.022)	-0.005 (0.020)
Marginal newcomer	-0.132*** (0.036)	0.167*** (0.039)	0.171*** (0.033)	0.124*** (0.021)	0.009 (0.033)	0.056* (0.030)
Marginal newcomer x P	-0.064 (0.049)	-0.160*** (0.052)	-0.126*** (0.045)	-0.085*** (0.029)	0.078* (0.044)	0.030 (0.040)
Marginal oldcomer	-0.056 (0.036)	0.087** (0.042)	0.048 (0.032)	0.047** (0.021)	-0.034 (0.036)	-0.047 (0.032)
Marginal oldcomer x P	0.035 (0.045)	-0.121** (0.051)	-0.055 (0.040)	-0.043* (0.026)	0.067 (0.043)	0.068* (0.039)
Local newcomer not F	-0.135** (0.057)	0.130** (0.060)	0.116** (0.051)	0.069** (0.033)	0.018 (0.051)	0.006 (0.045)
Local newcomer Not F x P	0.020 (0.103)	-0.157 (0.104)	-0.157* (0.092)	-0.044 (0.059)	-0.074 (0.088)	0.067 (0.080)
Local newcomer F	-0.069 (0.054)	0.130** (0.059)	0.039 (0.049)	0.055* (0.032)	0.007 (0.050)	-0.044 (0.045)
Local newcomer F x P	-0.097 (0.072)	-0.115 (0.080)	-0.046 (0.066)	-0.043 (0.042)	-0.078 (0.067)	0.020 (0.061)
Local oldcomer Not F	-0.089*** (0.033)	0.013 (0.033)	-0.039 (0.030)	-0.014 (0.019)	0.002 (0.028)	0.027 (0.026)
Local oldcomer Not F x P	0.171*** (0.043)	-0.068 (0.046)	0.059 (0.039)	0.023 (0.025)	0.002 (0.039)	-0.027 (0.035)
Local newcomer not F W	-0.164 (0.158)	0.370* (0.215)	0.108 (0.144)	0.151 (0.093)	-0.034 (0.182)	0.052 (0.166)
Local newcomer Not F W x P	0.124 (0.189)	-0.461* (0.238)	-0.078 (0.172)	-0.188* (0.110)	-0.020 (0.202)	0.084 (0.184)
Local newcomer F W	-0.085 (0.083)	0.003 (0.098)	0.028 (0.075)	-0.008 (0.048)	0.247*** (0.083)	-0.002 (0.072)
Local newcomer F W x P	-0.178 (0.135)	-0.023 (0.146)	0.004 (0.123)	0.059 (0.079)	-0.197 (0.123)	0.081 (0.110)
Local oldcomer Not F W	-0.073 (0.134)	0.016 (0.137)	0.084 (0.122)	0.034 (0.078)	-0.052 (0.116)	-0.058 (0.106)
Local oldcomer Not F W x P	-0.006 (0.160)	-0.049 (0.159)	-0.107 (0.145)	-0.039 (0.093)	0.120 (0.135)	0.103 (0.123)
Local oldcomer F W	-0.036 (0.079)	-0.027 (0.078)	0.040 (0.072)	0.006 (0.046)	0.001 (0.066)	0.106* (0.060)
Local oldcomer F W x P	-0.045 (0.117)	0.049 (0.121)	-0.010 (0.106)	0.028 (0.068)	-0.083 (0.103)	-0.183* (0.096)
Geo Control Vars	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2533	1521	2538	2538	1519	1533
Mean	0.09	0.11	0.13	0.08	0.06	0.08

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The variable about which titles households own on their fallows is only available in a subsample of villages

Tables : Characteristics of the land portfolio, household level

Table 26: Characteristics of the land portfolio, OLS with secteur fixed effect

	(1) Nb plots 2014	(2) Nb Fallows	(3) Area 2014
Marginal clan	-0.363*** (0.107)	-2.426*** (0.697)	-0.303** (0.138)
Men local clan	-0.005 (0.121)	-0.470 (0.770)	0.018 (0.155)
Women from local clan	0.041 (0.341)	-4.002* (2.048)	-0.184 (0.438)
Women F clan	-0.390 (0.263)	-1.295 (1.660)	-0.065 (0.341)
Geo Control Vars	Yes	Yes	Yes
Observations	2584	1561	2567
Mean	4.30	11.49	2.81

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The variable about which titles households own on their fallows is only available in a subsample of villages

Table 27: Characteristics of the land portfolio, OLS with secteur fixed effect

	(1) Nb plots 2014	(2) Nb Fallows	(3) Area 2014
Marginal clan	-0.278** (0.131)	-2.188** (0.887)	-0.277 (0.169)
Marginal newcomer	-0.175 (0.175)	-0.948 (1.147)	-0.011 (0.227)
Men local clan	-0.024 (0.129)	-0.323 (0.836)	0.045 (0.167)
Local newcomer not F	0.109 (0.295)	-2.455 (1.849)	-0.299 (0.381)
Women from local clan	-0.402 (0.442)	-2.428 (2.537)	-0.215 (0.570)
Local newcomer F	-0.169 (0.217)	-2.337 (1.473)	-0.216 (0.280)
Women F clan	-0.382 (0.352)	0.962 (2.179)	-0.199 (0.454)
Local newcomer not F W	1.038 (0.675)	-5.092 (4.157)	0.023 (0.870)
Local newcomer F W	-0.156 (0.521)	-5.594* (3.313)	0.225 (0.671)
Geo Control Vars	Yes	Yes	Yes
Observations	2548	1529	2532
Mean	4.30	11.49	2.81

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The variable about which titles households own on their fallows is only available in a subsample of villages

Table 28: Characteristics of the land portfolio, OLS with secteur fixed effect

	(1) Nb plots 2014	(2) Nb Fallows	(3) Area 2014
Paysannat	-0.281** (0.128)	-1.826** (0.884)	-0.511*** (0.165)
Marginal clan	-0.463*** (0.168)	-3.515*** (1.120)	-0.693*** (0.216)
Marginal clan x P	0.171 (0.215)	1.804 (1.410)	0.650** (0.277)
Men local clan	-0.235 (0.179)	-2.299** (1.096)	-0.520** (0.231)
Men local clan x P	0.393 (0.240)	3.455** (1.551)	0.933*** (0.309)
Women from local clan	0.358 (0.624)	-5.399 (4.232)	-0.191 (0.801)
Women from local clan x P	-0.406 (0.746)	2.268 (4.849)	0.090 (0.958)
Women F clan	-0.375 (0.348)	-1.789 (2.171)	-0.000 (0.447)
Women F clan x P	-0.135 (0.534)	0.504 (3.374)	-0.371 (0.692)
Geo Control Vars	Yes	Yes	Yes
Observations	2584	1561	2567
Mean	4.30	11.49	2.81

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The variable about which titles households own on their fallows is only available in a subsample of villages

Table 29: Characteristics of the land portfolio, OLS with secteur fixed effect

	(1) Nb plots 2014	(2) Nb Fallows	(3) Area 2014
Paysannat	-0.329** (0.134)	-2.137** (0.937)	-0.527*** (0.172)
Marginal newcomer	-0.405* (0.219)	-3.945*** (1.418)	-0.646** (0.283)
Marginal newcomer x P	-0.147 (0.297)	1.257 (1.891)	0.594 (0.384)
Marginal oldcomer	-0.575*** (0.215)	-3.652** (1.546)	-0.724*** (0.278)
Marginal oldcomer x P	0.489* (0.269)	2.391 (1.871)	0.733** (0.347)
Local newcomer not F	-0.055 (0.342)	-1.748 (2.170)	-0.203 (0.439)
Local newcomer Not F x P	0.210 (0.612)	-4.617 (3.798)	-0.645 (0.786)
Local newcomer F	-0.357 (0.325)	-3.230 (2.206)	-0.243 (0.418)
Local newcomer F x P	0.303 (0.436)	1.479 (2.958)	-0.014 (0.560)
Local oldcomer Not F	-0.341* (0.199)	-2.848** (1.207)	-0.635** (0.257)
Local oldcomer Not F x P	0.528** (0.260)	4.798*** (1.683)	1.144*** (0.335)
Women from local clan	-0.322 (0.314)	-2.621 (2.013)	-0.076 (0.403)
Women from local clan x P	0.062 (0.431)	0.189 (2.700)	-0.184 (0.554)
Geo Control Vars	Yes	Yes	Yes
Observations	2548	1529	2532
Mean	4.30	11.49	2.81

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The variable about which titles households own on their fallows is only available in a subsample of villages

Tables : Characteristics of the land portfolio, household level

Table 30: Characteristics of the land portfolio, OLS with secteur fixed effect

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Sh short fallows 2014	Sh med fallows 2014	Sh med fallows 2014	Sh conversions 2014	Sh Forest 2014	Sh cultivated 2014	Sh fallows 2014
Marginal clan	0.030*	-0.022	-0.026	-0.013	-0.014	0.006	-0.013
	(0.016)	(0.014)	(0.018)	(0.011)	(0.011)	(0.011)	(0.012)
Men local clan	-0.018	0.002	-0.006	-0.009	-0.014	0.012	-0.023*
	(0.018)	(0.016)	(0.020)	(0.012)	(0.012)	(0.013)	(0.014)
Women from local clan	0.061	0.005	-0.060	-0.038	-0.037	-0.033	0.059
	(0.052)	(0.046)	(0.056)	(0.034)	(0.034)	(0.036)	(0.038)
Women F clan	0.020	0.035	-0.055	-0.023	-0.022	0.033	-0.008
	(0.039)	(0.036)	(0.042)	(0.026)	(0.026)	(0.028)	(0.030)
Geo Control Vars	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2483	2584	2483	2583	2583	2582	2583
Mean	0.31	0.24	0.41	0.17	0.17	0.54	0.26

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The variable about which titles households own on their fallows is only available in a subsample of villages

Table 31: Characteristics of the land portfolio, OLS with secteur fixed effect

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Sh short fallows 2014	Sh med fallows 2014	Sh med fallows 2014	Sh conversions 2014	Sh Forest 2014	Sh cultivated 2014	Sh fallows 2014
Marginal clan	0.020 (0.020)	-0.016 (0.018)	-0.019 (0.021)	-0.011 (0.013)	-0.012 (0.013)	0.007 (0.014)	-0.012 (0.015)
Marginal newcomer	0.007 (0.027)	-0.020 (0.024)	0.009 (0.029)	0.007 (0.017)	0.008 (0.017)	-0.006 (0.018)	-0.014 (0.020)
Men local clan	-0.022 (0.020)	0.006 (0.018)	0.001 (0.021)	-0.005 (0.013)	-0.010 (0.013)	0.013 (0.014)	-0.024 (0.015)
Local newcomer not F	-0.011 (0.046)	-0.035 (0.040)	0.023 (0.049)	0.003 (0.029)	0.006 (0.029)	0.004 (0.031)	-0.024 (0.033)
Women from local clan	0.001 (0.069)	0.014 (0.060)	-0.012 (0.074)	-0.027 (0.044)	-0.026 (0.044)	-0.044 (0.046)	0.031 (0.050)
Local newcomer F	-0.070** (0.033)	-0.035 (0.029)	0.088** (0.035)	0.048** (0.022)	0.049** (0.021)	-0.005 (0.023)	-0.040 (0.025)
Women F clan	0.003 (0.053)	0.014 (0.048)	-0.031 (0.057)	-0.015 (0.035)	-0.014 (0.035)	0.054 (0.037)	-0.037 (0.040)
Local newcomer not F W	0.122 (0.103)	-0.030 (0.092)	-0.094 (0.111)	-0.018 (0.067)	-0.016 (0.067)	0.022 (0.071)	0.060 (0.076)
Local newcomer F W	0.011 (0.078)	0.030 (0.071)	-0.018 (0.084)	0.002 (0.052)	0.001 (0.051)	-0.054 (0.055)	0.050 (0.059)
Geo Control Vars	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2450	2548	2450	2547	2547	2546	2547
Mean	0.31	0.24	0.41	0.17	0.17	0.54	0.26

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The variable about which titles households own on their fallows is only available in a subsample of villages

Table 32: Characteristics of the land portfolio, OLS with secteur fixed effect

	(1) Sh short fallows 2014	(2) Sh med fallows 2014	(3) Sh med fallows 2014	(4) Sh conversions 2014	(5) Sh Forest 2014	(6) Sh cultivated 2014	(7) Sh fallows 2014
Paysannat	-0.022 (0.019)	0.027 (0.017)	-0.017 (0.021)	0.017 (0.013)	0.018 (0.013)	-0.030** (0.013)	0.011 (0.014)
Marginal clan	0.005 (0.025)	-0.021 (0.023)	-0.012 (0.027)	-0.001 (0.017)	-0.002 (0.017)	0.018 (0.018)	-0.048** (0.019)
Marginal clan x P	0.042 (0.033)	-0.004 (0.029)	-0.021 (0.035)	-0.020 (0.021)	-0.019 (0.021)	-0.017 (0.023)	0.055** (0.024)
Men local clan	-0.036 (0.027)	0.006 (0.024)	0.003 (0.029)	0.001 (0.018)	-0.002 (0.018)	0.029 (0.019)	-0.047** (0.020)
Men local clan x P	0.030 (0.037)	-0.003 (0.033)	-0.018 (0.040)	-0.017 (0.024)	-0.019 (0.024)	-0.035 (0.025)	0.047* (0.027)
Women from local clan	0.000 (0.097)	0.074 (0.085)	-0.099 (0.105)	-0.020 (0.062)	-0.018 (0.062)	-0.065 (0.066)	0.013 (0.070)
Women from local clan x P	0.088 (0.115)	-0.104 (0.101)	0.059 (0.124)	-0.028 (0.074)	-0.030 (0.074)	0.051 (0.078)	0.064 (0.084)
Women F clan	-0.025 (0.052)	0.017 (0.047)	0.005 (0.056)	0.002 (0.035)	0.004 (0.034)	0.070* (0.037)	-0.059 (0.039)
Women F clan x P	0.097 (0.080)	0.050 (0.072)	-0.146* (0.086)	-0.054 (0.053)	-0.055 (0.053)	-0.094* (0.056)	0.123** (0.060)
Geo Control Vars	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2483	2584	2483	2583	2583	2582	2583
Mean	0.31	0.24	0.41	0.17	0.17	0.54	0.26

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The variable about which titles households own on their fallows is only available in a subsample of villages

Table 33: Characteristics of the land portfolio, OLS with secteur fixed effect

	(1) Sh short fallows 2014	(2) Sh med fallows 2014	(3) Sh med fallows 2014	(4) Sh conversions 2014	(5) Sh Forest 2014	(6) Sh cultivated 2014	(7) Sh fallows 2014
Paysannat	-0.027 (0.020)	0.027 (0.018)	-0.016 (0.022)	0.017 (0.013)	0.018 (0.013)	-0.031** (0.014)	0.011 (0.015)
Marginal newcomer	-0.013 (0.033)	-0.034 (0.030)	0.014 (0.036)	0.015 (0.022)	0.016 (0.022)	0.018 (0.023)	-0.061** (0.025)
Marginal newcomer x P	0.072 (0.045)	-0.002 (0.040)	-0.048 (0.049)	-0.034 (0.030)	-0.035 (0.029)	-0.033 (0.031)	0.063* (0.034)
Marginal oldcomer	0.004 (0.032)	-0.018 (0.029)	-0.015 (0.035)	-0.005 (0.021)	-0.007 (0.021)	0.013 (0.023)	-0.046* (0.024)
Marginal oldcomer x P	0.027 (0.041)	0.000 (0.037)	-0.004 (0.044)	-0.011 (0.027)	-0.010 (0.027)	-0.006 (0.028)	0.049 (0.030)
Local newcomer not F	-0.059 (0.052)	-0.020 (0.046)	0.046 (0.056)	0.032 (0.034)	0.030 (0.034)	0.027 (0.036)	-0.073* (0.039)
Local newcomer Not F x P	0.055 (0.100)	-0.014 (0.083)	-0.086 (0.108)	-0.100* (0.061)	-0.096 (0.060)	-0.045 (0.064)	0.075 (0.069)
Local newcomer F	-0.073 (0.049)	-0.026 (0.044)	0.084 (0.053)	0.029 (0.032)	0.033 (0.032)	0.010 (0.034)	-0.024 (0.037)
Local newcomer F x P	0.002 (0.065)	-0.013 (0.059)	0.006 (0.071)	0.038 (0.043)	0.034 (0.043)	-0.032 (0.046)	-0.028 (0.049)
Local oldcomer Not F	-0.041 (0.030)	0.009 (0.027)	0.005 (0.033)	-0.001 (0.020)	-0.004 (0.020)	0.029 (0.021)	-0.047** (0.022)
Local oldcomer Not F x P	0.030 (0.040)	-0.003 (0.035)	-0.009 (0.043)	-0.005 (0.026)	-0.008 (0.026)	-0.032 (0.027)	0.043 (0.029)
Women from local clan	-0.037 (0.047)	0.025 (0.043)	0.001 (0.051)	0.005 (0.031)	0.007 (0.031)	0.035 (0.033)	-0.049 (0.035)
Women from local clan x P	0.114* (0.065)	-0.012 (0.059)	-0.085 (0.070)	-0.048 (0.043)	-0.050 (0.043)	-0.057 (0.045)	0.114** (0.049)
Geo Control Vars	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2450	2548	2450	2547	2547	2546	2547
Mean	0.31	0.24	0.41	0.17	0.17	0.54	0.26

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The variable about which titles households own on their fallows is only available in a subsample of villages