

# On the Origins and Consequences of Communal Property Rights\*

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## Abstract

Economists tend to emphasize the importance of private property rights over land. However, across societies and historically, communal property rights have been more common, particularly in sub-Saharan Africa, Latin America, and parts of Asia. We test the hypothesis that longer fallowing requirements – the time needed to leave land uncultivated to restore fertility – led to a higher prevalence of communal property rights. Longer fallowing requirements may lead to communal property rights because land that must remain fallow for longer periods is less valuable and benefits more from communal insurance and protection. We construct an ecological measure of the fallow length for the most suitable staple crop across grid cells based on soil type, temperature, and climate. We find that places where land needs to be fallowed for longer periods are more likely to have communal property rights. We then examine the implications for the success of land titling policies. We find that longer fallowing requirements are associated with less successful land titling projects. Our results highlight the origins of varied property rights structures and how property rights interact with development programs.

Keywords: Property Rights, Communal Land, Titling Reforms, Cultural Norms

JEL Classification: P14, Q15, O43

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## 1 Introduction

Economists have long argued that private property rights over land are essential for economic development (e.g. [de Soto 2000](#); [de Soto and Cheneval 2006](#)). This view has led to many land titling interventions - at times with disappointing results in terms of take-up and effects on agricultural productivity (e.g. [Platteau 1996, 2000](#); [Easterly 2007](#); [Fenske 2011](#); [Vendryes 2014](#)). Despite economists' focus on private property rights, many societies never develop private property rights and instead rely on communal land rights. In fact, historically, forms of communal property rights were very common ([Henrich 2020](#)): over 50% of societies in the Ethnographic Atlas relied exclusively on communal land rights, while 70% had at least partially communal land rights ([Murdock and White 1969](#)). In addition, communal land rights remain particularly prevalent in sub-Saharan Africa, Latin America, and parts of Asia ([Platteau 2000](#)). Why do some societies rely on communal land rights instead of private land rights? And, how does the presence of communal property rights affect the success of development policies?

Examining the consequences of communal property rights is challenging because property rights regimes are not allocated at random and instead evolve endogenously, due to factors like population density, cultural norms, and land values (e.g. [Boserup 1965](#); [Demsetz 1967](#); [Platteau 1996](#)). Environmental factors may influence the mode of agricultural production and the subsequent organization of property rights ([Boserup 1965](#)). Additionally, the choice of property regime depends on cultural norms for cooperation and various other institutional structures ([Henrich 2020](#)). The non-random allocation of property rights regimes has made it difficult to determine how differing property rights structures affect development outcomes and policy successes.

In this paper, we use insights from [Boserup \(1965\)](#) to make progress on these questions. [Boserup \(1965\)](#) and [Datoo \(1978\)](#) highlighted that societies with longer fallowing requirements for crops were more likely to have communal land rights. Fallow land is land that is usually cultivated but that is allowed to lie idle for several years in order to let it recover its fertility. Longer fallowing requirements may lead to communal land rights for several reasons. First, land that must remain fallow longer is less valuable for an individual to privatize. Second, land with longer fallowing requirements may benefit more from communal management for social insurance and protection from outsiders. Thus, longer fallowing requirements may lead to more communal property rights.

We combine ethnographic and ecological data to systematically explore the relationship between fallowing and communal land rights. We also study whether communal land rights and norms explain part of the heterogeneity in the success of land titling policies. Using FAO models, we construct an ecological measure of the fallow length for the maximum caloric suitability crop across  $5' \times 5'$  degree cells worldwide.<sup>1</sup> We show that this measure is strongly correlated with the amount of land that lay fallow historically in societies covered by the Standard Cross-Cultural Survey (SCCS) data.

We use the fallow requirement data to explore how fallow periods are related to the choice of property rights regimes across societies historically. Using SCCS and Ethnographic Atlas (EA) data, we show that communal land rights are more common in places with longer fallowing requirements for crops, in line with [Boserup \(1965\)](#). Likewise, private property rights are less common in these places. Using codified data from [Elkins et al. \(2009\)](#) on the content of country constitutions, we show that countries with more ancestors from areas with longer fallowing requirements have constitutions that are less likely to recognize private property rights today.

We next explore how communal property rights interact with land titling reforms, given the relatively lackluster success of titling reforms in some settings. In particular, [Easterly \(2007\)](#) posited that land titling reforms are unsuccessful because they often ignore underlying property rights norms that are often communal rather than individual.<sup>2</sup> To explore this hypothesis, we use World Bank project data that provides information on projects that have been implemented, the type of project, and ratings of how successful the project was. We find that land titling projects are significantly less successful in places with longer fallowing requirements and more communal land ownership norms. This negative effect is specific to land titling projects, and not more general to other types of projects.

We also examine how communal property rights affect the incidence of conflict. While private property rights are often suggested as a way to reduce conflict over resources, in settings with low state capacity, communal land rights might be better able to manage conflict. Using ACLED conflict data, we find that conflict is lower in places with longer fallowing requirements and more communal land ownership norms; the negative relationship is particularly strong in settings with low state capacity. This suggests that communal land rights might be better able to reduce conflict in settings where states are weak and ineffective at

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<sup>1</sup>The FAO fallow requirement measure is a non-linear function of soil types, temperatures, and climate.

<sup>2</sup>See also [Home \(2013\)](#).

enforcing private land rights.

Our findings contribute to several strands of literature. First, we contribute to the literature exploring the origins and evolution of property rights over land (Boserup 1965; Demsetz 1967; Bowles and Choi 2019). We provide novel causal evidence on how ecological factors influence the structure of property rights over land. In this paper, we focus on how fallowing lengths affects the emergence and persistence of communal property rights over land. Additionally, existing research has focused on the emergence of private property rights in settings where a counterfactual property rights regime does not exist, i.e. the counterfactual is unregulated “open-access’ resources (e.g Demsetz 1967).<sup>3</sup> However, this is not the only relevant counterfactual for many resources – such as agricultural land. The more common counterfactual property rights regime is often regulated communal property rights (Boserup 1965; Ostrom 1990; Baland and Platteau 1996; Lee Alston and Mueller 1999; Platteau 2000).<sup>4</sup> Thus, we provide evidence on the the origins and consequences of communal property rights over land.

Similarly, our results speak to the literature on how differences in property rights over land affect economic development (e.g. Galiani and Schargrodsy 2011). One challenge in quantifying the effects of private property rights is that it is difficult to disentangle whether the differences in outcomes arise from differences in the organization of property rights (e.g. communal vs. individual) or differences in the security of rights. Studies have found strong evidence that the *security* of property rights is essential (e.g. Besley 1995; Acemoglu and Johnson 2005; Goldstein and Udry 2008; Fenske 2011) and even influences cultural norms (e.g. Di Tella et al. 2007). However, as noted by Platteau (2000), communal land rights may actual offer higher security in many settings relative to private land rights – in particular in places with low state capacity or a long history of communal land rights. The endogenous formation of land rights has meant that there are few causal studies on how organization of land rights matters. We provide evidence that fallow requirements lead to more communal land rights relative to private land rights, and that this difference has implications for the comparative development.

Additionally, the results show how underlying institutions and cultural norms regarding land rights are important determinants of the success of land titling reforms. These findings contribute to a growing body of work highlighting the need to tailor development policies to

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<sup>3</sup>In these cases, the property rights are often held by the state (e.g. Alchian and Demsetz 1973).

<sup>4</sup>For instance, unlike open-access rights, communal land rights allow the exclusion of outsiders from village land (Platteau 2000).

the local institutions and cultural norms where projects are implemented (Alsan et al. 2019; Ashraf et al. 2020; Lowes and Montero 2021; Bau 2021). In particular, we highlight that the way property rights in land are understood and how people view their relationship to land may be quite different across W.E.I.R.D. and non-W.E.I.R.D. societies (Henrich 2020).

Finally, our paper contributes to a growing literature studying how ecological and environmental forces shape culture and institutions (e.g. Alesina et al. 2013; Fenske 2014; Alsan 2015; Galor and Ozak 2016; Becker 2019; Giuliano and Nunn 2020; Boggle and Durante 2021; Fouka and Schläpfer 2020; Mayshar et al. 2021). A few of these papers have focused on how ecological factors influence culture and institutions through their effects on pre-industrial agricultural practices of societies (Alesina et al. 2013; Galor and Ozak 2016; Mayshar et al. 2021, see e.g.). We contribute to this literature by focusing on an understudied but essential economic institution – property rights for land – and show that historical ecological differences in fallowing requirements influence land institutions and development policies.

The rest of this paper is organized as follows. Section 2 provides background on fallow practices, land rights, and the conceptual framework describing our main hypothesis that longer fallow requirements increase the prevalence of communal land rights. Section 3 describes the ecological and ethnographic data we use to test our hypothesis. Section 4 provides our empirical results examining how fallow requirements influence property rights. Section 5 examines the implications of our results for land titling policy success and for the incidence of conflict. Section 6 explores the mechanisms behind our results. Section 7 concludes.

## 2 Background & Conceptual Framework

### 2.1 Fallow Land

The agricultural practice of fallowing land involves allowing land that is usually cultivated to lay idle for periods of time in order to let it recover its fertility. Fallowing is the oldest and most widespread agroforestry practice for restoring land fertility lost in cultivation (Young 1989). The fallow period replenishes nutrients in the land by allowing other natural vegetation to grow.<sup>5</sup> The length of the necessary fallow period depends on soil types, climate

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<sup>5</sup>In more modern agricultural systems, instead of relying solely on naturally occurring vegetation during fallow, specific vegetation – such as grasses, a grass-legume mix, or a green-manure crop rotation – are used to further enhance soil fertility during fallow periods (Fischer et al. 2012).

conditions, the inputs applied, and the types of crops cultivated (Fischer et al. 2012).<sup>6</sup> Fallow periods that are shorter than optimal (given local conditions) lead to low soil fertility and low productivity. Additionally, fallow periods that are too short lead to soil erosion as crops do not develop sufficiently strong root systems to protect against flooding and sliding. Rotating between crop cultivation and fallowing (also known as shifting cultivation) remains a common practice in many countries in Sub-Saharan Africa and Latin America to restore soil fertility and limit soil degradation (López 1998).

Fallowing land is key to restoring land fertility, but it is a complex decision for agricultural producers. Letting land fallow is both an investment and a source of potential insecurity for two reasons. First, by letting land fallow instead of cultivating it, individuals may face consumption insecurity in the absence of social insurance or if they lack access to sufficient non-fallow land (De Zeeuw 1997; López 1998). Second, in settings with weak state capacity, fallow land may be subject to expropriation by outsiders or other villagers (e.g. Goldstein and Udry 2008). The investment and insecurity aspects of the fallowing decision may interact: more security may increase the extent of fallowing (e.g. Goldstein and Udry 2008; Fenske 2011), yet fallowing itself may lead to less security. For these reasons, rather than letting fallow land remain completely unregulated and open to outsiders (i.e. “open-access”), villages often defined property rights over fallow land in various ways.

## 2.2 Communal vs. Private Land Rights

Property rights over land are a bundle of rights related to the use, access, and transfer of land. These rights can take various forms, but they almost always involve some regulations regarding use, transfer, and access rights. In other words, land – including fallow land – is not completely “open-access” land; instead, villages tended to define a set of land rights to govern and manage agricultural land (Platteau 2000).

In societies with private property rights for land, all land rights for a given plot are held by a sole individual or by a nuclear family (as a single household). In contrast, in societies without fully individual private property rights, villagers manage land communally, where several or all land rights are held and granted by a community (Boserup 1965; Platteau 2000). Communities in these cases were defined as a collective group of people who are either extended families, clans, villages, or tribe members (Binswanger and McIntire 1987; Platteau 2000). This form of kin-based communal land ownership was the dominant form

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<sup>6</sup>Eventually, all land should be left fallow after a given period of cultivation (Fischer et al. 2012).

of property rights even in pre-industrial western societies (Boserup 1965; Goody and Goody 1983; Henrich 2020).

Communal land rights can consist of more or less “communality” depending on how many components of rights (e.g. use, access, transfer) are allocated to the community. However, communal land rights tended to have the following characteristics. First, land that is owned communally by villages or lineages has strict restrictions on its use by outsiders (López 1998).<sup>7</sup> Second, individuals often have exclusive use rights on the land that they are currently cultivating and the crops they produce on the land, but, once the land is left fallow, the land can be reallocated by the community (López 1998; Pande and Udry 2005; Goldstein and Udry 2008).

### 2.3 Evolution of Land Rights

In contexts with weak states, communal property rights are the key counterfactual property rights regime to private property rights (Platteau 2000). A fundamental debate in anthropology and economics revolves around the evolution and emergence of various property rights structures. Most prominently, Boserup (1965) highlighted that societies transition across different modes of agriculture in the process of development, often due to increasing population pressures. These systems are characterized by differences in their fallowing methods (ranging from long fallow systems to multi-cropping systems). Boserup (1965) posited that as population pressures increase (and, therefore, land becomes more scarce), societies both transition from extensive to intensive agriculture and tend to develop private property rights for land instead of relying on communal rights.<sup>8</sup>

In a similar vein, an influential view in economics has subsequently argued that individual and private property rights emerge as resources become more scarce and the benefits of privatization exceed its (non-negligible) costs. In particular, Demsetz (1967, pg. 350) summarized the view as follows: “It is my thesis that... the emergence of new property rights takes place in response to the desires of interacting persons for adjustment to new benefit-cost possibilities... property rights develop to internalize externalities when the gains from internalization become larger than the costs of internalization.” Together, this set of hypotheses from Boserup (1965) and Demsetz (1967) became known as the evolutionary theory of

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<sup>7</sup>In other words, communal land is “common property with closed or highly restricted access for external potential users” (López 1998).

<sup>8</sup>See Figure D5 for a summary of Boserup (1965) provided by Datoo (1978).

property rights (*ETPR*) (Platteau 1996).

However, this theory on the evolution of property rights has been subject to important critiques. First, many scholars highlighted that communities often develop informal rules and norms that may be as effective as private rights at managing communal resources (e.g. Ostrom 1990). As noted by Platteau (2000, pg. 90), “in fact, the precise characteristics of communal ownership which [the proponents of the *ETPR*] use as a counterfactual remain largely undefined: the degree of regulation in this property regime is left unspecified, or the potential for regulation in village committees is considered to be hopelessly low” when, in fact, communal land rights may be as effective at managing shared communal resources. Furthermore, scholars have noted that community rules and norms also evolve in response to scarcity in ways that allow them to become better able to manage communal resources (e.g. Hayami and Kikuchi 1981; Hayami and Ruttan 1985; Binswanger and McIntire 1987).

A second important critique is that *ETPR* is less relevant when the costs to privatization remain high and are expected to remain high (Baland and Platteau 1998). In particular, while theories have focused on the benefits of privatization, the costs of privatization are non-negligible (Bruce et al. 1994, Chapter 2). These costs include the costs associated with defining the extent of plots, defending property when there is little state enforcement, and exposure to risks (Baland and Platteau 1998; Platteau 2000).<sup>9</sup> This is especially relevant in rural settings far from state centers, where enforcing private property rights might be particularly costly and states are often weak or absent.

A final related critique of the *ETPR* is that it implicitly assumes that private land rights grant more tenure security, thereby leading to more investment due to an assurance effect. However, this assumption relies on the existence of a strong state or neutral third-party for enforcement. In many settings, this assumption is unlikely to hold and, in fact, communal rights might provide more tenure security (Atwood 1990; Platteau 2000; Brasselle et al. 2002). As noted by Platteau (2000, pg. 140) “as is apparent from the... survey of the African situation, there is no solid basis for claiming that increased individualization of land rights generates an assurance effect. As it turns out, in customary land areas basic use rights seem to be sufficient to induce landholders to invest and the adding of transfer rights (with the possible exception of the right to bequeath land) does not appear to significantly improve investment incentives.”

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<sup>9</sup>Additionally, the *ETPR* analysis often ignores the distributive consequences of privatization; these distributive consequences - by benefiting some and hurting others within a village - might be enough to halt privatization efforts once local political economy forces are factored in.

## 2.4 Implications of Fallow Requirements for Land Property Rights

Both [Boserup \(1965\)](#) and [Demsetz \(1967\)](#) noted a likely relationship between longer fallowing periods and the presence of communal land rights. In her seminal work, [Boserup \(1965\)](#) focused on how population pressures – rather than ecological pressures – shift societies across agricultural practices and institutional structures, slowly leading to the emergence of private land rights. While we build off [Boserup \(1965\)](#) and instead focus on how ecological pressures in the form of different fallowing requirements might lead to different property rights structures, [Boserup \(1965\)](#) noted that fallow periods play an important role in the evolution of property rights:

*"The attachment of individual families to particular plots becomes more and more important with the gradual shortening of the period of fallow and the reduction of the part of the territory which is not used in the rotation... As more and more land is subject to specific cultivation rights little land will be available for redistribution by the chief, and valuable land for redistribution will become available mainly when a family dies out or leaves the territory... Redistribution of land thus becomes a less important and less frequently exerted function of the chief, and in the end it disappears altogether"* ([Boserup 1965](#), pg. 80-81)

In other words, shorter fallow periods are likely associated with more private land rights and less communal land rights. Similarly, [Demsetz \(1967\)](#) highlighted the likely relationship between shorter fallow periods and the emergence of private land rights:

*"Once a crop is grown by the more primitive agricultural societies, it is necessary for them to abandon the land for several years to restore productivity. Property rights in land among such people would require policing cost for several years during which no sizable output is obtained. Since to provide for sustenance these people must move to new land, a property right to be of value to them must be associated with a portable object. Among these people it is common to find property rights to the crops, which, after harvest, are portable, but not to the land. The more advanced agriculturally based primitive societies are able to remain with particular land for longer periods, and here we generally observe property rights to the land as well as to the crops."* ([Demsetz 1967](#))

We build off these insights by [Boserup \(1965\)](#) and [Demsetz \(1967\)](#), and provide a conceptual framework for what longer or shorter fallowing periods imply for individuals under

both private and communal rights. We first discuss how fallow requirements affects incentives under private and communal rights, and then discuss the predictions of the framework.

As in [Baland and Francois \(2005\)](#), consider a rural setting where binding enforcement of contracts is limited and privatization costs are non-negligible.<sup>10</sup> Societies face a decision on whether to use communal land rights (including to manage fallow land and to allocate land) or private property rights. Individuals are risk averse and face liquidity constraints; this means that states of the world without access to cultivatable land are costly and undesirable. Additionally, lack of access to land might also increase intra-community unrest.

Under these conditions, communal land rights will be better able to manage risk and insecurity through the reallocation of land ([Baland and Francois 2005](#)).<sup>11</sup> However, since communal land rights may face a tragedy of the commons, especially when the size of a village is large ([López 1998](#)), private land rights might be better at internalizing the future gains from choosing to fallow land. Thus, there is a potential trade-off between social insurance under communal land rights and efficiency gains under private land rights that depends on the length of the fallow period.

Therefore, all else equal, land with longer fallowing requirements creates a greater need for communal management for social insurance during fallow periods ([Ostrom 1990](#); [Baland and Platteau 1996](#); [De Zeeuw 1997](#); [Platteau 2000](#); [Baland and Francois 2005](#)). As noted by [Platteau \(2006\)](#), when the fallow length is shorter:

*“Since less land returns periodically to the village pool, there are also fewer possibilities to adjust the endowments of community members when the need arises. The scope of the social security mechanism that operates through such adjustments is correspondingly reduced to eventually vanish when all land plots are under the permanent control of their individual possessors”. ([Platteau 2006](#), pg. 847)*

Conversely, land with shorter fallow duration is more valuable land, as it can be cultivated more often and induces less insecurity during fallow periods.<sup>12</sup> This creates greater

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<sup>10</sup>These are important and realistic assumptions, as otherwise both property rights would be optimal under no transaction costs and complete markets: “under some conditions, including the absence of transaction costs, the two solutions [regulated communal ownership and private ownership] are theoretically equivalent and they lead to a Pareto-efficient outcome” ([Platteau 2000](#), pg. 78).

<sup>11</sup>See also [De Zeeuw \(1997\)](#); [Platteau \(2006\)](#). Allocating land to other members facing insecurity during fallow periods reduces the intra-community expropriation risks. Additionally, communal land rights may provide better protection of fallow land if there are returns to scale to group monitoring/defense of outsiders ([Platteau 2000](#)).

<sup>12</sup>By insecurity, we mean both consumption insecurity and expropriation insecurity.

incentives towards private property rights formation ([Boserup 1965](#); [Demsetz 1967](#)).

This simple conceptual framework offers a set of predictions. Primarily, it suggests that increases in the fallow requirements are associated with more communal land rights; conversely, land with lower fallow requirements is more likely to have private land rights. The framework also offers a set of secondary predictions. First, all else equal, higher population density increases the benefits of private vs. communal rights; importantly, this prediction is also in line with [Boserup \(1965\)](#)'s main hypothesis. Second, increases in risk during fallow periods (via production shocks or conflict) increases the prevalence of communal land rights. Finally, more collective cultural norms and higher social capital increase the relative benefits of communal land rights (as in [Ostrom 1990](#)). In fact, these norms are reinforced under communal rights and might co-evolve ([Platteau 2006](#)). For instance, [Hayami and Kikuchi \(1981, pg. 22\)](#) posit that under moderate population growth when privatization remains prohibitively costly, "the social structures becomes tighter and more cohesive in response to a greater need to co-ordinate and control the use of resources as they become increasingly scarce... rules defining rights and obligations among people on the use of the resources as well as rules to settle possible conflicts" then emerge.

However, this framework abstracts from many important aspects. First, it abstracts from equity and distributive considerations, which affect the relative benefits of different property rights. In reality, changes in property rights have distributive consequences; thus, equity considerations will be a fundamental aspect of what property rights evolve ([Baland and Platteau 1998](#)). Second, the framework assumes that state enforcement of land rights is missing. This stands in contrast to some modern settings where states are effective at arbitrating disputes and enforcing private land rights. Communal land rights are likely to be particularly beneficial when the state is unable to enforce private property rights. Third, the framework ignores elite capture, either in state enforcement (e.g. [Behrer et al. 2021](#)) or in land allocation under communal land rights (e.g. [Goldstein and Udry 2008](#)).

### 3 Data

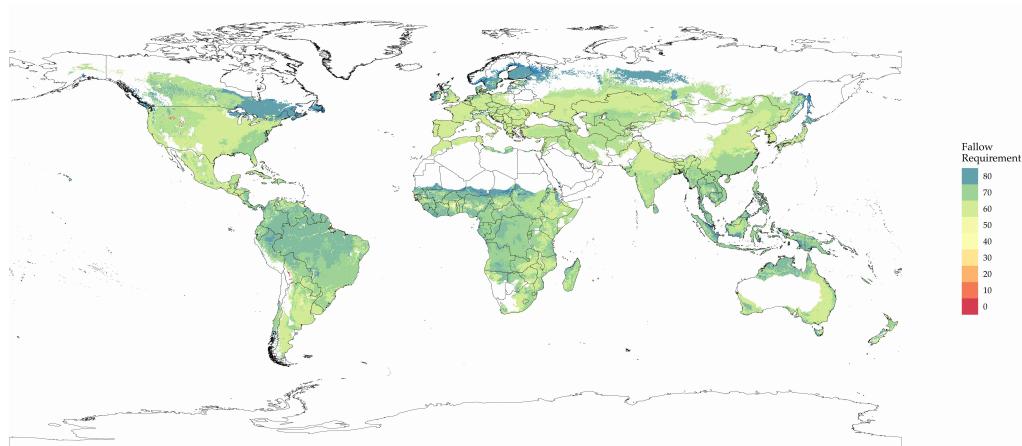
#### 3.1 Data: Fallowing Requirements

We use FAO GAEZ data and models to construct the extent to which various crops require fallowing. The FAO estimates fallow requirements for various crop types as a non-linear function of: local soil type, temperature, crop growth cycles, and climate (moisture) ([Fischer](#)

et al. 2012). The FAO models express fallow requirements as the percentage of time during the fallow-cropping cycle the land must be under fallow. For instance, a fallow requirement of 50% means that after three years of cultivation, the land needs to remain fallow for three years; likewise, a fallow requirement of 70% implies that after three years of cultivation, the land needs to remain fallow for seven years.<sup>13</sup> The fallow requirements are calculated for rain-fed agricultural production using low input levels.<sup>14</sup>

Using the FAO models, we construct the fallowing requirement for the maximum caloric suitability crop (as defined by data from Galor and Ozak 2016) for 5' × 5' degree cells across the world (approximately 100 km<sup>2</sup>).<sup>15</sup> Figure 1 presents a map of fallow requirements across the world.

Figure 1  
Fallow Requirements Across the World



*Notes:* Map presents the fallowing requirement for the maximum caloric suitability crop for across the world in 5' by 5' grid cells. The fallowing requirement for a crop is defined as the optimal percentage of time during the fallow-cropping cycle that land must be under fallow (Fischer et al. 2012). Cells shaded in white represent regions where the land is not suitable for agriculture.

### 3.2 Data: Ethnographic Data

We use two data sources for ethnographic data containing information on societies' agricultural practices historically. First, we use data from Standard Cross-Cultural Sample (SCCS)

<sup>13</sup>The fallow requirements developed by Fischer et al. (2012) were based on previous work estimating fallow periods across different regions (e.g. Young and Wright 1980; FAO/IIASA 1991).

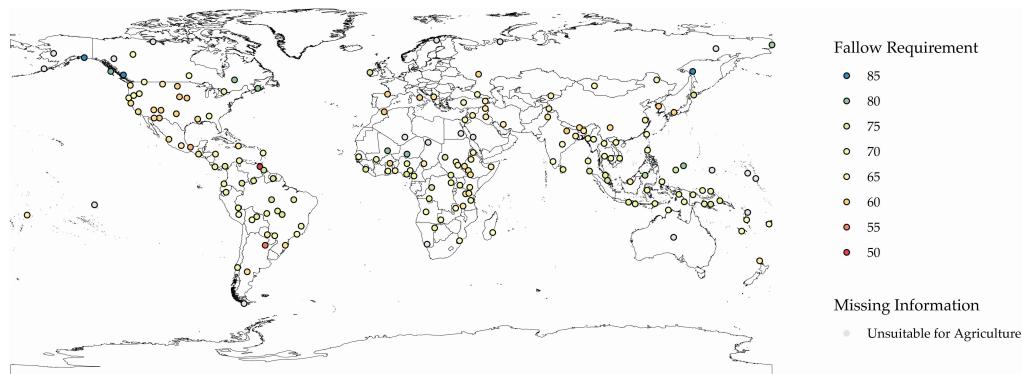
<sup>14</sup>For intermediate level of inputs, the FAO sets fallow requirements at one third of the fallow period requirement under low input levels, and sets fallow requirements uniformly at 10% for high input levels (Fischer et al. 2012).

<sup>15</sup>See Galor and Ozak (2016) Figure A.1 for a map showing the maximum caloric suitability crop for 5' × 5' degree cells.

(Murdock and White 1969). This data source contains very detailed ethnographic questions – including on land rights – for 186 cultures. To study a larger set of societies, we also use data from the Ethnographic Atlas (EA) that provides ethnographic data on 1,265 societies (Murdock 1967). While the EA covers a larger set of societies than the SCCS that we can then link to modern linguistic groups, the EA does not contain detailed questions on land rights. However, note that the SCCS societies were chosen from the full sample of societies from the EA; this sample was chosen to be representative of the full sample, and to be culturally and historically independent from other societies samples.<sup>16</sup>

For both ethnographic data sources, information on each society is coded for the earliest possible period that contains satisfactory ethnographic data.<sup>17</sup> This information has been coded to attempt to reflect conditions prior to industrialization and (where applicable) prior to European contact. Both data sources contain longitude and latitude measures for the centroid of a societies historical location. Figures 2 and 3 present maps with the centroids of SCCS and EA societies, and the estimated fallow requirements (described in Section 3.1) for a 100 km buffer around these centroids.

Figure 2  
Fallow Requirements Across SCCS Societies

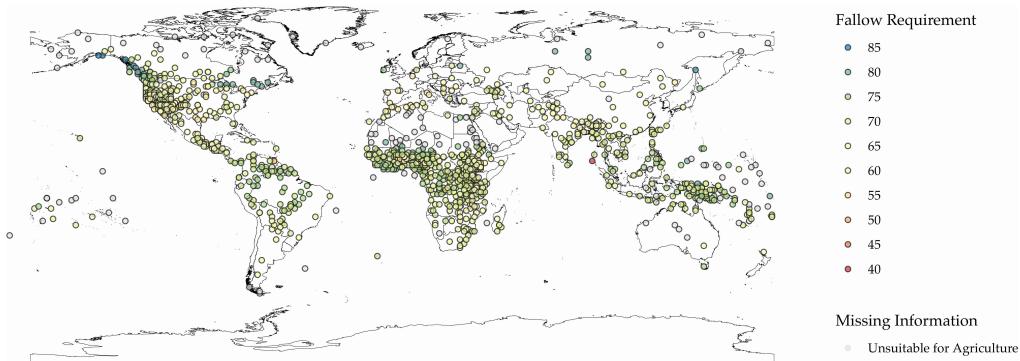


*Notes:* Map presents the fallowing requirement – percentage of time during the fallow-cropping cycle that land must be under fallow – for the maximum caloric suitability crop for each group in the SCCS. Grey dots represent groups where the land is not suitable for agriculture.

<sup>16</sup>The SCCS selection first grouped the 1,265 societies from the EA into 186 clusters of closely-related cultures, and then one representative and well-documented society was chosen from each cluster to be part of the SCCS (Murdock and White 1969).

<sup>17</sup>For societies with a written history, the dates of this written history are the observation dates. For groups without written histories, the dates of observation refer to the dates of earliest observation of these cultures by ethnographers.

Figure 3  
Fallow Requirements Across EA Societies



*Notes:* Map presents the fallowing requirement – percentage of time during the fallow-cropping cycle that land must be under fallow – for the maximum caloric suitability crop for each group in the EA. Grey dots represent groups where the land is not suitable for agriculture.

### 3.2.1 Measuring Land Rights: SCCS

To examine whether a society in the SCCS has communal land rights or private land rights, we use variable 1726 denoted as measuring the “Communality of Land” (Murdock and White 1969). This is a 1 to 3 categorical variable, where 1 = land is predominantly private property, 2 = land is partially communally used, and 3 = communal land use rights only.

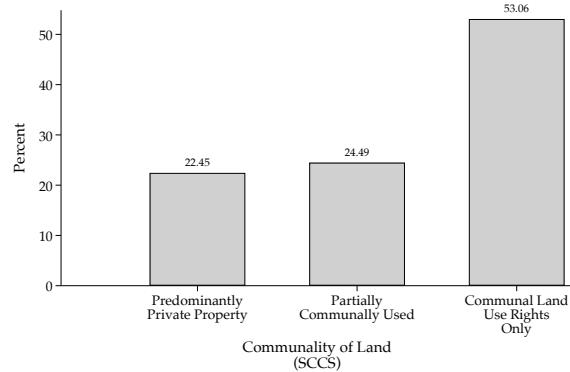
Figure 4 presents the distribution for the “Communality of Land” variable. 53.06% of SCCS societies had communal land rights use only, 24.49% had partial communal land rights, and 22.45% had predominately private property rights. Figure 5 presents a map of the communality of land measure across SCCS societies. Communal land rights are particularly prevalent in South America, Sub-Saharan Africa, and parts of Asia.

To validate that our measure of fallowing requirements correlates with the actual amount of fallow land by a society, we use variable 1128 from the SCCS, labeled as the “Cropping Index (Rough indicator of Fallowing) for Major Crops” (Murdock and White 1969). This variable measures the “percentage of total land used for major crops used in any given year,” where land that is not used is presumed to be fallow land (Pryor 1986).<sup>18</sup> For societies that practiced agricultural production, the variable is a 1-5 categorical variable, where 1= less than 10% of land used per year, 2 = 10% - 29% of land used per year, 3 = 30% - 49% of land used per year, 4 = 50% - 99% of land used per year, and 5 = 100% or more of land used per year.<sup>19</sup>

<sup>18</sup>It notes that tree crops are considered to have no fallow.

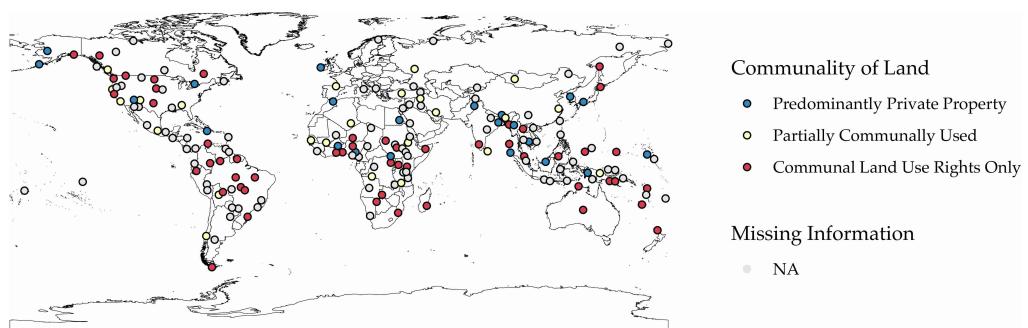
<sup>19</sup>The amount of land used for major crops can be over 100% due to double cropping.

**Figure 4**  
Communality of Land in the SCCS



*Notes:* Figure presents a histogram for the “Communality of Land” variable for societies in the SCCS.

**Figure 5**  
Communal Land Rights Across SCCS Societies



*Notes:* Map presents the extent to which land rights are organized communally in the SCCS.

### 3.3 Data: Ethnologue to Link Ethnographic Data to Modern Data

While some outcomes of interest (such as land rights historically) are available at the society-level, some more modern outcomes of interest (such as modern land rights) are available at the country level. Thus, for analyses involving these modern outcomes, we construct measures of fallowing requirements at the country level using the data and methodology developed by [Alesina et al. \(2013\)](#) and [Giuliano and Nunn \(2018\)](#). The country-level measure corresponds to the average fallowing requirement faced by the ancestors of individuals currently living in a country. To create this measure, we use data from [Giuliano and Nunn \(2018\)](#) on (i) the location of ethnic groups using over 7,000 different languages or dialects from Ethnologue 16 linked to societies in the EA, and (ii) information on the global population densities (at a one-kilometer resolution) from the Landscan database. By using the link between the EA societies and each of the 7,000+ Ethnologue dialects from [Giuliano and Nunn \(2018\)](#), we create a measures of ancestral fallowing requirements for all individuals living in a country today. Figure C3 presents a map of the fallowing requirement for the Ethnologue dialects linked to EA societies, and Figure C4 presents a map of the ancestry-adjusted fallow requirements across countries.

## 4 Results: Fallowing Requirements & Property Right Origins

### 4.1 Empirical Strategy

We examine the correlation between fallowing requirements and our outcomes of interest (e.g. communal land rights) in ethnographic data by estimating the following equation:

$$y_{sc} = \gamma_1 FallowRequirement_{sc} + \mathbf{X}'^G_{sc} \boldsymbol{\Gamma} + \mathbf{X}'^H_{sc} \boldsymbol{\Phi} + \delta_{r(c)} + \varepsilon_{sc} \quad (1)$$

where  $y_{sc}$  is the outcome of interest for society  $s$  for country  $c$ . We measure  $FallowRequirement_{sc}$  as the average percentage of time during the fallow-cropping cycle that land must be under fallow for the maximum caloric suitability crop of a society  $s$  using a 100 km buffer around the society's centroid. We include  $\mathbf{X}'^G_{sc}$ , a vector of geographic covariates at the society-level, and  $\mathbf{X}'^H_{sc}$ , a vector of historical pre-colonial ethnographic covariates. The society-level geographic and ethnographic controls and are described in detail below. We also include continent fixed effects,  $\delta_{r(c)}$  (where  $r(c)$  is a function that maps countries  $c$  to continents  $r(c)$ ), to account for time-invariant differences across regions, and we estimate robust standard

errors.

## 4.2 Validating Fallow Requirement Measure

We first confirm that the FAO fallowing requirement measure is correlated with observed fallowing practices across societies. We estimate equation (1) for SCCS societies where the outcome variable is the “Cropping Index” (i.e. percentage of total land for major crops used in any given year). If our fallowing requirement measure is a valid proxy for agricultural practices historically (and subsequent property rights), then we would expect a strong negative relationship between fallowing requirements and the percentage of land used for major crops in a given year.<sup>20</sup> Figure 6 presents a binscatter between a society’s estimated fallow requirement and the cropping index measure. We find a negative and statistically significant relationship between a society’s estimated fallow requirement and the cropping index measure, helping validate our fallow requirement measure.

We further investigate the robustness of this relationship to geographic covariates. This addresses the concern the relationship between fallowing requirements and amount of land used might be driven by omitted differences in geographic characteristics. Table 1 presents the estimates for equation (1) where we sequentially add a number of geographic covariates that might affect the amount of fallow land. In particular, we include continent fixed-effects (in columns (2)-(5)); controls for latitude, longitude, average precipitation, average temperature, and agricultural suitability (in columns (3)-(5)); controls for malarial suitability and tsetse fly suitability (in columns (4)-(5)); and, fixed-effects for the maximum caloric crop for each society (in column (5)) to account for unobserved differences across crops (which is an importance concern given recent work on how differences across crops lead to differences in state institutions [Mayshar et al. 2021](#)).<sup>21</sup> Throughout, we continue to find a negative and statistically significant relationship between fallowing requirements and the amount of agricultural land used in a given year: a 10 percentage point increase in fallow requirements is associated with using 4.5% less land in a given year. These results further validate that the fallow requirement measure is a strong proxy for historical fallowing practices.<sup>22</sup>

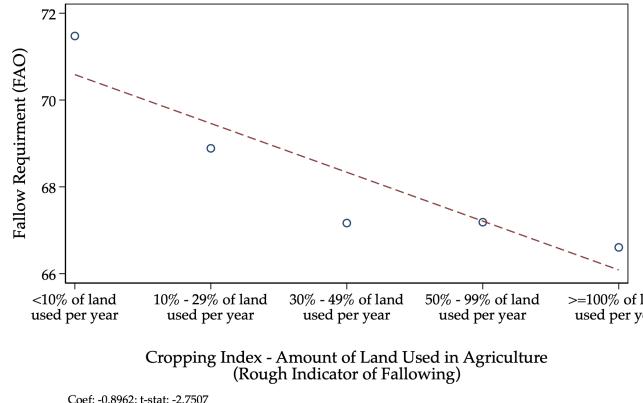
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<sup>20</sup>This question is only available in the SCCS data and not in the EA.

<sup>21</sup>All controls aside from latitude and longitude are calculated using a 100 km buffer around an SCCS societies centroid.

<sup>22</sup>Similarly, [Boserup \(1965\)](#) noted that longer fallowing requirements would also be associated with more extensive (less intensive) agricultural production. Table D2 presents estimates for the relationship between longer FAO fallow requirements and the intensity of agriculture across societies in the SCCS. We find evidence consistent with [Boserup \(1965\)](#): longer FAO fallow requirements are associated with more extensive agricultural

**Figure 6**  
Fallowing Requirements & Observed Fallowing Intensity: SCCS



*Notes:* The figure presents binscatters between the fallowing requirements and the reported share of a land used for major crops (a proxy for the amount of land lay fallow in a given year). The unit of observation is a SCCS group. Regressions control for latitude, longitude, and continent fixed-effects. The bottom-right of each figure presents the estimated bivariate coefficient and t-statistic. Standard errors are clustered at the SCCS group level.

**Table 1**  
Effect of Fallow Requirement on Amount of Land Used For Agriculture  
(Rough Indicator for Fallowing)

	Dependent Variable: <i>Amount of Agricultural Land Used</i>				
	(1)	(2)	(3)	(4)	(5)
<i>Fallow Requirement</i>	-0.062*** (0.023)	-0.063*** (0.020)	-0.043* (0.024)	-0.044* (0.025)	-0.044* (0.026)
Continent FE	N	Y	Y	Y	Y
Geography Controls	N	N	Y	Y	Y
Disease Controls	N	N	N	Y	Y
Crop FE	N	N	N	N	Y
Outcome Mean	2.43	2.43	2.43	2.43	2.43
Adjusted R <sup>2</sup>	0.038	0.187	0.243	0.234	0.256
Observations	145	145	145	145	145

*Notes:* The unit of observation is a society in the Standard Cross Cultural Survey (SCCS). Robust standard errors in parentheses. The dependent variable *Amount of Agricultural Land Used* is a 1 to 5 categorical variable, where 1=<10% of agricultural land used per year, 2=10-29% of agricultural land used per year, 3=30-49% of agricultural land used per year, 4=50-99% of agricultural land used per year, and 5=>100% of agricultural land used per year. *Geography Controls* include centroid longitude, centroid latitude, average rainfall, average temperature, elevation, and agricultural suitability. *Disease Controls* include malaria suitability and tsetse suitability. *Crop FE*s are fixed effects for the maximum caloric suitability crop in each society. *Ethnographic Controls* includes the presence of large domesticated animals, the proportion of the local environment that is tropical or subtropical, an index of settlement density, and an index of political development. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

### 4.3 Fallowing Requirements & Land Rights

We next test the hypothesis that longer fallowing requirements are associated with a higher probability that a society has communal land rights instead of private land rights. We first estimate equation (1) for SCCS societies where the outcome variable is the “Communality of Land” variable.<sup>23</sup> Figure 7 presents a binscatter examining the relationship between a society’s FAO fallowing requirement and the extent to which land rights were communal. Consistent with [Boserup \(1965\)](#) and Section 2.4, we find that societies that had longer fallowing requirements were more likely to own land communally rather than privately.

Table 2 presents the estimates for equation (1) while sequentially including geographic and ethnographic covariates. Columns (2)-(5) include the geographic covariates included in Table 1; column (6) adds additional ethnographic controls, including an indicator for the presence of large domesticated animals, the proportion of the local environment that is tropical or subtropical, an index of settlement complexity (e.g. nomadic vs. settled), and an index of political development (i.e. jurisdictional hierarchy beyond the local level).<sup>24</sup> Across all specifications, we find that a positive and statistically significant relationship between longer fallowing requirements and the presence of communal land rights: a 10 percentage point increase in fallow requirements is associated with a 4.1 percentage point higher probability of communal land rights being present. The results suggest that fallowing constraints were an important factor determining how communities organized land ownership.

### 4.4 Fallowing Requirements & Land Rights in Constitutions

The results in Section 4.3 show that longer fallowing requirements are associated with a historically higher prevalence of communal land rights and a lower prevalence of private land rights. We now explore whether this relationship continues to hold in more contemporary measures of land rights. We use data from the Comparative Constitutions Project (hereafter CCP) ([Elkins et al. 2009](#)). The CCP database is a systematic codification of the characteristics (form and content) of all the world’s constitutions, both past and present. The database covers country-year pairs for most independent countries since 1789. In addition, the database records all changes made to the constitution of a country over time (amend-

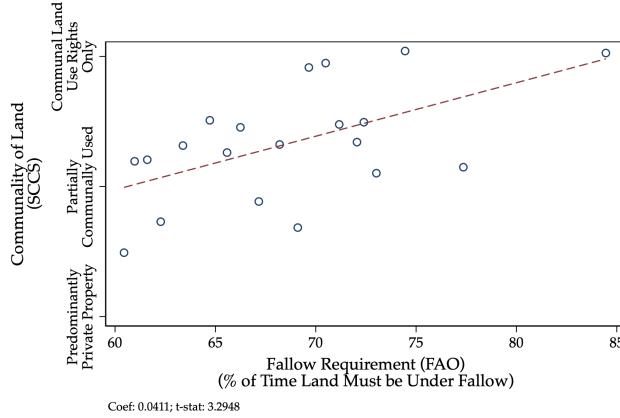
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production. This provides further evidence that the FAO measure of fallow requirements is a strong proxy for historical fallowing practices.

<sup>23</sup>This question is only available in the SCCS data and not in the EA data.

<sup>24</sup>Note that many of these variables could also be affected by fallowing lengths and are likely “bad controls”. For this reason, we show results with and without their inclusion.

**Figure 7**  
Fallowing Requirements & Communal Land Rights: SCCS



*Notes:* The figure presents binscatters between the fallowing requirements and the communality of land property rights. The unit of observation is a SCCS group. Regressions control for latitude, longitude, and continent fixed-effects. The bottom-right of each figure presents the estimated bivariate coefficient and t-statistic. Standard errors are clustered at the SCCS group level.

**Table 2**  
Effect of Fallow Requirement on Communal Land Rights

	Dependent Variable: <i>Communality of Land Rights</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Fallow Requirement</i>	0.043*** (0.013)	0.039*** (0.014)	0.031** (0.015)	0.033** (0.015)	0.036** (0.016)	0.041** (0.020)
Continent FE	N	Y	Y	Y	Y	Y
Geography Controls	N	N	Y	Y	Y	Y
Disease Controls	N	N	N	Y	Y	Y
Crop FE	N	N	N	N	Y	Y
Ethnographic Controls	N	N	N	N	N	Y
Outcome Mean	2.33	2.33	2.33	2.33	2.33	2.29
Adjusted R <sup>2</sup>	0.098	0.113	0.151	0.138	0.221	0.227
Observations	88	88	88	88	88	82

*Notes:* The unit of observation is a society in the Standard Cross Cultural Survey (SCCS). Robust standard errors in parentheses. The dependent variable *Communality of Land Rights* is a 1 to 3 categorical variable, where 1=land is predominantly private property, 2=land is partially communally used, and 3=communal land use rights only. *Geography Controls* include centroid longitude, centroid latitude, average rainfall, average temperature, elevation, and agricultural suitability. *Disease Controls* include malaria suitability and tsetse suitability. *Crop FE*s are fixed effects for the maximum caloric suitability crop in each society. *Ethnographic Controls* includes the presence of large domesticated animals, the proportion of the local environment that is tropical or subtropical, an index of settlement density, and an index of political development. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

ments, new constitutions, reinstatement, interim constitution). In the following analysis, the unit of observation is the constitution in force in a given country on December 31st of a given year since that country has had a written constitution. We examine five different measures of property rights; each measure a different dimension of property rights. We define indicator variables equal to one if a constitution grants individual rights to: (1) transfer property, (2) own property, (3) testate property (right to give property at death), and (4) inherit property. We view each of these measures as proxies for stronger private property rights. Additionally, we combine all four measures in a index for private property rights that is computed as the average of the other four variables.<sup>25</sup>

Table 3 presents the estimates for the relationship between these outcomes and the ancestry-adjusted fallowing requirement measure (described in Section 3.3). Even columns only condition on continent fixed-effects, while odd columns also include the same ancestry-adjusted geographic and ethnographic covariates that are in Table 2. We find that higher ancestral fallowing requirements have a negative and statistically significant relationship with most of these measures of individual property rights. The exception is "inherit property", where the coefficient is negative but not significant. For the index of property rights (columns (9) and (10)), a one standard deviation increase in the ancestry-adjusted fallow requirement is associated with a 0.167 standard deviation reduction in the index of property rights measure. These results provide evidence that ancestral fallowing requirements continue to shape the organization of property rights today.

In Appendix Table D4 we include additional control variables. Because constitutions of previously colonized countries may be influenced by former colonizers (La Porta et al. 2008) we include controls for the legal origin of the law. We also show our results are robust to controlling population density in 1500 and GDP per capita in 2000.

## 5 Results: Property Rights & Consequences for Development

We have shown that longer fallow requirements lead to the development of more communal land rights. We now ask what are the consequences of communal land rights for development. In particular, we examine the implications of different property rights structures on the success of land titling policies, and on the incidence of conflict.

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<sup>25</sup>Variables defined in the [Appendix A](#)

**Table 3**  
Following Requirement and the Property Rights Bundle: Evidence from National Constitutions

	Dependent Variable: Right to [...] in Constitution										Index of Property Rights	
	Transfer Property		Own Property		Testate Property		Inherit Property					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		
Fallowing Requirement [std.]	-0.083*** (0.025)	-0.038 (0.050)	-0.065** (0.030)	-0.075** (0.036)	-0.042** (0.021)	-0.054 (0.037)	-0.057 (0.045)	-0.040 (0.051)	-0.072*** (0.018)	-0.065** (0.028)		
Mean Dep. Var.	0.22	0.22	0.82	0.82	0.10	0.10	0.09	0.09	0.35	0.35		
Num. of Custers	122	122	122	122	121	121	121	121	123	123		
Observations	8188	8188	8024	8024	8288	8288	8079	8079	8633	8633		
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Ethnographic Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes		
Geographic Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes		
Continent FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
R <sup>2</sup>	0.185	0.243	0.183	0.248	0.079	0.098	0.162	0.223	0.153	0.207		

Notes: OLS estimates with robust standard errors clustered at the country level in parenthesis. The unit of observation is a country's constitution in a given year. Data is from the *Comparative Constitutions Project* (Elkins et al. 2009). Across specifications, outcomes are dummy variables equal to one if a constitution grants rights to one if a constitution grants rights to (1-2) transfer property, (3-4) own property, and (7-8) inherit property. Outcome variable in columns 9 and 10 is property rights index computed as the average of the other four variables. Odd columns control for country-adjusted geographic characteristics (latitude, longitude, elevation, land suitability, malaria) and ethnographic controls (settlement complexity, mean size of local community, political complexity, historical reliance on pastoralism and historical reliance on agriculture). Every specification controls for the log number of years since a constitution was first written, the total number of amendments made to each constitution, year dummies and continent fixed effects. The sample is restricted to countries where all groups practiced agriculture to varying degrees and for which information on fallow time is available. \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

## 5.1 Property Rights & Titling Policy Success

How does the presence of communal property rights for land influence the success of development policies? Many scholars have posited that private property rights for land are essential for economic development and, therefore, policies should aim to increase their prevalence in developing economies (e.g. [de Soto 2000](#); [de Soto and Cheneval 2006](#)). This influential view led to multiple reforms aimed at titling land, especially in the 1990 and 2000s across Africa and Latin America.<sup>26</sup> However, many of these titling reforms have often had mixed and often disappointing results (e.g. [Platteau 1996, 2000](#); [Jacoby and Minten 2007](#); [Vendryes 2014](#); [Lawry et al. 2017](#)).

Given these lackluster results despite immense foreign investment in titling policies, [Easterly \(2007\)](#) hypothesized that the lack of success may often occur because land titling reforms often ignore underlying property rights norms, where land rights are often communal rather than individualistic.<sup>27</sup> For instance, the British colonial land reforms in Kenya sought to privatize land in settings where customary land rights were strong and well-defined; this led to low levels of take-up and, instead, efforts to recognize communal land rights ([Easterly 2007](#); [Home 2013](#)).

To explore whether the success of titling reforms interacts with the underlying land right structures, we use World Bank project data provided by [AidData \(2017\)](#). This data covers World Bank funded projects between 1995 and 2014 and includes information on the location, description, and sectors. To examine the success of projects, we explore the outcome rating of projects. A subset of these projects are given an outcome rating based on “the extent to which the operation’s major relevant objectives were achieved, or are expected to be achieved, efficiently”. The outcome rating is a six point categorical scale ranging from highly unsatisfactory to highly satisfactory project. We limit the sample to those projects that are given a rating.

We use information on project sectors and project description to classify whether projects involved land titling or not. In particular, we define a project as being in a land titling project if one of its five sector categories or project title refers to land titling.<sup>28</sup>

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<sup>26</sup>For instance, in 2005, the World Bank alone was supervising a portfolio of more than U.S.\$1 billion worth of land administration projects ([Galiani and Schargrodsky 2011](#)).

<sup>27</sup>See also [Miceli and Kieyah \(2003\)](#) for a theoretical model on why titling policies often fail to succeed.

<sup>28</sup>Specifically, the project is labeled as a titling project if the description or sector includes one of the following key words: titling, title, land reform, property right, land administration, land registration, land development project, cadastre, land records, land management.

We use this data to test whether countries that have higher ancestral fallow requirements (and therefore more communal land rights) have less successful land projects. In particular, we compare the success of land projects and non-land projects by ancestral fallow requirements. We present the results of a pooled regression of the project outcome on the ancestral fallow requirement measure in Table 4. On average, World Bank projects receive a rating between moderately satisfactory and satisfactory in our sample. For land titling projects, we find a sizable and negative effect of fallow requirements on the rating received: a one standard deviation increase in the fallow requirement is associated with approximately a one point decrease in the project rating (equivalent to moving from moderately satisfactory to moderately unsatisfactory). Reassuringly, this effect for fallow requirements is only found for land titling projects, and not other types of World Bank projects. Additionally, in Figure D6, we present binscatters of the relationship between fallow requirements and World Bank ratings for titling and non-titling project separately. The figure shows that land titling projects are significantly less successful in places with more communal ownership norms, and that this relationship does not hold when examining other types of projects. These results suggest that the success of titling reforms may depend on the underlying property rights regimes.

## 5.2 Property Rights & Conflict

The conceptual framework in Section 2.4 highlights the important role that land-conflict management plays in the choice of property rights regime. It also highlights that private property rights may increase the amount of land-related conflicts in areas with low state capacity and enforcement. Communal property rights in these settings might therefore be associated with less conflict.

To explore this mechanism, we use two complementary sources of data. First, we use georeferenced conflict data from ACLED. This data has a broader coverage, capturing conflict events from 1997-2021 for Africa, 2016-2021 for Latin America, and 2018-2021 for all other countries. However, the ACLED data does not consistently disentangle whether conflict events were land-related or not. To capture whether a conflict event was due to land conflicts, we follow the methodology in Eberle et al. (2020) to construct measures of “land-related” violence using the “notes” recorded for each event to find instances that mention land issues in the description. Second, to complement the ACLED data and use a measure of land-specific conflict, we use data from the Institutional Profiles Database (IDP) that records the

**Table 4**  
Effect of Fallow Requirement on World Bank Project Success

	Dependent Variable:					
	<i>World bank Project Rating</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Fallow Requirement × Land Titling Project</i>	-0.944*** (0.243)	-0.906*** (0.238)	-0.872*** (0.251)	-0.842*** (0.260)	-0.845*** (0.267)	-0.716*** (0.188)
<i>Land Titling Project</i>	-0.576** (0.240)	-0.600** (0.235)	-0.390* (0.215)	-0.420** (0.210)	-0.380* (0.203)	-0.216 (0.175)
<i>Fallow Requirement [.std]</i>	-0.098 (0.062)	-0.079 (0.079)	-0.074 (0.072)	-0.004 (0.076)	-0.011 (0.067)	
Continent FEs	N	Y	Y	Y	Y	Y
Project Sector FEs	N	N	Y	Y	Y	Y
Project Year FEs	N	N	Y	Y	Y	Y
Geography Controls	N	N	N	Y	Y	Y
Ethnographic Controls	N	N	N	N	Y	Y
Country FEs	N	N	N	N	N	Y
Outcome Mean	4.24	4.24	4.23	4.23	4.23	4.23
Adjusted R <sup>2</sup>	0.010	0.034	0.136	0.156	0.178	0.296
Observations	21,228	21,228	21,172	21,172	21,172	21,172
Clusters	87	87	87	87	87	87

*Notes:* The unit of observation is a project-country pair. Standard errors are clustered at the country level and presented in parentheses. The dependent variable *World Bank Project Rating* is a variable ranging from 1 to 5, where 1 = a project was rated as highly unsatisfactory, 2 = unsatisfactory, 3 = moderately unsatisfactory, 4 = moderately satisfactory, and 5 = satisfactory. *Fallowing Requirement* is the country-level population-weighted measure of a country's fallowing requirement. *Land Titling Project* is an indicator variable equal to 1 if the project description mentions land titling. *Geography Controls* include longitude, latitude, elevation, land suitability, and malaria suitability. *Ethnographic Controls* includes settlement complexity, mean size of local community, political complexity, historical reliance on pastoralism, and historical reliance on agriculture. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

severity of land-related conflicts at the country level. The IDP data was constructed using surveys completed by country or regional Economic Services agents of the French Ministry for the Economy and Finance. The benefit of this data is that it provides high-quality measures from experts. However, the data covers only 95 countries and relies on perceptions rather than on specific reports or instances of conflict.

Table 5 presents the regression estimates for the relationship between the number of conflict events in the ACLED data and ancestral fallowing requirements of ethnologue groups. We find that longer fallowing requirements are associated with less conflict. These results are robust to a number of geographic and ecological covariates, population density controls, and country fixed-effects. The results suggest that societies with longer fallow requirements and more communal land rights experience less conflict. Interestingly, result is in contrast to accounts that private rights reduce conflict. However, as highlighted in Section 2.4, in settings with low state capacity, communal land rights might be better at providing social insurance and reducing social conflict.

To explore this heterogeneity, we explore whether the relationship between conflict and ancestral fallowing requirements varies by the extent of state capacity. Specifically, we examine this relationship by looking at countries with high (above median) and low (below median) the “Rule of Law” measure from the World Bank Governance Indicators data. Figure 8 presents the binscatter for the number of conflict events in the ACLED data by high and low rule of law countries. We find that the negative relationship between conflict and historical fallowing requirements is concentrated in low rule of law countries. This suggests that communal land rights (relative to private land rights) might be particularly effective at reducing conflict in settings with weak states.

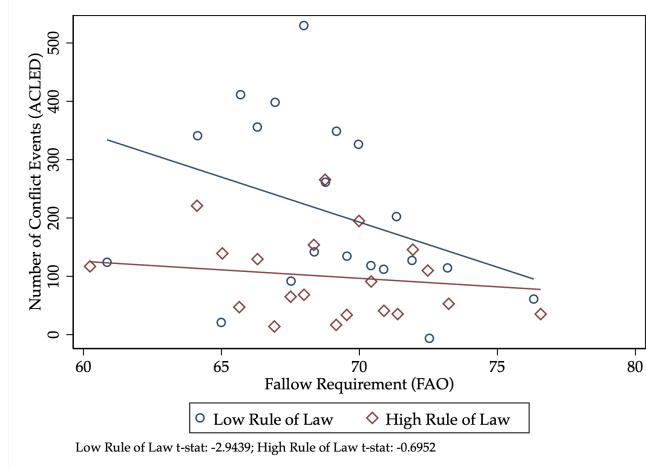
Finally, we examine the relationship between historical fallowing requirements and land-specific conflict events. Figure 9 presents the binscatter for the number of land-related conflicts in the ACLED data. It shows that areas with longer historical fallowing requirements have lower amounts of land-related conflict. Figure 10 provides the binscatter for the severity of land-related conflict across countries from the IDP data. It shows that countries with longer historical fallowing requirements tend to have less land-related conflict. These results together suggest that communal property rights are associated with lower land-related conflict.

**Table 5**  
Effect of Fallow Requirement on Conflict

	<b>Dependent Variable:</b> <i>Number of Conflict Events</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Fallow Requirement</i>	−10.160** (4.208)	−8.956*** (3.120)	−8.995*** (3.123)	−9.307*** (3.302)	−8.072** (3.294)	−8.584*** (3.243)
Country FEs	Y	Y	Y	Y	Y	Y
Geography Controls	N	Y	Y	Y	Y	Y
Disease Controls	N	N	Y	Y	Y	Y
Crop FEs	N	N	N	Y	Y	Y
Ethnographic Controls	N	N	N	N	Y	Y
Population Controls	N	N	N	N	N	Y
Outcome Mean	142.44	142.91	142.91	142.93	152.68	152.68
Adjusted R <sup>2</sup>	0.157	0.159	0.159	0.163	0.170	0.196
Observations	6,719	6,697	6,697	6,696	5,983	5,983
Clusters	6,719	6,697	6,697	6,696	5,983	5,983

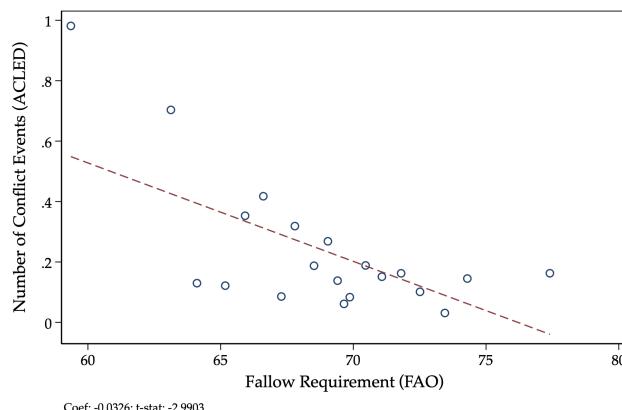
*Notes:* The unit of observation is an ethnologue group. Standard errors clustered by ethnologue group in parentheses. The dependent variable *Number of Conflict Events* is defined as the number of conflict events in the ACLED data per ethnologue group. *Geography Controls* include centroid longitude, centroid latitude, average rainfall, average temperature, elevation, and agricultural suitability. *Disease Controls* include malaria suitability and tsetse suitability. *Crop FEs* are fixed effects for the maximum caloric suitability crop in each society. *Ethnographic Controls* includes the presence of large domesticated animals, the proportion of the local environment that is tropical or subtropical, an index of settlement density, and an index of political development. *Population Controls* includes log population density for each group. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Figure 8**  
**Fallowing Requirements & Conflict:**  
**Heterogeneity by Rule of Law**



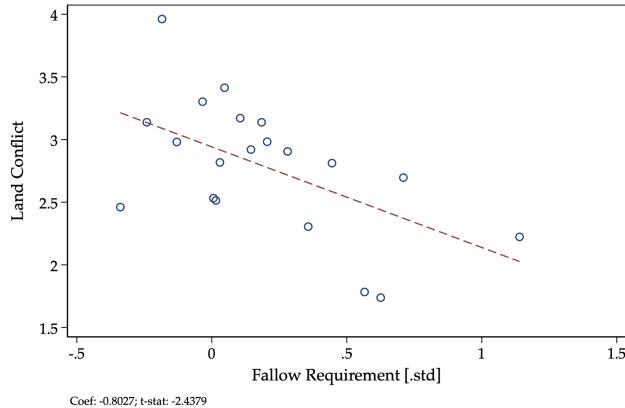
*Notes:* The figure presents binscatters between the fallowing requirements and the number of conflict events in the ACLED data. The unit of observation is a ethnologue group. The figure presents results separately for groups in countries with low (below median) and high (above median) Rule of Law measures from the World Bank Governance Indicators dataset. Regressions control for latitude, longitude, and continent fixed-effects. The bottom-right of each figure presents the estimated bivariate coefficient and t-statistic for each subset of countries. Standard errors are clustered at the ethnologue group level.

**Figure 9**  
**Fallowing Requirements & Conflict: Land-Related Conflicts**



*Notes:* The figure presents binscatters between the fallowing requirements and the number of land-related conflict events in the ACLED data. The unit of observation is a ethnologue group. Regressions control for latitude, longitude, and continent fixed-effects. The bottom-right of each figure presents the estimated bivariate coefficient and t-statistic. Standard errors are clustered at the ethnologue group level.

**Figure 10**  
Fallowing Requirements & Land-Related Conflict: IDP Data



*Notes:* The figure presents binscatters between the fallowing requirements and the severity of land-related conflict in rural areas in the IPD data. The unit of observation is a country. Land conflict is a 0 to 4 categorical variable, where 0 = No land-related conflict in rural areas, and 4 = Serious land-related conflict in rural areas. Regressions control for latitude, longitude, and continent fixed-effects. The bottom-right of each figure presents the estimated bivariate coefficient and t-statistic. Standard errors are clustered at the country level.

## 6 Mechanisms: Kinship Tightness & Cultural Norms

Cultural norms that made communal management more effective likely evolved along with property rights (Platteau 2000, 2006; Harris and Honig 2022). Likewise, reliance on kin groups to manage land may lead to higher kinship tightness (Boserup 1965; Platteau 2000). This co-evolution of cultural norms and social structures might make the transition to private property rights more difficult. In this section, we explore whether longer fallow requirements are associated with more collective norms and in-group (kinship) tightness (e.g. Schulz et al. 2019; Enke 2019; Henrich 2020).

### 6.1 Property Rights & Kinship Tightness

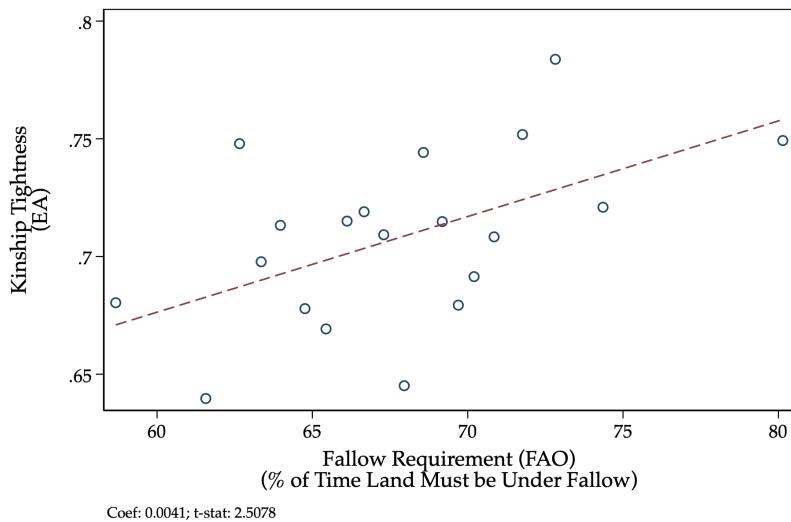
We construct a measure of kinship tightness for societies in the Ethnographic Atlas following the definition in Enke (2019). We explore whether societies that historically faced longer fallowing requirements also had more kinship tightness. Table 6 presents the results, while Figure 11 presents the binscatter exploring the relationship between fallowing requirements and kinship tightness. We find that longer fallowing requirements are associated with more kinship tightness. This suggests that communal land management is likely associated with more kinship tightness and collective norms (e.g. Schulz et al. 2019; Enke 2019).

Table 6  
Effect of Fallow Requirement on Kinship Tightness

	<b>Dependent Variable:</b> <i>Kinship Tightness</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Fallow Requirement</i>	0.009*** (0.002)	0.004** (0.002)	0.005** (0.002)	0.003 (0.002)	0.004** (0.002)	0.005** (0.002)
Continent FE	N	Y	Y	Y	Y	Y
Geography Controls	N	N	Y	Y	Y	Y
Disease Controls	N	N	N	Y	Y	Y
Crop FE	N	N	N	N	Y	Y
Ethnographic Controls	N	N	N	N	N	Y
Outcome Mean	0.71	0.71	0.71	0.71	0.71	0.71
Adjusted R <sup>2</sup>	0.023	0.303	0.311	0.321	0.330	0.358
Observations	1,125	1,125	1,125	1,125	1,125	992

*Notes:* The unit of observation is a society in the Ethnographic Atlas (EA). Robust standard errors in parentheses. The dependent variable *Kinship Tightness* is defined as in Enke (2019) and is 0 to 1 variable corresponding unweighted average of four binary variable measuring various aspects of kinship structures (presence of: extended families, joint residence, unilineal descent, and clans). *Geography Controls* include centroid longitude, centroid latitude, average rainfall, average temperature, elevation, and agricultural suitability. *Disease Controls* include malaria suitability and tsetse suitability. *Crop FE*s are fixed effects for the maximum caloric suitability crop in each society. *Ethnographic Controls* includes the presence of large domesticated animals, the proportion of the local environment that is tropical or subtropical, an index of settlement density, and an index of political development. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Figure 11  
Fallowing Requirements & Kinship Tightness: EA



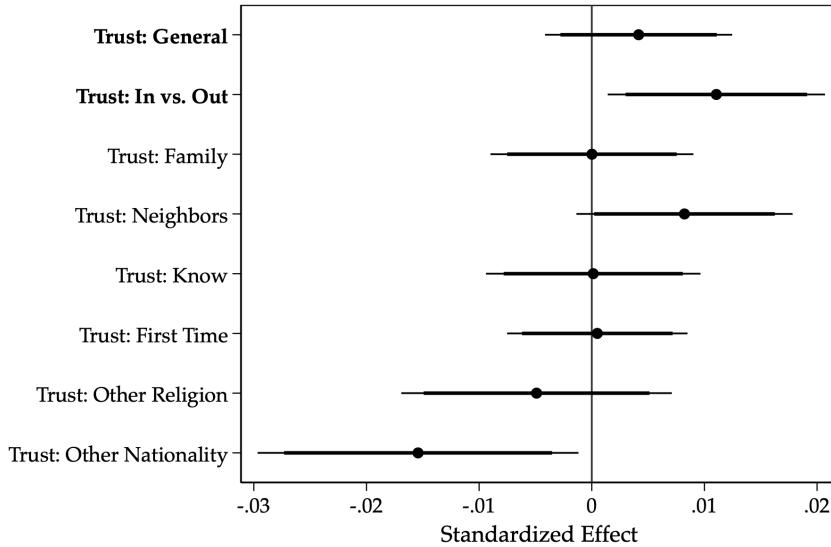
*Notes:* The figure presents bincscatters between the fallowing requirements and kinship tightness as defined in [Enke \(2019\)](#). The unit of observation is an Ethnographic Atlass (EA) group. Regressions control for latitude, longitude, and continent fixed-effects. The bottom-right of each figure presents the estimated bivariate coefficient and t-statistic. Standard errors are clustered at the EA group level.

## 6.2 Property Rights & Cultural Norms

We also explore how ancestral fallowing requirements have impacted contemporary cultural norms. We link second-generation immigrants in the World Value Surveys (WVS) to their ethnologue group as in [Enke \(2019\)](#). We then examine how ancestral fallowing requirements impact trust in various groups.

Figure 12 presents the estimated coefficients. We find that longer ancestral fallowing requirements are associated with more in-vs-out-group trust. In particular, second-generation immigrants from ethnic groups with longer fallowing requirements are particularly more trusting of their neighbors but less trusting of individuals from other nationalities. The results provide some evidence consistent with the hypothesis by [Platteau \(2006\)](#) that communal land rights co-evolved with tighter collective social norms.

**Figure 12**  
Fallowing Requirements & Trust Norms: WVS



*Notes:* The figure presents standardized effect sizes for the estimated coefficient of ancestral fallowing requirements on various trust outcomes in the World Value Surveys. The unit of observation is a second-generation migrant linked to an ethnographic group in the EA. Regressions include wave and origin-country fixed effects, control for individual's age, age squared and gender, and for an ethnic group's ancestral latitude, longitude, precipitation, temperature, elevation, agricultural suitability, malaria ecology, and tsetse suitability. Standard errors are clustered at the ethnic group level.

## 7 Conclusion

Most societies have historically had communal land rights rather than private land rights. However, there has been a strong focus on private land rights in development policies, specifically with the implementation of various titling reforms in developing countries. What explains the disconnect in the prevalence of communal land rights and the importance placed on private land rights?

We show that these communal land rights evolve endogenously and matter for the success of development policies. In particular, we systematically test the hypothesis that communal land rights were more common in areas with longer fallowing requirements. This is because fallow land requires community protection, which favors the adoption of communal land rights over private land rights in settings with low state capacity. Combining various ecological and ethnographic data sets, we provide empirical evidence that longer fallowing requirements are strongly associated with communal land rights over private land rights. Furthermore, we show that longer fallowing requirements are associated with less granting of individual property rights in constitutions. We then use this variation to show that the underlying property rights in land affect the success of land policies: titling reforms are less successful in places where communal land rights are more common. We provide

suggestive evidence that this may be because communal land rights are relatively more effective at reducing land conflicts in places where states are weak, which is relevant for many of the titling reforms in developing countries.

Our results provide insight into the economics of property rights. Property rights are a bundle of various rights (e.g. use rights, inheritance rights, transfer rights) and these bundles display considerable variation worldwide, especially in non-W.E.I.R.D. contexts. A fruitful avenue for further work might explore the implications of various non-western components to land rights for economic development policies. Additionally, our results show that the success of common development land policies depends on the underlying land rights and cultural norms regarding the ownership of land. These results suggest that tailoring policies to local land rights may be important for the design of development policies.

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**Online Appendix for:**

**On the Origins and Consequences of Communal Property Rights**

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September 13, 2022

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## Appendix A Variables Definition and Sources

**Transfer Property:** Data comes from ([Elkins et al. 2009](#)). Survey question: *Does the constitution mention the right to transfer property freely? 1 = Yes; 2 = No; 96 = other.* In the paper Transfer Property is a dummy variable equals to one if the constitution of a given country in a given year grants the right to transfer property, zero otherwise.

**Own Property:** Data comes from ([Elkins et al. 2009](#)). Survey question: *Does the constitution provide for a right to own property? 1 = Yes; 2 = No; 90 = left explicitly to non-constitutional law; 96 = other.* In the paper Own Property is a dummy variable equals to one if the constitution of a given country in a given year grants the right to own property, zero otherwise.

**Testate Property:** Data comes from ([Elkins et al. 2009](#)). Survey question: *Does the constitution provide for a right of testate, or the right to transfer property freely after death? 1 = Yes; 2 = No; 96 = other.* *Testate or testacy refers to the right to give property.* In the paper Testate Property is a dummy variable equals to one if the constitution of a given country in a given year grants the right to testate property, zero otherwise.

**Inherit Property:** Data comes from ([Elkins et al. 2009](#)). Survey question: *Does the constitution provide for inheritance rights? 1 = Yes; 2 = No; 96 = other.* *Inheritance refers to the right to receive property.* In the paper Inherit Property is a dummy variable equals to one if the constitution of a given country in a given year grants the right to inherit property, zero otherwise.

**Index of Property Rights:** We compute our Property Rights index with data from ([Elkins et al. 2009](#)) as the mean of Transfer Property, Own Property, Testate Property, and Inherit Property.

## Appendix B Proxies for Land Rights in the EA

### B.1 Defining Land Right Proxy Measures in the EA

Unfortunately, the EA data does not contain the “communality of land” variable (nor the “cropping index” question). However, we construct a proxy for the strength of private land rights in the EA. The EA data contains a variable on whether a society has private rights for the inheritance of land (variable v74). Specifically, variable v74 measures the Inheritance Rule for Real Property (Land), where code 1 corresponds to an “Absence of individual property

rights or rules".<sup>29</sup> We define an indicator variable for the existence of private inheritance rights for land that equals 1 when variable v74 does not indicate an absence of individual property rights or rules.

However, using this variable as a direct measure of land rights has two shortcomings. First, the variable measures only property rights for land inheritance and not property rights for land use. However, these property right dimensions tend to be correlated historically: private land inheritance often followed from private land use rights (and not vice-versa) (Platteau 2000). Thus, it can be thought of as proxy for the existence of private land use rights. Second, more importantly, not all societies relied exclusively on agricultural production, meaning that the measure corresponds to all subsistence patterns (e.g. nomadic pastoralists, settled groups, mixed groups). Therefore, to construct our proxy the strength of private land rights, we weight the indicator for private inheritance rights by a society's reliance on agriculture for subsistence (variable v4).<sup>30</sup> The logic of our proxy is similar to how Becker (2019) and McGuirk and Nunn (2022) construct measures of reliance on pastoralism.<sup>31</sup> Specifically, we define a measure for the strength of private land rights as:

$$\text{Strength of Private Land Rights} = \frac{\text{Reliance on Agriculture} \times \text{Private Inheritance Rights}}{(2)}$$

To validate this measure, we also construct the Strength of Private Land Rights measure for the sample of societies in the SCCS and explore its correlation with the Communality of Land variable. We find that the Communality of Land variable is strongly correlated with the Strength of Private Land Rights measure (correlation coefficient of -0.424). Additionally, we find that this correlation is much larger than the correlation between the Communality of Land and the (unweighted) indicator variable for Private Inheritance Rights alone (-0.358), highlighting the importance of weighting by the historical reliance on agriculture.<sup>32</sup>

Figure B1 presents a map for the strength of private land rights for each society in the

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<sup>29</sup>Codes 2-7 correspond to kinship inheritance rules for land (e.g. matrilineal (sister's son), patrilineal (sons), etc).

<sup>30</sup>The reliance on agriculture measure in the EA is a 0-9 variable ranging from 0-5% dependence to 86%-100% dependence. We scale this measure to be 0-1.

<sup>31</sup>The Becker (2019) constructs a pastoralism measure for societies in the EA by weighting an indicator variable that equals one if the primary large animal in a society is suitable for herding (variable v40) a societies reliance on animal husbandry for subsistence (variable v4).

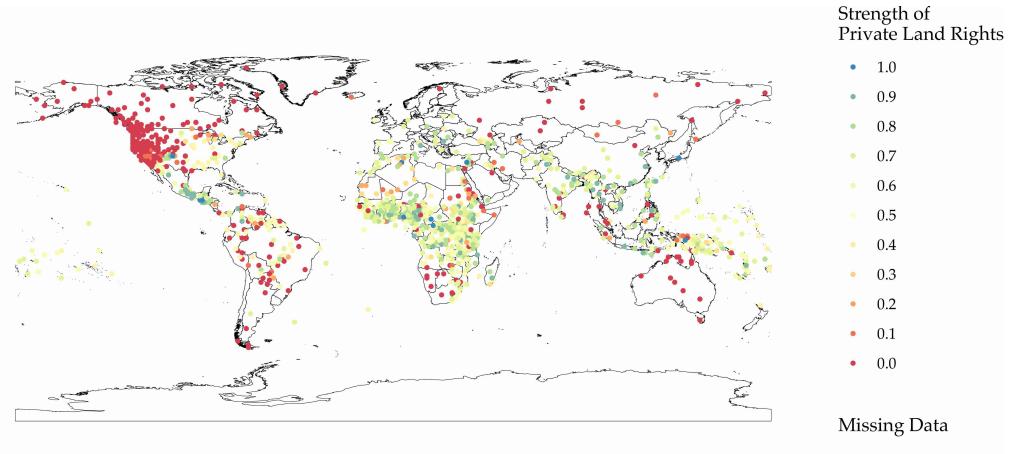
<sup>32</sup>Additionally, when we regress the Communality of Land variable on both measures, only the Strength of Private Land Rights measure is statistically significant (t-value of -2.73, coefficient of -1.15) while the (unweighted) indicator variable for Private Inheritance Rights alone is statistically insignificant and of small magnitude (t-value of -0.37, coefficient of -0.11).

EA. Similar to the map in Figure 5, the strength private land rights is lower in non-Western societies.

## B.2 Effect of Fallow Requirements on Land Right Proxies in the EA

We use our proxy measures for land rights in the EA and explore the extent to which fallowing requirements are correlated with our measure for the strength of private land rights. While this measure is an imperfect proxy (as it is derived on whether land inheritance has private rights, not land use), it helps us explore whether this relationship between fallow requirements and the structure of land rights holds for a larger sample of societies. Figure B2 presents a binscatter examining the relationship between a society's FAO fallowing requirement and the strength of private land rights in the EA. We find that societies that had longer fallowing requirements were less likely to have strong private land rights. Table B1 presents regressions estimates for this relationship for SCCS societies in Panel A and EA societies in Panel B. We continue to find evidence that longer fallowing requirements are associated with less strong private land rights. However, this relationship is less precisely estimated once we include the full set of controls. The results provide additional evidence that suggests that societies that faced longer fallow requirements were less likely to adopt private land rights.

**Figure B1**  
Land Rights Across EA Societies



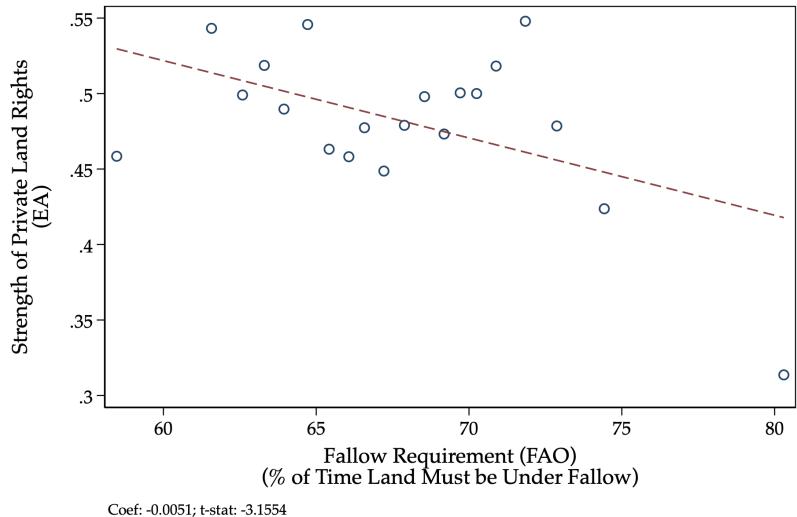
*Notes:* Map presents the strength of private land rights for each group in the EA.

Table B1  
Effect of Fallow Requirement on the Strength of Private Land Rights

	<b>Dependent Variable:</b> <i>Strength of Private Land Rights</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: SCCS Societies</i>						
<i>Fallow Requirement</i>	−0.008 (0.005)	−0.012*** (0.004)	−0.008* (0.005)	−0.010* (0.005)	−0.006 (0.006)	−0.002 (0.005)
Continent FEs	N	Y	Y	Y	Y	Y
Geography Controls	N	N	Y	Y	Y	Y
Disease Controls	N	N	N	Y	Y	Y
Crop FEs	N	N	N	N	Y	Y
Ethnographic Controls	N	N	N	N	N	Y
Outcome Mean	0.40	0.40	0.40	0.40	0.40	0.40
Adjusted R <sup>2</sup>	0.013	0.176	0.195	0.193	0.192	0.565
Observations	138	138	138	138	138	126
<i>Panel B: EA Societies</i>						
<i>Fallow Requirement</i>	0.002 (0.002)	−0.005*** (0.002)	−0.006*** (0.002)	−0.005*** (0.002)	−0.003 (0.002)	0.001 (0.001)
Continent FEs	N	Y	Y	Y	Y	Y
Geography Controls	N	N	Y	Y	Y	Y
Disease Controls	N	N	N	Y	Y	Y
Crop FEs	N	N	N	N	Y	Y
Ethnographic Controls	N	N	N	N	N	Y
Outcome Mean	0.48	0.48	0.48	0.48	0.48	0.46
Adjusted R <sup>2</sup>	0.001	0.328	0.373	0.376	0.431	0.659
Observations	1,154	1,154	1,154	1,154	1,154	1,005

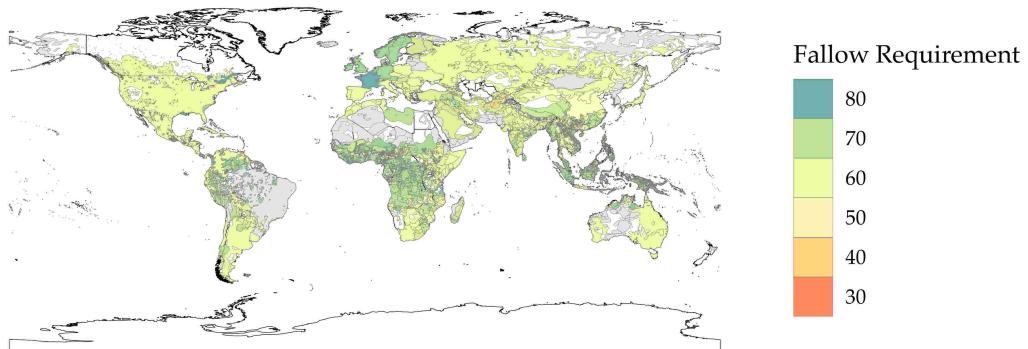
*Notes:* The unit of observation is a society in the Standard Cross Cultural Survey (SCCS) in Panel A or the Ethnographic Atlas (EA) in Panel B. Robust standard errors in parentheses. The dependent variable *Strength of Private Land Rights* is the interaction between a societies reliance on agriculture and an indicator equal to one if the society had private inheritance rights for land. *Geography Controls* include centroid longitude, centroid latitude, average rainfall, average temperature, elevation, and agricultural suitability. *Disease Controls* include malaria suitability and tsetse suitability. *Crop FEs* are fixed effects for the maximum caloric suitability crop in each society. *Ethnographic Controls* includes the presence of large domesticated animals, the proportion of the local environment that is tropical or subtropical, an index of settlement density, and an index of political development. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Figure B2  
Fallowing Requirements & Private Land Rights: EA



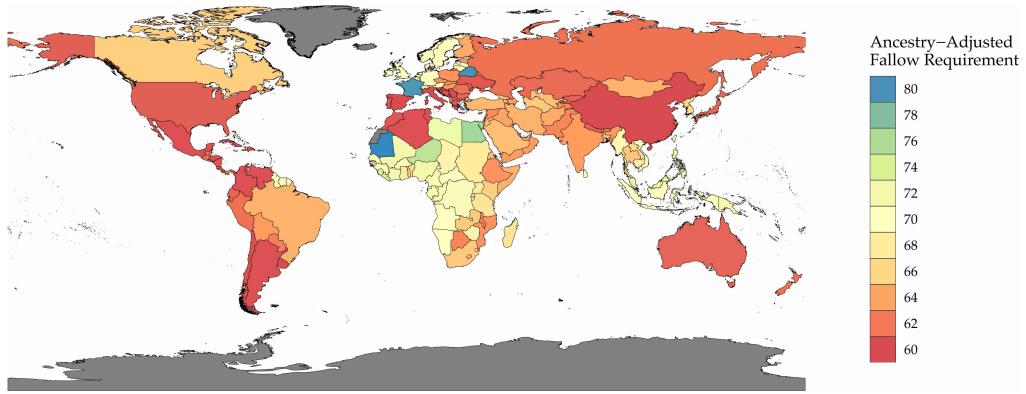
## Appendix C Additional Maps

Figure C3  
Fallow Requirements Across Language Groups



Notes: Map presents the fallowing requirement – percentage of time during the fallow-cropping cycle that land must be under fallow – for the maximum caloric suitability crop for each language group in the Ethnologue linked to the EA (Giuliano and Nunn 2018). Grey areas represent groups where the land is not suitable for agriculture.

Figure C4  
Ancestry-Adjusted Fallow Requirements



*Notes:* Map presents the ancestry-adjusted fallowing requirement – percentage of time during the fallow-cropping cycle that land must be under fallow – for the maximum caloric suitability crop for each country using the methodology from (Giuliano and Nunn 2018). Grey areas represent groups where the land is not suitable for agriculture.

## Appendix D Additional Tables and Figures

Table D2  
Effect of Fallow Requirement on Intensity of Agricultural Production

	Dependent Variable: <i>Intensity of Agriculture</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
Fallow Requirement	-0.052** (0.023)	-0.058*** (0.020)	-0.052** (0.021)	-0.057*** (0.022)	-0.035 (0.025)	-0.027 (0.027)
Continent FE	N	Y	Y	Y	Y	Y
Geography Controls	N	N	Y	Y	Y	Y
Disease Controls	N	N	N	Y	Y	Y
Crop FE	N	N	N	N	Y	Y
Ethnographic Controls	N	N	N	N	N	Y
Outcome Mean	3.47	3.47	3.47	3.47	3.47	3.46
Adjusted R <sup>2</sup>	0.029	0.199	0.194	0.186	0.207	0.491
Observations	167	167	167	167	167	154

*Notes:* The unit of observation is a society in the Standard Cross Cultural Survey (SCCS). Robust standard errors in parentheses. The dependent variable *Intensity of Agriculture* is a 1 to 6 categorical variable, with higher values related to more intensive agricultural production. *Geography Controls* include centroid longitude, centroid latitude, average rainfall, average temperature, elevation, and agricultural suitability. *Disease Controls* include malaria suitability and tsetse suitability. *Crop FE*s are fixed effects for the maximum caloric suitability crop in each society. *Ethnographic Controls* includes the presence of large domesticated animals, the proportion of the local environment that is tropical or subtropical, an index of settlement density, and an index of political development. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Figure D5  
Fallow System, Agricultural Mode, and Institutions

FALLOW SYSTEMS				AGRICULTURAL TECHNIQUES				SOCIO-ECONOMIC STRUCTURES			
AGRICULTURAL STAGE	YEARS CULTIVATION	YEARS FALLOW	FALLOW LANDSCAPE	AGRICULTURAL TOOLS	FERTILISATION METHODS	LAND IMPROVEMENTS	LABOUR INPUT	LAND TENURE	SETTLEMENT FORM & TRANSPORT NETWORK	DIVISION OF LABOUR & EXCHANGE	SOCIAL & POLITICAL ORGANISATION
MULTI-CROPPING	2-3 per year	Negligible	None	Mechanised equipment including tractors	Chemical fertilisers Green manuring Marlins. Composts. Silt etc.	Irrigation, Terracing	Long hours of regular, daily work	Permanent ownership	As below, + more intensive, - more feeder roads	Out-migration	Shift of power to (remote) urban centre
ANNUAL CROPPING	Yearly	Several months	None	As in multi-cropping	As in multi-cropping	Irrigation in dry regions. Terracing	Peasant ownership, small farms (freehold)	Urbanised, to some extent	Long work hours.	Differentiated forms of social organisation,	
SHORT FAOLLOW	1-2	1-2	Grass	Hoe, plough, drought animals	Manure from droppings of drought animals	None	Individual usufructuary tenure, + pronounced seasonal peak + pledging to retain control	Permanent settlements, + roads	Some professional artisans and traders	Differentiated forms of social organisation,	
BUSH FAOLLOW	From 1-2 to 6-8	6-10	Bush	Hoe, axe, fire	Ash, supplemented by burnt or unburnt vegetable materials from outside	None	Specific right to cultivate given + subject to authority	Stable and larger settlements with plots subject to authority	Some division of labour, village markets with part-time artisans	A little more central authority	
FOREST FAOLLOW	1-2	20-25	Forest	Digging stick axe fire	Ash in situ	None	General right to cultivate land, + few hours of irregular or work	Unstable dispersed settlements, trails	Rudimentary	No central authority	

Fig. 1. Boserup's Theory of Agricultural Change. (Modified after an unpublished paper by P. Porter.)

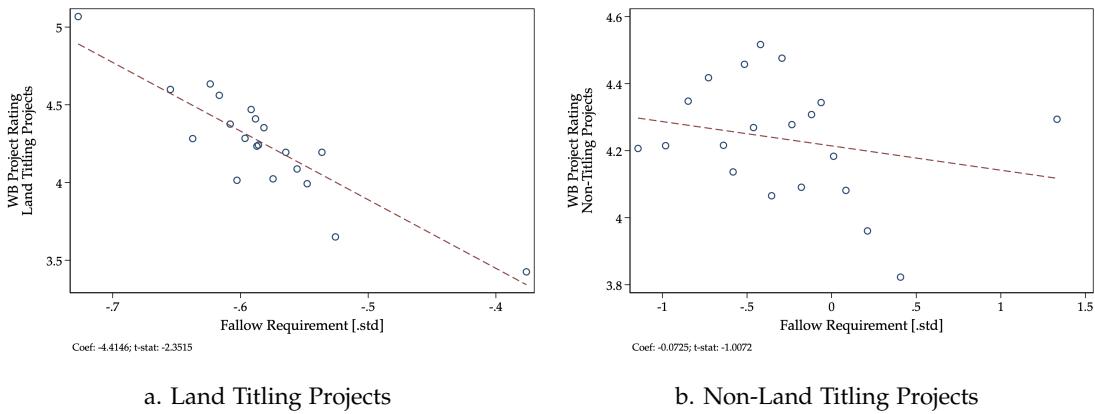
Figure shows Datoo (1978)'s summary of Boserup (1965) theory.

Table D3  
Effect of Fallow Requirements on Jurisdictional Hierarchy

	Dependent Variable: <i>Extent of Jurisdictional Hierarchy</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: SCCS Societies</i>						
<i>Fallow Requirement</i>	-0.026 (0.016)	-0.021 (0.013)	-0.004 (0.015)	0.001 (0.016)	0.025 (0.016)	0.023 (0.015)
Continent FEes	N	Y	Y	Y	Y	Y
Geography Controls	N	N	Y	Y	Y	Y
Disease Controls	N	N	N	Y	Y	Y
Crop FEes	N	N	N	N	Y	Y
Ethnographic Controls	N	N	N	N	N	Y
Outcome Mean	2.14	2.14	2.14	2.14	2.14	2.14
Adjusted R <sup>2</sup>	0.009	0.247	0.244	0.257	0.301	0.456
Observations	165	165	165	165	165	152
<i>Panel B: EA Societies</i>						
<i>Fallow Requirement</i>	-0.010 (0.006)	-0.007 (0.006)	-0.003 (0.007)	0.003 (0.007)	0.004 (0.007)	0.002 (0.007)
Continent FEes	N	Y	Y	Y	Y	Y
Geography Controls	N	N	Y	Y	Y	Y
Disease Controls	N	N	N	Y	Y	Y
Crop FEes	N	N	N	N	Y	Y
Ethnographic Controls	N	N	N	N	N	Y
Outcome Mean	1.68	1.68	1.68	1.68	1.68	1.84
Adjusted R <sup>2</sup>	0.001	0.161	0.179	0.192	0.198	0.307
Observations	1,155	1,155	1,155	1,155	1,155	1,034

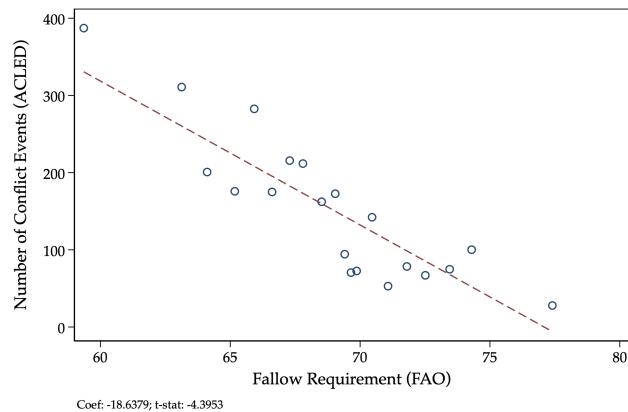
*Notes:* The unit of observation is a society in the Standard Cross Cultural Survey (SCCS) in Panel A or the Ethnographic Atlas (EA) in Panel B. Robust standard errors in parentheses. The dependent variable *Extent of Jurisdictional Hierarchy* measures the degree of jurisdictional hierarchy beyond the local level, ranging from 0=no levels, to 5=four levels. *Geography Controls* include centroid longitude, centroid latitude, average rainfall, average temperature, elevation, and agricultural suitability. *Disease Controls* include malaria suitability and tsetse suitability. *Crop FEes* are fixed effects for the maximum caloric suitability crop in each society. *Ethnographic Controls* includes the presence of large domesticated animals, the proportion of the local environment that is tropical or subtropical, an index of settlement density, and an index of political development. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Figure D6  
Communal Land Rights and World Bank Project Success



*Notes:* The figure presents bincatters between the world bank project success rating for projects related to land titling (a.) or projects not related to land titling (b.), and population-weighted fallowing requirement. The unit of observation is a project-country pair. The bottom-left of each figure presents the estimated bivariate coefficient and t-statistic. Standard errors are clustered at the country level.

**Figure D7**  
**Fallowing Requirements & Conflict: All Conflicts**



*Notes:* The figure presents bincscatters between the fallowing requirements and the number of conflicts in the ACLED data. The unit of observation is a ethnologue group. Regressions control for latitude, longitude, and continent fixed-effects. The bottom-right of each figure presents the estimated bivariate coefficient and t-statistic. Standard errors are clustered at the ethnologue group level.

Table D4  
Following Requirement and the Property Rights Bundle: Evidence from National Constitutions: Endogenous Controls

	Dependent Variable: Right to [...] in Constitution						Index of Property Rights	
	Transfer Property		Own Property		Testate Property		Inherit Property	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fallowing Requirement [std.]	-0.090** (0.035)	-0.036 (0.053)	-0.072 (0.045)	-0.075** (0.036)	-0.034 (0.023)	-0.037 (0.039)	-0.010 (0.041)	-0.035 (0.054)
Mean Dep. Var.	0.23	0.23	0.82	0.82	0.11	0.11	0.10	0.10
Num. of Custers	109	109	109	122	108	108	108	110
Observations	7545	7545	7358	8024	7597	7597	7418	7942
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	No	Yes	No	Yes	No	Yes	No	Yes
Endogenous Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Continent FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.196	0.257	0.215	0.248	0.094	0.109	0.331	0.372
							0.180	0.240

Notes: OLS estimates with robust standard errors clustered at the country level in parenthesis. The unit of observation is a country's constitution in a given year. Data is from the *Comparative Constitutions Project* (Elkins et al. 2009). Across specifications, outcomes are dummy variables equal to one if a constitution grants rights to (1-2) transfer property, (3-4) own property, (5-6) testate property, and (7-8) inherit property. Outcome variable in columns 9 and 10 is a property rights index computed as the average of the other four variables. Odd columns control for ancestry-adjusted geographic characteristics (latitude, longitude, elevation, land suitability, malaria) and ethnographic controls (settlement complexity, mean size of local community, political complexity, historical reliance on pastoralism and historical reliance on agriculture). Every specification controls for the log number of years since a constitution was first written, the total number of amendments made to each constitution, year dummies and continent fixed effects. The sample is restricted to countries where all groups practiced agriculture to varying degrees and for which information on fallow time is available. \* p < 0.1; \*\* p < 0.05; \*\*\* p < 0.01