

Making Secure Land Tenure Count for Global Development Goals and National Policy

Evidence from Zambia

Daniel Ayalew Ali

Klaus Deininger

Thea Hilhorst

Frank Kakungu

Yuanyuan Yi



WORLD BANK GROUP

Development Economics

Development Research Group

June 2019

Abstract

Adding a module designed to measure land tenure-related Sustainable Development Goals indicators to the 2018 round of Zambia's labor force survey shows low transferability and high levels of tenure insecurity. Having a title is associated with greater transferability and reduced insecurity. Although demand for titles, including willingness to pay, is high, current policies limit the scope for tenure regularization and reinforce rather than reduce gender discrimination. Efforts in this direction need to be preceded by

(i) procedural reform to reduce costs, streamline procedures, and make them gender-sensitive; (ii) institutional change to increase the efficiency of service delivery and ensure record maintenance; and (iii) legal change to recognize customary tenure and improve land management and transferability. Adding the Sustainable Development Goals land tenure module to ongoing surveys has the potential to provide the evidence base needed to design results-based approaches for the land sector and reliably track progress.

This paper is a product of the Development Research Group, Development Economics. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at <http://www.worldbank.org/prwp>. The authors may be contacted at dali1@worldbank.org, kdeining@worldbank.org, thilhorst@worldbank.org, and yiyi@worldbank.org.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

Making Secure Land Tenure Count for Global Development Goals and National Policy: Evidence from Zambia*

Daniel Ayalew Ali¹, Klaus Deininger¹, Thea Hilhorst¹, Frank Kakungu², Yuanyuan Yi¹

¹The World Bank, 1818 H Street NW, Washington, DC 20433

²Central Statistical Office of Zambia, Lusaka

JEL Classification: Q15; O13; O17; O55

Keywords: Sustainable Development Goals; land tenure security; transferable rights; land title; customary land rights; demand for title; Zambia; Africa

* We thank the Zambia Central Statistical Office team led by Victor Bwalya for support to data collection, Ndashe Yumba, Joseph Minango, Kelvin Chibangula and Emmanuel Tembo from the Ministry of Lands and Natural Resources as well as Ademola Braimoh, Douglas Graham, Neeta Hooda and Tasila Banda from the World Bank supported ZIFLP project for support to survey implementation. We duly acknowledge funding support from the German Ministry for Economic Cooperation and Development. We are also grateful to Malcolm Childress, Ina Ruthenberg, Manohar Sharma, Matt Sommerville and seminar participants at the 2019 World Bank Land and Poverty Conference and the World Bank's Zambia country office for comments and suggestions.

1. Introduction

Security of property rights to land affects incentives for land-attached investment and female empowerment, while the ability to access formally registered documents is a precondition for transactions with strangers to foster structural change, emergence of financial markets, and transparency. Yet, the fact that legal and institutional arrangements governing land ownership and access evolved over long historical periods in response to local conditions led to enormous variation over space that limited the scope for globally comparable indicators on land tenure security that could then be targeted by specific programs. It may even have contributed a focus on rather simplistic shortcuts (e.g., “titles”) that fail to do justice to the underlying complexities and, by focusing on inputs rather than the desired outcomes, may send inappropriate signals.

To address this, the Sustainable Development Goals (SDGs) define two indicators (1.4.2 and 5.a.1) related to land.¹ While the latter focuses on the agricultural population, the indicators require nation-wide data covering (i) access to formally documented rights; (ii) transferability via bequest or sale; and (iii) perceived tenure security. To build local capacity and facilitate coordination in data collection and based on guidance by the inter-agency expert group on SDGs (IAEG-SDG), FAO, UN-Habitat and the World Bank designed a module for inclusion in ongoing household surveys by National Statistical Agencies (FAO *et al*, 2018). Simultaneously, to obtain data more quickly at a larger scale, use of a ‘global poll’ has been advocated by some and considerable resources were mobilized in support of an initiative, the ‘Prindex’,² to implement it.

However, while there has been extensive conceptual discussion, empirical data have not been analyzed in any detail to explore if proposed methodologies are sound and provide a basis for actionable policy advice. This paper aims to start filling this gap by using the case of Zambia where the SDG module, with supplemental questions on demand for title, was included in the country’s 2018 Labor Force Survey (LFS). Data generated in this way can also be compared to the Prindex global poll administered in Zambia during the same period. While our analysis focuses on the LFS, an evidence-based and coherent policy dialogue on land will only be possible if data provided by different initiatives are conceptually clear and complementary.

Data from the LFS suggest that in Zambia transferability of land is limited, few parcels have title, and tenure insecurity is widespread: only 42% of land owners can bequeath and 36% sell their land and 44% perceive a risk of losing it over the next 5 years. Less than 10% of households have title, 13% an informal document or incomplete title and 55% of those without title want to acquire it and are willing to pay a median of

¹ SDG 1.4.2 aims to measure “the proportion of total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by sex and by type of tenure” whereas SDG 5.a.1 focuses on “the proportion of total agricultural population with ownership or secure rights over agricultural land, by gender” and “the share of women among owners or rights-bearers of agricultural land, by type of tenure” (FAO *et al*, 2018).

² Prindex (www.prindex.net) is implemented by private contractors, with oversight from the UK’s Overseas Development Institute (ODI) and financial support mainly from DFID and the Omidyar network.

US\$ 35 (at a mean of US\$ 71). This is well above the cost of issuing titles in a systematic effort that is based on a proper regulatory framework and reasonably cost-effective approach.

Regression analysis allows exploration of issues of gender and non-response. While having documentation implies significantly higher levels of transferability, regression results suggest that women are less likely to be involved in transfer decisions for titled as compared to untitled land. Instead of helping to redress gender bias, in Zambia formal titling reinforces it. Zambia's legal framework makes obtaining title possible only for State but not for customary land. Having title to land (not just informal documents) is associated with a reduction of tenure insecurity by 24% and demand and willingness to pay for title are higher on transferable parcels with insecure tenure, in line with the notion that formal registries reduce insecurity and allow land transfers beyond the immediate community.

Three policy implications emerge. First, our results do not justify universal titling: 45% of respondents without title have no interest in formal documents. One interpretation is that, as long as there is little demand for transfers to outsiders, customary arrangements work well as access to local information and an ability to quickly adjudicate disputes or enforce resolutions often allows relevant institutions to be more flexible than formal ones. Efforts to demarcate traditional authorities' area boundaries, improve land use (e.g., via zoning and planning), and strengthen internal accountability -by clarifying that public recognition of chiefs' rights come with responsibilities- can make such arrangements more robust to deal with future stress or shocks.

Second, the strong links between formal title and tenure security from regressions -compared to more limited effects of informal documents- together with demand and willingness to pay for formal title suggest that, if there is demand for title, full title seems preferred to half-way solutions. The high willingness to pay by the 55% of respondents who want formal title reinforces this and calls for measures to either increase efficiency of public land administration service delivery or explore properly structures of public-private partnerships (PPPs) ideally in a build-operate-transfer (BOT) mode for issuance and initial maintenance of titles at an affordable cost while building public sector capacity to ensure maintenance in the medium term.

Third, by documenting that, despite legal provisions mandating gender equality, access to land is biased against women and that formal systems reinforce rather than redress female exclusion, LFS data strengthen the case for more gender-sensitive land policy. To reduce the risk of the recently launched National Land Titling Program permanently disempowering women, measures are needed to make women aware of their land rights, ensure women's joint land rights are documented, and monitor gender impacts.

Data for the Prindex global poll in Zambia were collected concurrently with the LFS. Prindex data suggest that having property rights documented does not matter economically -regressions point to no link between documented rights and the ability to transfer land and even a negative and significant link between informal documentation and the ability to use land as collateral. While omission of most non-residential agricultural

properties (reported by 75% of respondents in the LFS but only 4% in Prindex) may be one factor contributing to this result, it highlights the need for careful assessment of Prindex’s conceptual foundations, sample selection, implementation protocol and actual data to help appreciate the type of issues it can address. Limitations imposed by the fact that in more than 50% of cases, data on documentation and perceived tenure security were reported by family members rather than owners suggests that methodological adjustments can help this initiative achieve its potential and make a meaningful input to the land policy debate while preventing contradictory policy recommendations from results that reflect differences in data collection protocols rather than ground reality.

The rest of the paper is structured as follows: Section 2 discusses the conceptual framework and relates it to the evolution of Zambia’s land tenure system. Section 3 presents data and descriptive evidence on gender-differentiated access to formal documents, transferability, perceived tenure security, and demand for documentation at the household and parcel levels. Section 4 presents regression evidence on factors (including access to different types of documentation) associated with higher levels of tenure security, transferability, and demand for formal documents. It also compares our findings from LFS data to those emerging from the Prindex poll that are comparable and explores reasons that might lead to differences. Section 5 concludes by drawing out implications for policy, research, and future efforts at data collection on land rights as a part of the SDGs.

2. Conceptual framework and empirical relevance

To link the conceptual framework to measurement, we use the literature on land tenure and socio-economic outcomes as well as sources of demand for documented tenure to identify aspects of gender-differentiated tenure security in terms of (i) the ability to transfer via bequest or sale; (ii) access to documented land rights, and (iii) perceived security of land rights. This is complemented with a discussion of demand for secure land rights as well as a description of Zambia’s land tenure system to highlight how data could make the policy dialogue more evidence-based and allow benchmarking of progress over time.

2.1 Evidence on benefits from land titling

Development economists have long highlighted the central role of institutions, i.e., social constraints on human interaction enforced by the state or communities to structure incentives in any exchange, in shaping growth and the distribution of its gains among the population (Greif 1993; North 1971). Property rights are a key institution that allows individuals or groups to lay ‘a claim to a benefit or income stream that the state will agree to protect through the assignment of duty to others who may covet, or somehow interfere with, the benefit stream’ (Sjaastad and Bromley 2000). By defining who is entitled to the benefits flowing from a resource, how land rights are defined and can be accessed is a key element of societies’ social fabric.

The literature highlights two key effects of property rights (Besley and Ghatak 2010). On the one hand, by allowing those exerting effort to increase resource values and reap the associated rewards, clearly defined and registered property rights to land will reduce expropriation risk thus encouraging land-related investment (Besley 1995; Fenske 2011). On the other hand, by reducing the transaction costs involved in market-mediated land transfers, secure property rights allow for structural transformation and possible use of land as collateral in credit markets. Creation and maintenance of property rights systems is a public good that reduces the socially wasteful need for landholders to expend resources (e.g., to build fences or hire private guards) to protect rights (De Meza and Gould 1992) against challenges (Fetzer and Marden 2017).

If levels of land-attached investment or efficiency-enhancing land transfers are below optimum, systematic titling can benefit those who lack resources or knowledge on how to navigate complex land administration systems.³ Receipt of titles allowed former squatters, especially women, to join formal labor markets instead of staying at home to guard their land, thereby increasing their income and reducing child labor (Field 2007). In Vietnam, certificates triggered investment in perennials and prompted (poor) households to shift to non-agricultural activities (Do and Iyer 2008). Demarcation of land led to higher long-term investment and freed up labor for productive uses in Benin (Goldstein *et al.* 2015). If women were disadvantaged before, they can disproportionately benefit from such measures, land certification helped (e.g., in Ethiopia) to empower women and led to increased productivity as well as land market transactions (Deininger *et al.* 2011).

Positive impacts of land-tenure security on investment in rural areas have been documented in China (Jacoby *et al.* 2002), Thailand (Feder *et al.* 1988), Latin America (Bandiera 2007), and Eastern Europe (Rozelle and Swinnen 2004) as well as globally (Lawry *et al.* 2016). Even in low income settings, demand and willingness to pay (WTP) for land rights has been found to be high and potential gender effects significant (Ali *et al.* 2016). In Argentina joint titling helped reduce fertility and increase children's human capital investment (Galiani and Schargrotsky 2004) without affecting credit access (Galiani and Schargrotsky 2010). The high cost of registering subsequent changes implied however that many households whose rights changed, e.g., through death, divorce or sale/purchase, were de-regularized (Galiani and Schargrotsky 2016).

Despite laws mandating gender equality, women may disproportionately suffer from tenure insecurity (Adelman and Peterman 2014) and conflicts (Deininger and Castagnini 2006; Joireman 2008) that may be inheritance-related (Chapoto *et al.* 2011). Legal reforms allowing women to inherit increased their asset ownership (Deininger *et al.* 2013) and benefited their offspring (Deininger *et al.* 2014) are therefore important, but even the legal basis for females to inherit land often does not exist (Peterman 2012).

³ Systematic titling involves declaration of an entire administrative unit as an adjudication area, intensive efforts at awareness raising, systematic gathering of evidence, public viewing of evidence, and establishment of transparent and accelerated (administrative) procedures for dispute resolution. Compared to sporadic titling whereby individuals with the necessary resources and knowledge get their claims titled on a case by case basis, a systematic process involves a lower cost per title and is less likely to result in 'land grabbing'.

Economic development involves specialization and movement of labor out of agriculture. An inability to formally trade or lease land will impede structural change, land market imperfections have been identified as key contributors to factor misallocation in agriculture (Restuccia and Santaaulalia-Llopis 2015). Limited tradability of untitled land across farmers results in land misallocation and distorts individuals' occupational choice between farming and working outside agriculture, with potentially far-reaching impact (Chen 2017).

The importance of land rights documentation to facilitate long-term land transfers and occupational shifts out of agriculture is supported by the migration-enhancing impact of community land rights certification in Mexico, an effect that was particularly pronounced for households with weaker initial rights (de Janvry *et al.* 2015) and possibly mediated via inheritance (Valsecchi 2014). Reforms affecting transferability of land had large impacts on migration historically (Chernina *et al.* 2014) and on female labor force participation and wages (Emran and Shilpi 2017). Broad distribution of property rights in the US is seen as fundamental to participation in capital markets, use of land as collateral, and access to opportunity (Libecap 2018).

Documented land rights allow realizing the full potential from trade in land and its use as collateral in financial markets if authoritative information on the assignment of property rights is available at low cost, normally from public registries (Arrunada 2009). Credit impacts from land titling can be expected if land markets are sufficiently fluid and third parties such as mortgage lenders can easily access registries to get reliable land ownership information. If these conditions do not hold, credit effects of land titling may be absent or limited to the better off (Carter and Olinto 2003). Simple measures to reduce transaction costs and improve the quality of information, such as computerization can affect credit volume and the number of mortgages, as documented in India (Deininger and Goyal 2012) and, by enhancing access to digital savings and loan products, the rapid spread of digital handsets opens up opportunities in this space (Bharadwaj *et al.* 2019).

2.2 Policy issues related to recognition of customary tenure

Despite the advantage of having formally documented land rights, up to 90% of households in Africa hold land without a title under customary tenure (Deininger 2003). Some interpreted this as a sign of the issue being irrelevant, as a title does not add beyond existing arrangements (Pinckney and Kimuyu 1994). Three main reasons for continued existence of customary systems are normally advanced; namely, (i) benefits of customary tenure (e.g., risk-diversification) may outweigh benefits of tradability; (ii) establishing and maintaining a system of land titles may cost more than the value of the benefits it provides; and (iii) efforts to increase tenure security can trigger political resistance.

The transferability limitations inherent to customary systems are a choice that trades off the benefits, e.g., increased productivity from market exchange, versus the cost, in particular, the danger of landlessness that

could result from such an arrangement (Andolfatto 2002).⁴ As long as specialization and the associated scope for efficiency-enhancing land transactions remain limited and land relatively abundant, customary institution's advantages for risk sharing (Promsopha 2018), as a social safety net (Baland and Francois 2005) or for old-age insurance (Caucutt *et al.* 2013) together with evidence of limited investment disadvantages (Bruce and Migot-Adholla 1994) are often thought to outweigh the cost of establishing formal systems.

Yet, while customary arrangements are well suited to govern intra-community land relations in a context of personal exchange, they are ill-suited to deal with inter-community disputes. The unmediated coexistence of competing customary and modern jurisdictions itself can, via insecurity over which source of law will prevail, undermine trust, increase contestability and encourage use of extra-judicial measures (Eck 2014). Increasing land pressure can, by weakening the ties of accountability that bound together tightly knit village communities, further erode customary institutions' advantages, trigger appropriation of land by chiefs who perceive themselves as landlords rather than custodians for a vital community asset (Berry 2009), corrupt such systems and cause inequality (Guirkinger and Platteau 2014) or conflict (Chimhowu and Woodhouse 2006). Cases for which this has recently been documented include Kenya (Greiner 2017) and Ghana (Boamah 2014). Third, customary systems are often biased against women, an issue that becomes more urgent as tenure insecurity may rise with rising population density. Even without overt discrimination, women's lack of documented rights makes it difficult to assert rights against competing claims if they are contested (Henrysson and Joireman 2007),⁵ creating insecurity that can negatively affect investment and productivity of land use (Dillon and Voena 2018) and women's bargaining power.

The cost of establishing and maintaining formal tenure systems is another factor. With first-time registration costs of US\$30 and US\$60 per title in traditional land projects (Brits *et al.* 2002) and up to US\$1,000 per title in some cases (Jacoby and Minten 2007), it is easy to argue that costs well above any imaginable benefits undermine the economic rationale for titling. Advances in technology such as aerial photography and earth observation drastically reduced costs of surveying. If used together with participatory ways of demarcation,⁶ these can drastically reduce the cost of tenure regularization, as in Rwanda where 11.5 million parcels were demarcated and registered at US\$5 to US\$6 per parcel (Nkurunziza 2015). Cloud computing and interoperability, e.g., with personal ID or building permit systems, can increase benefits from land rights documentation for public policy. Increased levels of cell phone penetration even in Africa allow notification of co-owners and updating of records in new, sustainable ways. Experiences also highlight the scope for

⁴ With credit-market imperfections, unrestricted transferability may trigger distress sales or myopic transactions with negative social impacts.

⁵ This is in addition to women being more likely to suffer from conflict (Deininger and Castagnini 2006; Joireman 2008), especially inheritance-related ones (Chapoto *et al.* 2011).

⁶ A system that relies on textual records only (documenting neighbors' names rather than boundary coordinates) implemented in Ethiopia from 2005 achieved a cost of US\$ 1 per title for first-time registration (Deininger *et al.* 2008). Its positive impact, including on gender (Melesse and Bulte 2015; Muchomba 2017) suggests that documenting social consent on boundaries is more important than high-precision maps.

designing systems, as in Mexico, that maintain the benefits from customary arrangements while at the same time improving accountability to move towards greater individualization and transferability.⁷

Historical literature has long highlighted the political character of land institutions. If land was suitable for agriculture, colonial rulers mostly organized African smallholders in officially recognized ‘tribes’ -in some cases confined to certain areas set aside for ‘native’ cultivation. Governance was often via indirect rule by traditional authority via recognized chiefs or headmen who were endowed with discretionary powers to allocate land and resolve conflict (Boone 2017). After independence, many policies continued unchanged. Macro-economic changes in the 1990s triggered a wave of new land legislation including formal recognition of customary tenure (Alden Wily 2018).⁸ Yet, take-up of these opportunities remained limited as only few countries such as Ethiopia (Deininger *et al.* 2008) or Rwanda (Ali *et al.* 2014) where chiefs did not play a role managed to link legal reforms with implementation of nation-wide programs of low-cost participatory land regularization with positive effect (Ali *et al.* 2017).

2.3 Characterizing Zambia’s land tenure system

Although mining contributes significantly to Zambia’s economy, land is key for economic diversification (Pycroft *et al.* 2014) and poverty reduction for the 85% of the labor force who derive their main livelihood from agriculture (Chitonge 2016). In what is now Zambia, colonial authorities classified the most productive land as “crown land” reserved for Europeans while the rest -94% of the country’s 74 mn. ha- was designated as “Native reserves” or “Trust land” and made available to Africans under local chiefs and headmen. The system changed little with independence except that crown land was renamed into ‘state land’ and native reserves or trust land designated as ‘customary’. Land was vested in the President and “settlement schemes” established, first on abandoned state land, to stimulate commercial agriculture and food security (Roth 1995). The 1995 Land Act brought changes in three areas; namely, (i) recognition of customary tenure as a legitimate form of tenure; albeit, without a mechanism to determine its extent or boundaries to allow rights to be registered; (ii) stipulating that land has value and can be bought, sold, and mortgaged; and (iii) provisions for conversion of customary to state land as the only way to achieve formal recognition of land rights.

To convert customary to state land and thus create the preconditions for issuing formal documents, approval by the chief, the District Council, the Ministry of Lands, and a full survey are required. With few surveyors and limited capacity to process applications in the bureaucracy, this results in what is often a complex and discretionary process (Adams 2003) with costs amounting to thousands of dollars. While local consultation

⁷ In Mexico, less than 15% of *ejidos* -mostly in peri-urban areas- made use of the opportunity to fully individualize their land (Zepeda 2000). This suggests that, even at relatively high levels of per capita income, safety net functions of communal land ownership remain important.

⁸ Principles are summarized in the 2006 ‘Framework and Guidelines for Land Tenure in Africa’ that were endorsed by African Heads of State.

is mandated, reports point towards limited compliance with such rules, lack of transparency and limited enforceability of rules (Ng'ombe et al. 2014). As it would irrevocably remove a piece of land from the chief's to the state's control and entail the loss of the flexibility (e.g., in terms of re-assigning land if an investor's plans turn sour), conversion of customary to state land is resisted by chiefs unless facilitated by significant payments (German *et al.* 2013). A draft land policy, first adopted by the Cabinet in 2002, that among others was expected to clarify the role of chiefs and regulate state land conversion has not yet been finalized.

As a result, while farmers with title were found to have higher levels of fixed and long-term investment and productivity (Smith 2004), many of those who could have benefited from formal documentation were unable to afford it (Larson 2014). Titled state land seems to have often been acquired by individuals with non-farm jobs and the knowledge, resources, and connections to navigate the conversion process but did not affect productivity (Sitko *et al.* 2014).⁹ This led scholars to conclude that, instead of furthering productivity and investment, Zambia's land titling transfers land to 'speculators' who are unable to make productive use of the land, potentially jeopardizing the sector's long-term potential (Sitko and Jayne 2014).¹⁰ Case studies reinforce this notion and suggest that insecure property rights to land may trigger exclusionary processes favoring rich in-migrants over poorer locals whose access to natural resources and welfare (including children's nutritional indicators) is compromised in the process (Merten and Haller 2008). Without country-wide data on extents of land under customary tenure, coverage with formal or informal documents, perceived tenure security and ability to transfer, assessing representativeness of case studies, defining the objectives to be achieved by the new land policy or ways in which they should be tracked is difficult and adding the SDG module to the LFS provided a cost-effective first step towards closing this gap.

3. Data and descriptive statistics

To illustrate how integrating the SDG land tenure module into ongoing surveys can inform the policy debate, we describe descriptive results, noting that less than half of households can bequeath land to their offspring or sell it; only 11% have title; with 43% concerned about losing land within the next 5-years, levels of perceived tenure insecurity are high; and the share of informal documents (14%) outnumbered that of formal ones and 54% of those without formal document would want to acquire title and pay more than a systematic process based on streamlined regulations and implemented efficiently would cost.

⁹ Before 2000, retired or retrenched civil servants accounted for a significant share of land acquisition whereas after 2000, speculative land acquisition by those who made a fortune outside agriculture seems to predominate (Sitko and Jayne 2014).

¹⁰ "Land titling may be implicated in process of elite capture of land at the possible expense of future small-scale farm growth and farm consolidation" (Sitko and Jayne 2014, p. 199) so that growth of the emergent farm sector is not a reflection of small-scale farmers transitioning towards higher productivity, investment (capital accumulation), commercialization, and job creation, but largely due to policies that allow disproportionate capture by a rural minority with little or no effect on agricultural growth.

3.1 Questionnaire design and methodological considerations

To explore the scope for measuring different elements of land tenure security in a way that is cost-effective and replicable, the SDG land tenure module was embedded in Zambia's 2018 LFS with an incremental budget of US\$ 50,000. Building on the SDG module (FAO *et al*, 2018), four sets of land-related issues were added to the survey instrument:

First, to avoid that gender information will be available only for parcels with documented rights, we inquire about land users as well as owners and ask whether land can be transferred by either bequest or sale and, if yes if females have a say in either case.¹¹ Second, we ask for presence of formal or informal documents from a list of locally accepted documents, classifying them into full and partial titles (e.g., letters of offer or 'intention to treat'), as well as informal documents ('chief's certificates'), and cross-check title holders' names against the roster of household members and their gender to assess if land is held individually or jointly by women. Third, we ask questions on perceived tenure security, an issue that will be important if coverage with or the evidentiary value of formal documents are limited, e.g., due to lack of authoritative registries or fraud-proof procedures. Recognizing that, based on the literature, subjective perceptions may suffer from several types of bias,¹² we frame this as a question on owners' perception of the risk (on a 1-5 scale) of losing a parcel in the next 5 years, in line with the SDG questionnaire. Finally, we ask directly if respondents would want to apply for title and, if yes, the amount they would be willing to pay for it. The rationale for doing so is that perceived tenure insecurity may only imperfectly correlate with demand for formal documentation; those who report being secure may still want a formal document (e.g., for easier land transfers) while those who are insecure may not see formal documents as a beneficial or affordable solution.

As renters would scarcely know the nature of their landlords' documentation and factors causing them to be tenure insecure may be unrelated to levels of tenure security provided by documented land rights,¹³ we drop households who rent their primary residence or access employer-provided free housing and own no other land. This results in a sample of 7,113 land owners who, based on sample weights, represent 2.4 million of Zambia's estimated 3.5 million households. As the LFS deployment schedule did not allow pre-testing, challenges in the survey's start-up phase led to rather high non-response rates.¹⁴ Means and t-tests for differences of means for key variables between the 4,888 land owning households (excluding renters) who

¹¹ If mobile penetration is high, innovative technology solutions such as automatic notification of all interested parties in case of an attempted transfer, can potentially put a check on such abuses and are currently being experimented with in a range of countries.

¹² Responses on perceptions will be affected by framing (Abraham *et al*. 2018; Hopkins and Mummolo 2017), limited attention (Foellmi *et al*. 2016), self-centeredness (Proto and Sgroi 2017), scope for strategic responses (Gal and Gal 2014), and halo effects (Hong and Liskovich 2015). Even experts' assessments of property rights security have been shown to be affected by bias (Stubbs *et al*. 2014).

¹³ Owners' renting out land, especially for long periods, requires enough trust in land administration and legal systems to allow recovery of the asset.

¹⁴ To avoid disturbing the flow of the LFS instrument, the land module was appended at the end of the questionnaire and some enumerators seem to have considered the module as optional before a re-training as well as a revision of the survey instrument to add the gender of land owners was conducted at the half-time review by all enumerators.

responded to the land tenure module and the 2,225 who did not, as reported in appendix table A1, point towards significant differences as well as non-random non-response.¹⁵

As the land tenure module was appended at the end of the LFS questionnaire, socio-economic characteristics are available even for those who did not respond to the land tenure module. We can thus implement a control function approach (Wooldridge 2015) whereby we first regress Pr_i , an indicator variable equaling 1 if land owner i responded to the land tenure module and 0 otherwise, on a set of household characteristics using a logit model (see results in appendix table A2). The predicted value \widehat{Pr}_i from this regression is then used as an additional control variable in regressions reported in section four (tables 5-7). We also correct descriptive statistics in tables 1-4 for non-response by multiplying the survey's sampling weights with $1/\widehat{Pr}_i$.

3.2 Descriptive evidence on land tenure at the household level

Table 1 highlights socio-economic characteristics. Households have 5 members on average. About 36% (49% in rural vs. 6% in urban areas) live in a traditional hut, 26% (32% in rural and 13% in urban areas) in a traditional house, 33% (19% in rural vs. 66% in urban areas) in a detached house, and 5% (virtually all in urban areas) in a flat or apartment. Only about 20% have access to tap water or electricity, access to which is heavily biased in favor of urban areas where 73% and 70% have access to water and electricity vs. rural areas where only about 4% have access to either. A total of 29% of households are female-headed, 41% have completed high school, 15% college or higher, and 19% have no formal education. Of those with jobs about 46% work for a salary and 54% are self-employed.

A first observation from table 2, which presents summary statistics on land tenure at the household level is that, with only 22% of married-couple households have at least one parcel owned either jointly or individually by women, access to land is biased against women. The ability to transfer land via bequest or sale remains limited with only 43% having the right to bequeath and 39% to sell land overall. Women's ability to make decisions is limited in either case with females having a say in about 40% of cases -but less than 25% if they are married. While more than two-thirds of urban households (70% and 72%) can transfer land via bequest or sale, only about a third or a quarter (32% and 26%) have bequest or sale rights in rural areas. Customary tenure systems seem a key factor limiting households' ability to transfer land in general and women's ability to make decisions on this issue. The data show stark inter-regional differences with 22% able to bequeath in the East, 75% in Lusaka, 24% in the South, 30% in the West, and 47% in the North.

¹⁵ Among the non-respondents we exclude those who obtained dwellings free. On average, non-respondent households smaller (with 4.8 vs. 5.3 household members), with fewer working members (20% vs. 25% for own business), and higher levels of worse living conditions (52% vs. 40% living in a traditional hut). Their dwellings are smaller, with fewer than 3 rooms and lack of access to electricity (8% vs. 19%) and tap water (8% vs. 20%). Household heads are younger (42 vs. 47 years old) and better educated (47% vs. 42% completed high school and about 27% overall completed primary school but 9% vs. 15% college or higher).

Binding transferability restrictions, especially for bequest, are likely to reduce investment incentives even if tenure is secure (Deininger and Jin 2006) while sales limits will undermine emergence of credit markets. In light of Zambia's history of requiring Presidential consent for any land transfer and a doctrine of land having no value that prevailed until recently (Adams 2003), understanding of the basis and nature of these restrictions will be essential to assess how these should feature in discussions of the new land policy.¹⁶

A total of 31% of households report having access to some document, a level that is higher for urban (72%) as compared to rural areas (15%). Documents are most prevalent in Lusaka (67%) with shares between 11% in the East and 18% in the South. Yet, at about 11% overall (31% in Lusaka, 6% in the South and about 2% in the remainder of the provinces), less than half of these documents are full titles. While virtually all are in the name of household members, only 35% list a woman as a land owner. Incomplete titles, that have not been formalized by paying required fees and certificates by traditional authorities on customary land, each account for about half of these documents. Cross-checking these figures against administrative data (Kaunda 2017) suggests that they are plausible, though at the high end.¹⁷

Substantively, high levels of informality may be due to three issues. Cost of service delivery may be elevated by outdated survey regulations requiring high precision sporadic surveys, institutional inefficiencies related to sporadic title issuance, and a rather dysfunctional IT system. A need to pay fees (of at least ZMK 4,000 per urban parcel, in most instances much higher) upfront rather than in installments may be unaffordable for credit constrained households, limiting transition to the formal regime and reducing public revenue (as property tax can be levied only on titled properties). Converting customary land into state land to allow document issuance may be resisted by local traditional authorities and give rise to informal substitutes issued by chiefs that can weaken transparency.

Questions on likelihood of land loss suggest high levels of perceived tenure insecurity: 43% of respondents perceive some risk of losing their land in the next 5 years.¹⁸ Tenure insecurity is higher in rural than in urban areas (45% vs. 37%) and varies across regions with levels highest in the East where with 71%, insecurity is pervasive, followed by 43% in Lusaka and the North, and 21% and 11% in the West and South, respectively. Even if a more conservative measure of insecurity ("perceived land loss very likely") is used, 26% of land owners are tenure insecure, a figure that is very high in global comparison. In Malawi, much lower levels of tenure insecurity had far-reaching effects on productivity and gender equality (Deininger *et al.* 2019).

¹⁶ This would include determining the range of people to which land can be transferred, the type of approvals needed to bequeath within the family and the risk of these not being granted, and women's ability to make decisions on transferring land. Once such a regulatory assessment is completed, a suitable communications strategy could then be defined.

¹⁷ As per Kaunda (2017), Zambia's integrated land information system (ZILMIS) includes some 600,000 documents of which at most 200,000-250,000 are estimated to be complete titles. An average of 9.8% of respondents claiming to have title translates, at an average household size of 5.3 and with a national population of 15.6 million people, to 2.9 million households or 285,000 titles, suggesting that some informal documents or incomplete titles may have mistakenly been classified as complete titles.

¹⁸ Respondents to provide an answer on the likelihood of losing ownership or use rights to their land with a scale from 1 to 5, where 1 is not at all likely and 5 is extremely likely.

Identifying reasons for such insecurity which could include concern about non-extinguished or overlapping historical rights or current competition for land from ‘emergent’ farmers and assessing their productivity impact is a priority for further analytical work.

To explore if access to formal documentation is constrained by supply or demand-side factors, 90% of respondents are without a valid title and were asked if they would like to apply for title and, if yes, what they would be willing to pay for it.¹⁹ Overall, 54% of them -71% in urban and 50% in rural areas- want to acquire title and are willing to pay an average of ZMK 754 (ZMK 968 in urban and ZMK 667 in rural areas) for it. Title demand is highest in Lusaka (83%), followed by North (60%), East (59%), West (28%) and South (27%).

Aggregating demand for title or willingness to pay at the village level provides an estimate of the share of households who would like to acquire title as well as mean or total willingness to pay. These two parameters allow us to identify areas where a titling program would be welcome by a given share of the population and, for a given cost structure, could be run on a cost recovery basis or a given subsidy element. Results in table 3 suggest that, while in 71% of the villages respondents would be willing to pay at least ZMK 100 to get title, this holds for 87% in Lusaka and 81% in the East, but for less than half (45%) in the West and about one-third (35%) in the South. Even in Lusaka District more than 40% of the population do not want title in some 11% of villages, a share is that more than two-thirds (68%) in the West and almost that level (65%) in the South. Use of sampled households’ GPS coordinates allows us to map this. Figure 1 shows the location of villages where more than a given share of the sample population wants to acquire title (panel A) or with willingness to pay above a certain level (panel B). While it is not surprising to find most demand and willingness to pay concentrated along the line of rail, there is considerable variation over space.

3.3 Tenure characteristics at the parcel level

Parcel level data allow to distinguish between residential and agricultural parcels and statutory vs. customary tenure systems as illustrated in table 4. Estimates on population mean using the 3,787 residential parcels in our sample (panel A) suggest that, 43% can be transferred by bequest and 38% by sale, a share that is much higher for parcels located on state (with 65% able to bequeath and 68% to sell) than on customary land (34% and 25% with bequest and sale rights).²⁰ With rights to 73% of residential parcels documented in some way (41% and 22% with complete or partial title and 11% with a form of informal document), documentation is concentrated on state land; in fact, only 2.2% of residential parcels on customary land have an incomplete title and about 13% have an informal document. Owners want to acquire title for about half (46%) of

¹⁹ To implement this, a contingent valuation approach was adopted with starting values of ZMK 50, ZMK 500, and ZMK 5,000 and subsequent questions narrowing amounts (e.g., for the ZMK 50 starting value, the sequence is ZMK 3,000, ZMK 100, ZMK 2,500, ZMK 200, ZMK 2,000, ZMK 350, ZMK 1,300, ZMK 500, and ZMK 1,000). Note that at the time of the survey the exchange rate was about ZMK 10 per US\$.

²⁰ Exploring the type of transferability restrictions on state land where rights should be fully transferable would be of interest.

residential parcels that currently lack title (65% on state and 41% on customary land) and are willing to pay a median of about US\$ 35 (ZMK 350 overall; ZMK 500 for state and ZMK 200 for customary land) to acquire formal document. Interestingly, levels of tenure insecurity for residential parcels are higher on customary (42% insecure and 26% very insecure) than on state land (37% insecure and 19% very insecure).

Panel B of table 4 shows that 91% of the 3,670 agricultural parcels are under customary tenure. While 30% of these can be transferred via bequest (with little difference between tenure regimes), 23% can be sold (31% on state and 22% on customary land). With 15% (43% on state and 12% on customary land), the share of parcels with any rights documentation remains limited. For these, the share with informal documents (6.2% ‘chief certificates’ and 4% other papers) exceeds that of those with formal documents (1.8% with complete and 3% with incomplete title). Even on state land 57% of agricultural parcels lack documentation entirely and 19% and 17%, have complete or incomplete title. More than 98% of parcels (81% on state and 100% on customary land) lack valid title and 47% of these would like to acquire title, pointing to high levels of unmet demand, especially on customary land. With mean and median willingness to pay of ZMK 791 and ZMK 350, implementing a systematic land titling program on a cost recovery basis could be an option in several locations if an appropriate legal and regulatory framework was in place.

Data on tenure insecurity suggest that, with tenure of some 43% or 25% of agricultural parcels perceived to be insecure or very insecure, levels of tenure insecurity on agricultural land are higher on state (52%) rather than customary (42%) land but that the depth of insecurity is higher on the latter (25% on customary and 23% on state land), i.e., insecurity may be more acute. Demand for title is 47% overall (47% on agricultural and 46.4% on residential parcels) among those who perceive their land rights as secure, in line with the notion that, although titles can reduce insecurity, they perform other functions (e.g., reducing the cost of transfers among strangers). Of those who perceive their rights as insecure, 51% of agricultural and 40% of residential parcels would like to acquire title, suggesting that formal title is not perceived as a panacea to deal with tenure insecurity. Substantively, this suggests that other measures to secure tenure might need to be explored. Methodologically, it implies that, in situations where access to formal documents is incomplete, adding questions on title demand could greatly increase household surveys’ policy relevance.

4. Regression analysis and comparison to the Prindex global poll

Regressions for determinants of transferability, perceived tenure insecurity, and demand for title using LFS data allow us to explore heterogeneity of outcomes, including whether having title is associated with greater female decision-making. As similar regressions for Prindex data produce very different results, we discuss potential reasons in terms of data quality and use these to identify ways to improve this approach to ensure better complementarity and avoid confusion.

4.1 Methodology and results from regression analysis

To assess if formal documentation enhances transferability, we estimate

$$R_i = \alpha_1 + \beta_1 \sum_j T_{ij} + \mathbf{X}\gamma_1 + \mathbf{H}\delta_1 + \omega + \varepsilon_{i1} \quad (1)$$

where R_i is a zero-one indicator on whether the owner of parcel i can transfer it via bequest and sale, respectively. Explanatory variables are ownership documentation in the form of either full title (T_{i1}), title in process (T_{i2}), informal certificate (T_{i3}) against the reference category of no document; a vector \mathbf{X} of parcel characteristics that includes a dummy for residential vs. agricultural use, tenure type, a vector \mathbf{H} of households' socio-demographic characteristics; region fixed effects (ω) and a random error term (ε_i).

Results in table 5, with (panel A) and without (panel B) controls for non-response, suggest that having rights documented makes it easier to transfer land by sale or bequest (col. 1-6). Title is associated with an increment in the ability to bequeath land by 20 percentage points, an estimate not different statistically from that for incomplete title or chief's certificate. Customary land is more easily bequeathed by some 8 percentage points (col. 1). Similar results are obtained for ability to sell (col. 4) except customary tenure being insignificant and the point estimate for chief's certificate being higher by 6.5 percentage points. Separate regressions for state and customary land suggest residential parcels on state land are more likely to be bequeathed and sold by some 14 and 12 percentage points (col. 2 and 5). For customary land, informal documentation is associated with higher transferability via bequest or sale (by 25 and 32 percentage points), a quantitatively large effect in light of dependent variable means of 0.32 or 0.22.

To explore if formal titles empower married women, we estimate a version of (1) only for parcels owned by married couples transferable by sale (col 7) or bequest (col 8).²¹ The dependent variable is a zero-one dummy for the female household member's participation in land transfer decisions. Results suggest titling is biased against spouses' participation in inheritance decisions –(in)complete title is estimated to be associated with a drop in female participation in such decisions by almost half. Having either formal or informal document is associated with a significant reduction of women's participation in land sales decisions.

Replacing R_i in (1) with a dummy for owners perceiving some or a high likelihood of involuntarily losing ownership or use rights to land in the next 5 years allows identification of factors associated with tenure insecurity. Parcels with complete title are significantly less insecure-with an estimated reduction of 24 percentage points (more than half the sample mean) in moderate tenure insecurity (col. 1) and a 9 percentage points reduction (about a third of the sample mean) in severe insecurity (table 6). Customary land is estimated to be more secure by 6.5 percentage points (col.1), consistent with the notion that customary

²¹ The formulation used in the survey instrument is whether the spouse or other female household members 'have a say' in bequest or sale decisions. Sample size is reduced as questions on gender-differentiated transfer rights were properly administered only in quarters 3 and 4 of the survey.

tenure protects against low levels of tenure insecurity but that such protection cannot counter more potent threats; in fact, for severe insecurity the sign of the point estimate reverses, though only attaining marginal significance.

Factors associated with title demand can be analyzed by focusing on parcels without title and estimating

$$W_i = \alpha_2 + S_i + \beta_{21}T_{i2} + \beta_{22}T_{i3} + X\gamma + H\delta + \omega + \varepsilon_i \quad (2)$$

where W_i is either a zero-one indicator of whether the owner would like to apply for a title or, for cases where this is the case, willingness to pay (in logs). In addition to variables described above, right hand side variables include perceived tenure insecurity (S_i) to explore if high levels of perceived tenure insecurity create demand for land documentation and legalization. Table 7 displays results for the regressions with a zero-one indicators of wanting to apply for title (col. 1-3) and willingness to pay for it (col. 4-6). Those suffering from insecurity are more likely to apply for a title overall (col.1) and on customary land (col. 3) but less on state land (col. 2). Comparing the point estimate (0.095) to the dependent variable mean implies that insecurity increases demand for title by some 20%. Transferability is associated with about 30 percentage points higher level of title demand. While having title in process increases the amount willing to pay on state land by some 50%, having an informal certificate is associated with an increment in title demand by 38% and a 27% higher willingness to pay on customary land. Informal and formal documents thus do not seem to be substitutes for each other but rather have a strongly complementary relationship.

4.2 Comparing results and methodology to those of the Prindex global poll

Global polls such as Prindex could complement and put country-level statistics in context if concepts and procedures used are comparable. Comparing descriptive statistics from Prindex to those obtained using the LFS is, however, difficult without a description of the sampling procedure and information on non-response neither of which was available. To nevertheless capitalize on availability of these data which, for example, provide information on a larger set of transfer rights, we focus on regressions to explore links between access to either formal or informal documentation and transferability.

Results as reported in table 8 suggest that there is no association between access to a formal or informal documentation and the ability to transfer land *intra vivos*, bequeath, rent, or sell it, or use it as collateral. While this suggests that a careful methodological discussion of Prindex data and approach could be useful, empirical examination of data for the 32 countries (in addition to Zambia) for which data have been gathered thus far is well beyond the scope of this paper. Two issues that may explain some of the surprising findings reported above and their potentially broader implications are worth mentioning. First, the Prindex focuses on property rather than land that goes together with potentially very high levels of under-reporting of non-residential agricultural properties: in the case of Zambia, just about 4% of respondents, compared to 75% in

the LFS- report to own non-residential agricultural property.²² While this could explain part of the above findings,²³ it raises concerns about a large number of agricultural properties having been omitted. If correct, this may compromise the ability of Prindex data to provide information on any issues involving agricultural land, including reporting of statistics on SDG indicator 5.a.1.

A second concern emerging from Zambian data is that, rather than obtain property information from the most knowledgeable household member and then possibly cross-check responses against information supplied by other members with legitimate interests, Prindex obtains information on tenure, the type of formal documents, and other land characteristics from an adult member who is randomly selected.²⁴ In the case of Zambia, more than half (53%) of information on formal land documents comes from owners' uncles, aunts, sons, daughters, brothers, sisters, cousins, grandchildren, grandparents, nieces, nephews, fathers, mothers or in-laws. As reliable information on the type of formal documents is difficult to obtain without physical inspection of relevant documents even from owners, this may introduce measurement error.²⁵

As respondents who are not owners also provide the majority of responses on perceived tenure security, any analysis of such data would need to be preceded by a discussion of the extent to which responses to the same question by owners and non-owners are comparable or if, as tenure security perceived by non-owners will be affected by factors entirely different from those relevant for owners, they need to be analyzed separately. At the same time, co-owners are not asked to provide information on owners' gender and in cases where a document exists no information is requested on gender of individuals listed on documents. This limits the scope for gender analysis, e.g. by checking the extent to which documented and perceived rights match.

5. Conclusion and policy implications

This paper aimed to advance the debate on land data collection by going beyond conceptual issues and exploring if cost-effective implementation of a household-level SDG compliant module is possible and can offer insights as a basis for actionable policy advice and tracking progress on implementation. Zambia's experience suggests that piggy-backing a slightly expanded SDG module on existing surveys, such as the

²² This is combined with a failure to document land use or tenure type for residential land for which the Prindex questionnaire only asks if a property has any land attached to it or not (Q36). Published data suggest that 27% of households access only a residence with no land attached, a figure more than double what emerges from LFS data.

²³ Especially if located on state land, titled agricultural properties may be more easily transferred and used for collateral than the primary residence.

²⁴ As only (co)owners can decide on land transfers or use of land as collateral, this reduces the sample size for any regressions involving these variables, as illustrated by the limited number of observations in table 8.

²⁵ The literature documenting the presence and adverse impacts of intra-household informational imperfections even among monogamously married spouses reinforces this (Udry 1996). Recent experimental evidence supports the notion that spouses do not always communicate information about resources (Ashraf 2009) even if such strategic exploitation of informational advantages results in efficiency losses (Castilla 2019).

LFS, can generate policy relevant insights within about 12-months in a way that is cost effective,²⁶ scalable, and consistent with the IAEG-SDG mandate of building local capacity for sustainability.²⁷

Data from the module point towards high levels of tenure insecurity, demand for title, and limits on transferability of land. This suggests that for residential state land, award of (full) title is a viable strategy. At the same time they caution that, without regulatory and procedural reform, responding to such demand in a systematic way may be difficult, desired impacts may not materialize, affordability and sustainability may be limited, and negative gender impacts cannot be ruled out. Our data also show that titling is not a silver bullet to secure tenure in Zambia: 45% of households without title overall and 40% (23%) of those without title who perceive their land to be (very) insecure do not want to acquire title while 29% (20%) of those who have title feel (very) insecure. Unless other avenues to secure land tenure, including recognition of customary boundaries -possibly in return for greater accountability on land management- are available, transparent and effective use of the country's rural land resources may be difficult to achieve.

To the extent that private owners' willingness to pay can provide a lower bound estimate for the economic benefits from land title, survey data on demand and willingness to pay for title can help identify villages or regions where such an intervention may be justified and economically viable in principle. Despite high demand, current fees for title issuance are unaffordable and several times above stated willingness to pay. Regulatory reform to streamline processes and reduce fees is thus essential if such an intervention is to be affordable and sustainable and greater interoperability can greatly enhance long-term benefits. At the same time, with LFS data showing that the current titling process reinforces pre-existing gender bias rather than alleviating it,²⁸ changes in procedures for women to assert and protect their property claims during land titling are essential. Unless such changes are made ahead of any program, efforts such as the National Land Titling Program may disempower women rather than facilitating their economic and social participation. Continued collection of the variables highlighted here would be important to monitor progress and ensure unintended negative impacts are avoided or, if they arise, are addressed quickly.

Our results suggest that Prindex together with other cross-national initiatives such as the World Bank's Doing Business, is a complementary approach that can motivate debate on property but is unlikely to reach the level of granularity, detail, and continuity of national household surveys, particularly for agricultural land. If methodological issues identified here for Zambia are resolved, there are ample opportunities to

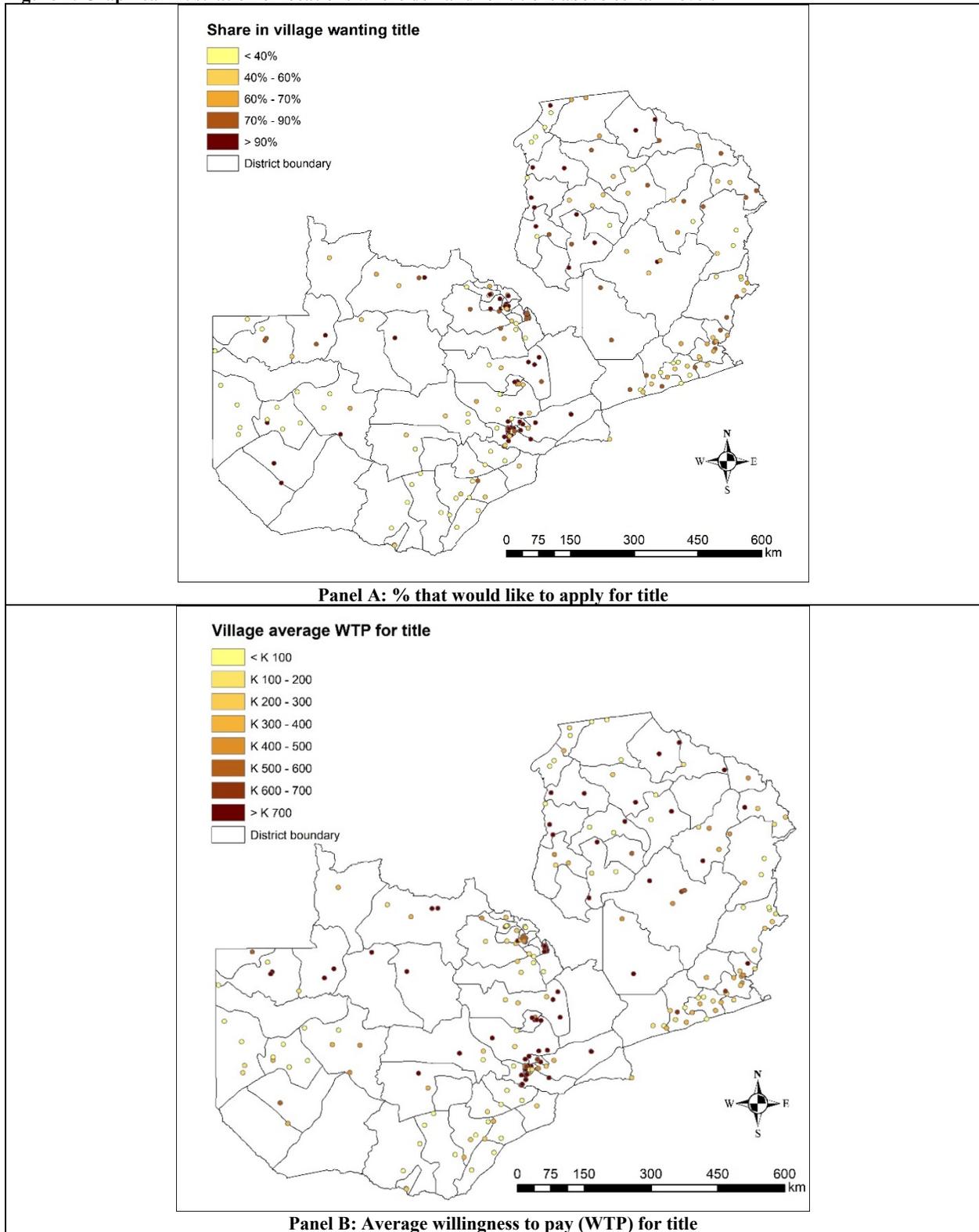
²⁶ At the incremental cost (US\$ 50,000, in addition to few days of long-distance support to programming and training) for administering the land tenure module in Zambia, some US\$ 5 million would be needed to cover 100 countries.

²⁷ The fact that such surveys are conducted in regular intervals (most LFSs are annual) offers opportunities to anchor land tenure in national statistics and generate data of high policy relevance that are in high demand from analysts. In Zambia's case, data for the 2019 LFS are currently collected with an improved questionnaire that corrects some of the initial shortcomings identified here (e.g. in terms of non-response), at the NSO's own initiative without additional funding from outside.

²⁸ Our analysis shows that, even if transfers are possible, titles may make it easier to forestall female spouses' input into transfer decisions.

realize synergies and to use Prindex as a stepping stone towards collection of household-based information to support a country-level policy dialogue that is based on local evidence rather than pre-conceived notions. Helping developing countries create the institutional preconditions for sustained and inclusive economic growth, equity, resilience and private sector development to achieve the SDGs through modernization of their land sector will require making the transition to a results-based evidence-driven approach. The approach taken in Zambia can generate the data and analysis needed to make this transition.

Figure 1: Graphical illustration of locations where demand for title is above certain levels



Source: Own compilation based on data from the CSO 2018 Quarterly Labor Force Survey for land holdings 2017/2018.

Table 1: Sample households' socio-economic characteristics

	Total	Region		Province					Head married	
		Rural	Urban	Lusaka	North	East	West	South	Yes	No
Household size	5.290	5.199	5.513	5.707	5.495	5.068	4.857	5.393	5.794	4.147
No. of adults	2.576	2.369	3.085	3.208	2.451	2.314	2.315	2.480	2.764	2.151
Share high school	0.355	0.270	0.563	0.562	0.260	0.162	0.296	0.399	0.350	0.364
Share salaried	0.323	0.279	0.431	0.475	0.212	0.402	0.186	0.284	0.326	0.316
Share self-employed	0.241	0.257	0.202	0.232	0.218	0.350	0.152	0.202	0.237	0.251
Share unemployed	0.273	0.273	0.274	0.238	0.284	0.259	0.293	0.279	0.252	0.320
Traditional hut	0.361	0.485	0.055	0.064	0.505	0.501	0.767	0.226	0.348	0.390
Traditional house	0.263	0.318	0.125	0.107	0.291	0.318	0.166	0.282	0.280	0.223
Detached house	0.327	0.193	0.656	0.546	0.202	0.170	0.048	0.477	0.330	0.320
Flat/apartment	0.049	0.003	0.164	0.283	0.002	0.012	0.019	0.015	0.042	0.067
No. of rooms	3.182	2.809	4.099	3.933	3.345	2.796	2.321	2.876	3.279	2.963
Electricity access	0.229	0.037	0.702	0.705	0.133	0.030	0.106	0.127	0.221	0.249
Access to tap water	0.247	0.049	0.734	0.777	0.193	0.044	0.166	0.133	0.222	0.304
Household head characteristics										
Male	0.711	0.720	0.689	0.677	0.800	0.741	0.549	0.706	0.950	0.170
Age	46.800	45.355	50.347	50.723	46.020	42.491	46.959	46.313	44.141	52.829
Married	0.694	0.717	0.637	0.634	0.794	0.754	0.523	0.702	1.000	0.000
Separated	0.102	0.107	0.089	0.109	0.074	0.085	0.170	0.112	0.000	0.333
Widowed	0.175	0.151	0.235	0.229	0.125	0.146	0.187	0.167	0.000	0.574
No education	0.186	0.232	0.071	0.057	0.243	0.422	0.188	0.122	0.159	0.245
Primary school	0.251	0.292	0.151	0.172	0.291	0.309	0.342	0.213	0.226	0.308
High school	0.410	0.409	0.413	0.432	0.389	0.215	0.359	0.540	0.444	0.334
College or higher	0.153	0.066	0.365	0.340	0.077	0.054	0.111	0.124	0.171	0.113
Self-employed	0.542	0.627	0.334	0.239	0.669	0.510	0.741	0.615	0.520	0.593
... farming	0.642	0.718	0.291	0.337	0.812	0.547	0.848	0.630	0.668	0.592
... non-farming	0.357	0.281	0.709	0.663	0.188	0.453	0.152	0.368	0.332	0.408
Work for salary	0.458	0.373	0.666	0.761	0.331	0.490	0.259	0.385	0.480	0.407
No. of obs.	4,888	3,703	1,185	491	525	761	491	566	3,455	1,433
Est. population	1,709,593	1,214,953	494,640	184,147	167,765	327,931	150,558	251,872	1,186,526	523,067

Source: Own computation from 2018 Quarterly Labor Force Survey conducted by Central Statistical Office of Zambia. Sampling weights adjusted with non-response probabilities are used to estimate the mean values.

Table 2: Households' land rights, tenure, and demand for documentation

	Total	Region				Province			Head married	
		Rural	Urban	Lusaka	North	East	West	South	Yes	No
No. of parcels	1.527	1.646	1.234	1.225	1.511	1.760	1.747	1.570	1.559	1.456
Area (median)	1.200	1.600	0.103	0.800	1.000	1.215	0.540	3.000	1.280	0.800
Of which used by males only*	0.622	0.631	0.600	0.637	0.746	0.657	0.507	0.727	0.806	0.173
... share used by women only*	0.283	0.268	0.316	0.327	0.227	0.250	0.323	0.274	0.079	0.778
... share used jointly with women*	0.110	0.130	0.064	0.045	0.058	0.122	0.216	0.004	0.143	0.031
Has right to sell land	0.394	0.261	0.721	0.748	0.369	0.256	0.189	0.208	0.386	0.412
... if yes, women have a say	0.397	0.433	0.370	0.368	0.332	0.308	0.417	0.256	0.211	0.820
Has right to bequeath land	0.428	0.318	0.699	0.752	0.472	0.216	0.297	0.241	0.426	0.435
... if yes, women have a say	0.410	0.450	0.371	0.379	0.283	0.345	0.502	0.189	0.240	0.799
Has some document	0.314	0.150	0.718	0.674	0.235	0.111	0.153	0.176	0.300	0.346
Has formal title	0.109	0.011	0.349	0.306	0.013	0.022	0.003	0.060	0.098	0.134
... if yes, woman included	0.347	0.376	0.344	0.322	0.147	0.489	1.000	0.345	0.121	0.724
Has incomplete title	0.071	0.023	0.189	0.167	0.032	0.014	0.026	0.064	0.068	0.076
... if yes, woman included	0.326	0.252	0.348	0.402	0.501	0.118	0.322	0.226	0.112	0.765
Has informal certificate	0.072	0.073	0.069	0.068	0.072	0.038	0.093	0.019	0.077	0.060
... if yes, woman included	0.241	0.240	0.243	0.205	0.116	0.046	0.419	0.000	0.091	0.683
Has no title	0.884	0.970	0.675	0.731	0.973	0.969	0.971	0.898	0.899	0.851
..... if yes, would like title	0.543	0.495	0.713	0.825	0.602	0.590	0.282	0.272	0.568	0.484
... if yes, mean WTP (ZMK)	754.01	666.53	968.14	949.21	756.39	521.01	556.61	464.37	803.84	613.83
... if yes, median WTP (ZMK)	350	250	500	500	150	200	350	100	350	200
Tenure perceived insecure	0.428	0.450	0.372	0.426	0.428	0.713	0.209	0.110	0.450	0.377
Tenure perceived very insecure	0.262	0.280	0.219	0.241	0.302	0.486	0.080	0.056	0.278	0.227
No. of sample households	4,888	3,703	1,185	491	525	761	491	566	3,455	1,433
Population size	1,709,593	1,214,953	494,640	184,147	167,765	327,931	150,558	251,872	1,186,526	523,067

Source: Own computation from 2017/18 Quarterly Labor Force Survey conducted by Zambia's Central Statistical Office. Sampling weights adjusted with non-response probabilities are used to estimate the mean values.

Note: Questions on area and gender-differentiated transfer rights were administered only in quarters 3 and 4 (to a total of 2,637 households).

*The sum does not add up to one as households own more than one parcel with different ownership structure. The figures should thus be interpreted as the share of households with at least one parcel owned by male only, female only or jointly.

Table 3: Demand for formal documentation at village level

	Total	Region			Province			
		Rural	Urban	Lusaka	North	East	West	South
Willingness to pay (WTP)								
Mean WTP > K 100	0.709	0.649	0.813	0.869	0.565	0.813	0.450	0.354
Mean WTP > K 200	0.618	0.534	0.764	0.833	0.500	0.583	0.325	0.313
Mean WTP > K 300	0.525	0.425	0.698	0.750	0.413	0.375	0.275	0.229
Mean WTP > K 400	0.444	0.326	0.648	0.667	0.326	0.188	0.200	0.146
Mean WTP > K 500	0.370	0.243	0.588	0.595	0.261	0.125	0.150	0.125
Mean WTP > K 600	0.327	0.211	0.527	0.536	0.239	0.125	0.075	0.083
Mean WTP > K 700	0.295	0.179	0.495	0.500	0.196	0.042	0.075	0.083
Title demand								
> 90% wanting title	0.234	0.150	0.379	0.500	0.152	0.000	0.125	0.063
> 70% wanting title	0.370	0.288	0.511	0.631	0.304	0.208	0.200	0.125
> 60% wanting title	0.442	0.367	0.571	0.690	0.413	0.354	0.250	0.125
< 40% wanting title	0.325	0.419	0.165	0.107	0.261	0.250	0.675	0.646
Number of villages	495	313	182	84	46	48	40	48

Notes: Own computation from 2017/18 Quarterly Labor Force Survey conducted by Zambia's Central Statistical Office. Sampling weights adjusted with non-response probabilities are used to estimate the mean values.

Table 4: Parcel characteristics

	Total	Land tenure			Regions				Perception		
		State	Cus.	Lusaka	North	East	West	South	Secure	Insec.	Very insec.
Panel A. Residential land											
Area in ha (median)	0.090	0.100	0.060	0.090	0.050	0.060	0.050	0.250	0.100	0.090	0.060
Used by males only	0.622	0.585	0.639	0.646	0.682	0.721	0.599	0.747	0.595	0.631	0.671
... used by women only	0.277	0.311	0.261	0.327	0.233	0.222	0.360	0.246	0.297	0.265	0.243
... used jointly with women	0.081	0.055	0.094	0.027	0.085	0.049	0.041	0.007	0.091	0.085	0.061
Has right to sell land	0.384	0.681	0.246	0.766	0.088	0.389	0.195	0.263	0.451	0.307	0.265
... if yes, women have a say	0.391	0.354	0.454	0.342	0.408	0.348	0.554	0.245	0.395	0.431	0.343
Has right to bequeath land	0.434	0.645	0.336	0.772	0.226	0.473	0.244	0.272	0.503	0.355	0.311
... if yes, women have a say	0.392	0.357	0.435	0.358	0.370	0.295	0.457	0.256	0.410	0.376	0.329
Has some document	0.334	0.734	0.148	0.690	0.110	0.231	0.154	0.197	0.391	0.281	0.224
Has formal title	0.128	0.405	0.000	0.315	0.025	0.018	0.003	0.055	0.162	0.068	0.083
... if yes, woman included	0.343	0.343		0.311	0.654	0.164	1.000	0.410	0.349	0.478	0.232
Has incomplete title	0.085	0.220	0.022	0.193	0.020	0.035	0.024	0.079	0.098	0.082	0.052
... if yes, woman included	0.310	0.319	0.265	0.351	0.101	0.315	0.401	0.255	0.338	0.186	0.310
Has informal certificate	0.055	0.021	0.072	0.037	0.030	0.054	0.088	0.023	0.056	0.053	0.057
... if yes, woman included	0.260	0.259	0.260	0.312	0.035	0.181	0.431	0.000	0.276	0.314	0.184
Has no title	0.872	0.595	1.000	0.685	0.975	0.982	0.997	0.945	0.838	0.932	0.917
..... if yes, would like title	0.464	0.651	0.413	0.834	0.400	0.592	0.195	0.235	0.440	0.403	0.566
... if yes, mean WTP (ZMK)	795.4	832.3	779.4	915.6	525.7	830.5	510.1	601.2	940.2	466.7	701.3
... if yes, median WTP (ZMK)	350	500	200	500	100	200	100	100	500	200	200
Tenure perceived insecure	0.400	0.366	0.416	0.371	0.723	0.471	0.174	0.105	0	1	1
Tenure perceived very insecure	0.233	0.186	0.255	0.207	0.456	0.336	0.058	0.055	0	0	1
No. of residential parcels	3,787	1,042	2,745	417	361	609	406	417	2,231	622	934
Population size	1 364 144	431 877	932 267	166 117	265 859	121 220	128 827	188 417	818 319	227 584	318 241
Panel B. Agricultural land											
Area in ha (median)	2.000	2.000	4.000	2.000	1.200	1.200	1.250	3.000	2.000	1.750	1.200
Customary	0.909	0.000	1.000	0.836	0.965	0.882	0.986	0.914	0.924	0.855	0.917
Used by males only	0.613	0.633	0.611	0.626	0.788	0.636	0.474	0.740	0.619	0.554	0.636
... used by women only	0.251	0.300	0.248	0.266	0.159	0.238	0.327	0.255	0.270	0.255	0.217
... used jointly with women	0.128	0.025	0.134	0.108	0.053	0.122	0.197	0.004	0.108	0.184	0.131
Has right to sell land	0.225	0.313	0.217	0.462	0.259	0.218	0.085	0.061	0.224	0.290	0.179
... if yes, women have a say	0.393	0.320	0.404	0.475	0.298	0.304	0.107	0.210	0.396	0.351	0.433
Has right to bequeath land	0.298	0.286	0.299	0.553	0.404	0.156	0.200	0.112	0.318	0.317	0.237
... if yes, women have a say	0.421	0.273	0.435	0.416	0.211	0.271	0.453	0.059	0.410	0.443	0.426
Has some document	0.148	0.430	0.120	0.411	0.192	0.069	0.037	0.104	0.167	0.161	0.095
Has formal title	0.018	0.194	0.000	0.096	0.006	0.006	0.000	0.035	0.021	0.008	0.017
... if yes, woman included	0.377	0.377		0.175	0.501	0.319		0.414	0.326	0.179	0.598
Has incomplete title	0.030	0.170	0.016	0.064	0.012	0.007	0.002	0.034	0.043	0.017	0.008
... if yes, woman included	0.310	0.261	0.364	0.515	0.569	0.000	0.000	0.274	0.276	0.283	0.780
Has informal certificate	0.062	0.036	0.065	0.121	0.062	0.028	0.034	0.013	0.073	0.058	0.039
... if yes, woman included	0.208	0.157	0.210	0.151	0.102	0.072	0.309	0.000	0.213	0.178	0.217
Has no title	0.982	0.806	1.000	0.904	0.994	0.994	1.000	0.965	0.979	0.992	0.983
..... if yes, would like title	0.470	0.355	0.479	0.715	0.551	0.532	0.212	0.226	0.428	0.506	0.539
... if yes, mean WTP (ZMK)	790.6	1 295.4	760.5	955.5	726.1	590.1	660.6	642.5	900.3	678.3	672.4
... if yes, median WTP (ZMK)	350	500	350	500	100	275	350	200	350	350	200
... if yes, mean WTP (ZMK/ha)	418.3	474.8	416.0	469.3	222.1	352.6	429.4	149.9	401.7	397.3	456.1
... if yes, median WTP (ZMK/ha)	133	250	125	175	100	167	125	50	117	165	175
Tenure perceived insecure	0.431	0.523	0.422	0.602	0.403	0.672	0.185	0.081	0	1	1
Tenure perceived very insecure	0.246	0.225	0.248	0.327	0.270	0.393	0.067	0.045	0	0	1
No. of agric. parcels	3,670	299	3,371	208	428	719	450	460	2,032	690	948
Population size	1 201 399	108 825	1 092 575	50 829	130 802	302 875	132 356	195 313	683 002	223 345	295 052
Total no. of parcel samples	7 457	1 341	6 116	625	789	1328	856	877	4263	1312	1882

Source: Own computation from 2017/18 Quarterly Labor Force Survey conducted by Zambia's Central Statistical Office. Sampling weights adjusted with non-response probabilities are used to estimate the mean values.

Note: Questions on area and gender-differentiated transfer rights administered only in quarters 3 and 4 (for 1,828 residential and 2087 agricultural parcels).

Table 5: Factors affecting land parcels' transferability

	Can bequeath			Can sell			Woman has a say	
	All	State	Cust.	All	State	Cust.	bequest	Sale
Panel A. Baseline regression								
Has title	0.195*** (0.038)	0.161*** (0.040)		0.190*** (0.038)	0.168*** (0.041)		-0.114** (0.052)	-0.100* (0.053)
Title in process	0.212*** (0.039)	0.146*** (0.052)	0.250*** (0.063)	0.230*** (0.043)	0.167*** (0.058)	0.302*** (0.067)	-0.110** (0.052)	-0.151*** (0.052)
Has inf. certificate	0.219*** (0.040)	-0.070 (0.084)	0.252*** (0.041)	0.285*** (0.038)	0.017 (0.109)	0.315*** (0.040)	-0.009 (0.052)	-0.110** (0.050)
Residential parcel	0.032*** (0.011)	0.136*** (0.035)	0.014 (0.011)	0.039*** (0.011)	0.118*** (0.037)	0.024** (0.012)	-0.024 (0.030)	-0.014 (0.039)
Customary tenure	0.084** (0.034)			-0.009 (0.026)			0.014 (0.065)	0.073 (0.073)
R-squared	0.217	0.300	0.179	0.275	0.321	0.170	0.284	0.270
Panel B. Control function approach								
Has title	0.195*** (0.038)	0.162*** (0.040)		0.190*** (0.038)	0.168*** (0.041)		-0.111** (0.052)	-0.097* (0.054)
Title in process	0.212*** (0.039)	0.146*** (0.052)	0.251*** (0.062)	0.230*** (0.043)	0.167*** (0.058)	0.300*** (0.068)	-0.105** (0.052)	-0.147*** (0.052)
Has inf. certificate	0.218*** (0.040)	-0.070 (0.084)	0.252*** (0.041)	0.285*** (0.038)	0.017 (0.109)	0.315*** (0.040)	-0.007 (0.052)	-0.105** (0.051)
Residential parcel	0.032*** (0.011)	0.137*** (0.035)	0.015 (0.011)	0.038*** (0.011)	0.117*** (0.037)	0.024** (0.012)	-0.024 (0.030)	-0.013 (0.039)
Customary tenure	0.084** (0.034)			-0.009 (0.026)			0.015 (0.065)	0.073 (0.073)
non-response	0.053 (0.207)	-0.070 (0.256)	0.181 (0.296)	-0.058 (0.168)	0.023 (0.214)	-0.141 (0.228)	-0.324 (0.348)	-0.402 (0.282)
R-squared	0.217	0.300	0.179	0.275	0.321	0.171	0.284	0.272
Observations	7,457	1,341	6,116	7,457	1,341	6,116	1,055	811
Dep. var. mean	0.365	0.568	0.320	0.283	0.596	0.215	0.237	0.211
Tests (p-value):								
Title = Inf. cert	0.659	0.009		0.052	0.162			
Title process = Inf. cert.	0.899	0.016	0.967	0.295	0.177	0.855		

Notes: Each column reports results from a parcel-level regression. Dependent variables are responses to questions on whether a parcel can be transferred via bequest (col. 1-3) or sale (col. 4-6). Col. 7 and 8 regress “Woman has a say” in the sample of parcels owned by married households who have transfer rights via either bequest or sale, respectively, on which the questions on gender-differentiated transfer rights are administered only in quarters 3 and 4. Household characteristics, region and survey quarter fixed effects are included. Constant is not reported, and standard errors are clustered at village level. Panel B checks robustness, using a control function approach by controlling for the probability that a sample household not reporting owning land. Significance is denoted by *** for $p < 0.01$, ** for $p < 0.05$, and * for $p < 0.1$.

Table 6: Factors affecting perceived tenure insecurity

	Perception of insecurity			Perception of high insecurity		
	All parcels	State land	Customary land	All parcels	State land	Customary land
Panel A. Baseline regression						
Has title	-0.243*** (0.041)	-0.192*** (0.046)		-0.087*** (0.034)	-0.085** (0.036)	
Title in process	-0.141*** (0.042)	-0.080 (0.060)	-0.176*** (0.057)	-0.113*** (0.031)	-0.089** (0.042)	-0.149*** (0.038)
Has informal certificate	-0.032 (0.036)	-0.154* (0.086)	-0.035 (0.039)	-0.037 (0.030)	0.057 (0.082)	-0.041 (0.029)
Residential parcel	-0.011 (0.011)	-0.073* (0.040)	0.003 (0.011)	0.014 (0.010)	-0.042 (0.031)	0.021** (0.010)
Customary tenure	-0.064** (0.027)			0.042* (0.022)		
R-squared	0.181	0.187	0.189	0.118	0.061	0.135
Panel B. Control function approach						
Has title	-0.243*** (0.041)	-0.190*** (0.046)		-0.087*** (0.034)	-0.082** (0.036)	
Title in process	-0.141*** (0.042)	-0.078 (0.060)	-0.176*** (0.057)	-0.113*** (0.031)	-0.087** (0.042)	-0.149*** (0.038)
Has informal certificate	-0.032 (0.036)	-0.151* (0.085)	-0.035 (0.039)	-0.037 (0.030)	0.061 (0.081)	-0.041 (0.029)
Residential parcel	-0.011 (0.011)	-0.071* (0.040)	0.003 (0.011)	0.014 (0.010)	-0.040 (0.031)	0.021** (0.010)
Customary tenure	-0.065** (0.027)			0.041* (0.022)		
Est. Probability of non-response	-0.123 (0.202)	-0.314 (0.259)	-0.020 (0.275)	-0.116 (0.159)	-0.324 (0.203)	-0.018 (0.220)
R-squared	0.181	0.188	0.189	0.119	0.063	0.135
Observations	7,457	1,341	6,116	7,457	1,341	6,116
Dep. var. mean	0.428	0.395	0.436	0.252	0.198	0.264
Test (p-value):						
Title = Inf. certificate	0.0001	0.673		0.272	0.103	
Title in process = Inf. Cert.	0.043	0.439	0.039	0.077	0.103	0.025

Notes: Each column reports results from a parcel-level regression. Perceived tenure insecurity is the likelihood of involuntarily losing ownership or use rights to land in the next 5 years on a 1-5 scale (with 1 is not at all likely and 5 extremely likely) and tenure perceived to be (very) insecure if the value given is 2 (3) or higher. Household characteristics, region and survey quarter fixed effects are included. Constant is not reported, and standard errors are clustered at village level. Significance is denoted by *** for $p < 0.01$, ** for $p < 0.05$, and * for $p < 0.1$.

Table 7: Factors affecting demand for and willingness to pay for formal title

	Want to apply			Amount willing to pay in logs		
	All	State land	Customary land	All	State land	Customary land
Panel A. Baseline regression						
Tenure insecurity	0.095*** (0.019)	-0.021 (0.037)	0.109*** (0.020)	-0.166** (0.074)	0.002 (0.135)	-0.214*** (0.081)
Residential parcel	-0.015 (0.012)	0.117*** (0.040)	-0.030*** (0.011)	-0.177*** (0.044)	-0.594*** (0.169)	-0.130*** (0.044)
Transferability	0.287*** (0.022)	0.269*** (0.041)	0.277*** (0.023)	0.449*** (0.082)	0.228 (0.164)	0.495*** (0.089)
Title in process	0.040 (0.036)	0.033 (0.044)	0.044 (0.064)	0.271** (0.137)	0.504*** (0.162)	-0.014 (0.189)
Has informal certificate	0.162*** (0.038)	0.076 (0.126)	0.174*** (0.037)	0.348*** (0.123)	0.160 (0.366)	0.280** (0.131)
Customary tenure	0.013 (0.030)			0.202 (0.125)		
R-squared	0.179	0.312	0.168	0.152	0.182	0.158
Panel B. Control function approach						
Tenure insecurity	0.095*** (0.019)	-0.022 (0.037)	0.109*** (0.020)	-0.166** (0.074)	-0.007 (0.134)	-0.214*** (0.081)
Residential parcel	-0.015 (0.011)	0.118*** (0.040)	-0.031*** (0.011)	-0.176*** (0.044)	-0.593*** (0.169)	-0.128*** (0.044)
Transferability	0.287*** (0.021)	0.268*** (0.041)	0.277*** (0.023)	0.448*** (0.082)	0.223 (0.166)	0.493*** (0.089)
Title in process	0.041 (0.037)	0.034 (0.044)	0.041 (0.065)	0.272** (0.137)	0.506*** (0.162)	-0.008 (0.189)
Has informal certificate	0.164*** (0.038)	0.077 (0.126)	0.177*** (0.037)	0.345*** (0.122)	0.155 (0.367)	0.274** (0.130)
Customary tenure	0.008 (0.031)			0.207 (0.126)		
Est. Probability of non-response	-0.345 (0.261)	-0.126 (0.350)	-0.499 (0.315)	0.585 (0.912)	-0.746 (1.374)	1.261 (1.163)
R-squared	0.180	0.312	0.170	0.153	0.183	0.159
Observations	6,793	818	5,975	3,304	484	2,820
Dep. var. mean	0.486	0.592	0.472	5.702	6.030	5.646
Test (p-value):						
Title in process = Inf. cert.	0.014	0.754	0.060	0.647	0.372	0.158

Notes: Each column reports results from a parcel-level regression that includes all parcels without a formal title (col 1-3) and for parcels for which a title is desired (col 4-6). “Title in process” means that a parcel has invitation to treat or survey plan – i.e., title is incomplete. Household characteristics, region and survey quarter fixed effects are included. Constant is not reported, and standard errors are clustered at village level. Significance is denoted by *** for $p < 0.01$, ** for $p < 0.05$, and * for $p < 0.1$.

Table 8: Links between formal land rights and documentation using Prindex data

	Bequeath	Transfer within hh	Sell	Rent	Use as collateral
Has formal document	0.004 (0.048)	0.029 (0.044)	0.054 (0.059)	0.022 (0.048)	0.012 (0.050)
Has informal document	0.049 (0.045)	0.017 (0.056)	0.024 (0.057)	0.029 (0.046)	-0.123** (0.060)
Residential land only	-0.031 (0.045)	0.033 (0.044)	0.019 (0.054)	0.012 (0.048)	0.062 (0.054)
R-squared	0.106	0.121	0.126	0.124	0.210
Dep. var. Mean	0.868	0.856	0.776	0.850	0.762
Observations	575	575	575	575	575

Notes: Each column reports results from a separate regression using a linear probability model where the dependent variable is a zero-one indicator on whether or not the owner can decide on bequest of land, its *inter vivos* transfer to other household members, sale, rent, or use as collateral. All columns include respondent and household characteristics as in other tables, regional and provincial dummies, as well as parcel dummy of being a second property. Constant term is not reported, and standard errors clustered at local area level. Statistical significance is denoted by *** for $p < 0.01$, ** for $p < 0.05$, and * for $p < 0.1$.

Table A1: Sample difference in household characteristics between those reporting owning land and those of non-response

	Total	Reported own/use land	No response	Difference
Household size	5.167	5.341	4.787	***
No. of adults	2.441	2.556	2.186	***
Share completed high school	0.334	0.343	0.312	***
Share working for salary	0.252	0.283	0.182	***
Share self-employed	0.231	0.245	0.201	***
Share unemployed	0.277	0.275	0.282	
Dwelling: Traditional hut	0.436	0.396	0.522	***
Dwelling: Traditional house	0.280	0.271	0.298	**
Dwelling: Detached house	0.253	0.295	0.161	***
Dwelling: Flat/apartment	0.032	0.037	0.019	***
No. of rooms	3.050	3.151	2.827	***
Electricity access	0.156	0.192	0.079	***
Access to tap water	0.165	0.202	0.084	***
Own dwelling	0.968	0.953	1.000	***
Household head characteristics:				
Male	0.717	0.726	0.699	**
Age	45.203	46.739	41.829	***
Married	0.704	0.707	0.698	
Separated	0.111	0.104	0.127	***
Widowed	0.151	0.163	0.126	***
No education	0.173	0.182	0.155	***
Completed primary school	0.264	0.256	0.283	**
Completed high school	0.433	0.418	0.468	***
College or higher	0.129	0.145	0.094	***
Self-employed	0.641	0.596	0.739	***
... self-employed: farming	0.699	0.697	0.702	
... self-employed: non-farming	0.301	0.303	0.297	
Work for salary	0.359	0.404	0.261	***
Rural/Urban and provinces:				
Rural	0.779	0.758	0.827	***
Central	0.084	0.075	0.105	***
Copperbelt	0.109	0.127	0.069	***
Eastern	0.123	0.156	0.050	***
Luapula	0.095	0.050	0.193	***
Lusaka	0.083	0.100	0.045	***
Muchinga	0.095	0.091	0.106	**
Northern	0.114	0.107	0.127	**
North Western	0.091	0.078	0.120	***
Southern	0.107	0.116	0.087	***
Western	0.100	0.100	0.098	
Number of households	7,113	4,888	2,225	

Notes: Own computation from 2017/18 Quarterly Labor Force Survey conducted by Zambia's Central Statistical Office. Stars indicate t-tests for significance of differences in mean values for the two categories: * for sig. at 10%, ** for sig. at 5% and *** for sig. at 1%. To deal with non-response bias, we exclude the households that are not reporting owning or using land and are renters or obtaining free dwelling from companies.

Table A2: Results from first-stage regressions to account for non-response

	Likelihood of non-response		
	EA FE	Constituency FE	Province FE
Head's age	-1.368*** (0.119)	-1.260*** (0.100)	-1.152*** (0.093)
Male head	-0.500*** (0.120)	-0.350*** (0.104)	-0.320*** (0.096)
Married head	0.264** (0.122)	0.099 (0.105)	0.062 (0.097)
Head completed high school	0.131 (0.102)	0.051 (0.086)	0.056 (0.081)
Head completed college or higher	0.150 (0.160)	0.087 (0.137)	0.154 (0.128)
Head in farming	-0.357*** (0.104)	-0.462*** (0.083)	-0.463*** (0.076)
Share with high schooleducation	-0.017 (0.187)	0.131 (0.157)	0.092 (0.146)
Share with salary	-0.312** (0.154)	-0.708*** (0.128)	-0.792*** (0.120)
Share self-employed	-0.753*** (0.127)	-0.659*** (0.103)	-0.404*** (0.090)
Share unemployed	0.397*** (0.131)	0.390*** (0.110)	0.398*** (0.103)
Dwelling: traditional hut	-0.047 (0.098)	-0.176** (0.079)	-0.260*** (0.070)
Dwelling: detached house	-0.331** (0.137)	-0.477*** (0.111)	-0.536*** (0.098)
Dwelling: flat	0.060 (0.304)	-0.101 (0.235)	-0.129 (0.209)
Total no. of rooms	-0.138*** (0.034)	-0.023 (0.024)	-0.018 (0.022)
Electricity access	-0.368* (0.212)	-0.357** (0.161)	-0.284* (0.147)
Tap water access	-0.352* (0.212)	-0.541*** (0.144)	-0.432*** (0.128)
Pseudo-R	0.0720	0.0611	0.0535
Log Lik.	-2065	-3182	-3846
No. of enumeration areas	345		
No. of constituencies		140	
No. of provinces			10
No. of observations	5,256	6,756	7,113

Notes: Fixed effects logit model is used to predict the probability of a sample household reporting owning or using land, excluding the households that are not reporting owning or using land and are renters or obtaining free dwelling from companies. Due to enumeration areas (EAs) containing all observations of reporting owning land or all of non-response, higher levels – of Constituencies and Provinces – fixed effects logit models are conducted to generate predicted probability of responding for each of households that are in the EAs having all reporting owing land. Based on the desirability of parametrizing the model on the association between responses on land use/own and non-responses, the point estimates should not be interpreted as causal relationship.

References:

- Abraham, K. G., E. Filiz-Ozbay, E. Y. Ozbay and L. J. Turner. 2018. "Framing Effects, Earnings Expectations, and the Design of Student Loan Repayment Schemes." National Bureau of Economic Research, Inc, NBER Working Papers: 24484.
- Adams, M. 2003. "Land Tenure Policy and Practice in Zambia: Issues Relating to the Development of the Agricultural Sector." Mokoro Ltd, Oxford.
- Adelman, S. and A. Peterman. 2014. "Resettlement and Gender Dimensions of Land Rights in Post-Conflict Northern Uganda." *World Development*, **64**, 583-596.
- Alden Wily, L. 2011. "Land Reform in Africa: A Reappraisal." Rights and resources initiative, Washington DC.
- Alden Wily, L. 2018. "Collective Land Ownership in the 21st Century: Overview of Global Trends." *Land*, **7**(2), 68.
- Ali, D. A., K. Deininger and M. Goldstein. 2014. "Environmental and Gender Impacts of Land Tenure Regularization in Africa: Pilot Evidence from Rwanda." *Journal of Development Economics*, **110**(0), 262-275.
- Ali, D. A., et al. 2016. "Small Price Incentives Increase Women's Access to Land Titles in Tanzania." *Journal of Development Economics*, **123**, 107-122.
- Ali, D. A., K. Deininger and M. Duponchel. 2017. "New Ways to Assess and Enhance Land Registry Sustainability: Evidence from Rwanda." *World Development*, **99**, 377-394.
- Andolfatto, D. 2002. "A Theory of Inalienable Property Rights." *Journal of Political Economy*, **110**(2), 382-393.
- Arrunada, B. 2009. *Building Market Institutions: Property Rights, Business Formalization, and Economic Development*. University of Chicago press, Chicago.
- Baland, J. M. and P. Francois. 2005. "Commons as Insurance and the Welfare Impact of Privatization." *Journal of Public Economics*, **89**(2-3), 211-231.
- Bandiera, O. 2007. "Land Tenure, Investment Incentives, and the Choice of Techniques: Evidence from Nicaragua." *World Bank Economic Review*, **21**(3), 487-508.
- Berry, S. 2009. "Property, Authority and Citizenship: Land Claims, Politics and the Dynamics of Social Division in West Africa." *Development and Change*, **40**(1), 23-45.
- Besley, T. 1995. "Property Rights and Investment Incentives: Theory and Evidence from Ghana." *Journal of Political Economy*, **103**(5), 903-937.
- Besley, T. and M. Ghatak. 2010. "Property Rights and Economic Development." in M. R. Rosenzweig and D. Rodrik (eds.), *Handbook of Economic Development Vol 5*, Elsevier, Oxford and Amsterdam.
- Bharadwaj, P., W. Jack and T. Suri. 2019. "Fintech and Household Resilience to Shocks: Evidence from Digital Loans in Kenya." *National Bureau of Economic Research Working Paper Series*, No. **25604**.
- Boamah, F. 2014. "How and Why Chiefs Formalise Land Use in Recent Times: The Politics of Land Dispossession through Biofuels Investments in Ghana." *Review of African Political Economy*, **41**(141), 406-423.
- Boone, C. 2017. "Legal Empowerment of the Poor through Property Rights Reform: Tensions and Trade-Offs of Land Registration and Titling in Sub-Saharan Africa." World Institute for Development Economic Research (UNU-WIDER), WIDER Working Paper Series: 037.
- Brits, A. M., C. Grant and T. Burns. 2002. "Comparative Study of Land Administration Systems with Special Reference to Thailand, Indonesia and Karnataka (India)." *World Bank Regional Land Workshop in Phnom Penh, Cambodia*.
- Bruce, J. W. and S. E. Migot-Adholla. 1994. *Searching for Land Tenure Security in Africa*. Kendall/Hunt Publishers, Dubuque, IA.
- Carter, M. R. and P. Olinto. 2003. "Getting Institutions "Right" for Whom? Credit Constraints and the Impact of Property Rights on the Quantity and Composition of Investment." *American Journal of Agricultural Economics*, **85**(1), 173-186.
- Chapoto, A., T. S. Jayne and N. M. Mason. 2011. "Widows' Land Security in the Era of Hiv/Aids: Panel Survey Evidence from Zambia." *Economic Development and Cultural Change*, **59**(3), 511-547.
- Chen, C. 2017. "Untitled Land, Occupational Choice, and Agricultural Productivity." *American Economic Journal: Macroeconomics*, **9**(4), 91-121.
- Chernina, E., P. Castaneda Dower and A. Markevich. 2014. "Property Rights, Land Liquidity, and Internal Migration." *Journal of Development Economics*, **110**, 191-215.
- Chitonge, H. 2016. "Zambia at 50: The Persisting Challenges of Economic Structural Transformation." *Development Southern Africa*, **33**(6), 790-805.
- de Janvry, A., K. Emerick, M. Gonzalez-Navarro and E. Sadoulet. 2015. "Delinking Land Rights from Land Use: Certification and Migration in Mexico." *American Economic Review*, **105**(10), 3125-3149.
- De Meza, D. and J. Gould. 1992. "The Social Efficiency of Private Decisions to Enforce Property Rights." *Journal of Political Economy*, **100**(3), 561-580.
- Deininger, K. 2003. *Land Policies for Growth and Poverty Reduction*. World Bank Policy Research Report series. Washington, D.C.: World Bank; Oxford and New York: Oxford University Press.
- Deininger, K. and R. Castagnini. 2006. "Incidence and Impact of Land Conflict in Uganda." *Journal of Economic Behavior & Organization*, **60**(3), 321-345.
- Deininger, K. and S. Jin. 2006. "Tenure Security and Land-Related Investment: Evidence from Ethiopia." *European Economic Review*, **50**(5), 1245-1277.
- Deininger, K., D. A. Ali, S. Holden and J. Zevenbergen. 2008. "Rural Land Certification in Ethiopia: Process, Initial Impact, and Implications for Other African Countries." *World Development*, **36**(10), 1786-1812.

- Deininger, K., D. A. Ali and T. Alemu. 2011. "Impacts of Land Certification on Tenure Security, Investment, and Land Market Participation: Evidence from Ethiopia." *Land Economics*, **87**(2), 312-334.
- Deininger, K. and A. Goyal. 2012. "Going Digital: Credit Effects of Land Registry Computerization in India." *Journal of Development Economics*, **99**(2), 236-243.
- Deininger, K., A. Goyal and H. K. Nagarajan. 2013. "Women's Inheritance Rights and Intergenerational Transmission of Resources in India." *Journal of Human Resources*, **48**(1), 114-141.
- Deininger, K., X. Fang, S. Jin and H. K. Nagarajan. 2014. "Inheritance Law Reform, Empowerment, and Human Capital Accumulation: Second-Generation Effects from India." *Policy Research Working Paper 7086*, World Bank, Washington DC.
- Deininger, K., F. Xia and S. Holden. 2019. "Gendered Incidence and Impacts of Tenure Insecurity on Agricultural Performance in Malawi's Customary Tenure System." *The Journal of Development Studies*, **55**(4), 597-619.
- Deininger, K. W., F. Xia and S. T. Holden. 2017. "Gender-Differentiated Impacts of Tenure Insecurity on Agricultural Performance in Malawi's Customary Tenure Systems." The World Bank, Policy Research Working Paper Series: 7943.
- Dillon, B. and A. Voena. 2018. "Widows' Land Rights and Agricultural Investment." *Journal of Development Economics*, **135**, 449-460.
- Do, Q. T. and L. Iyer. 2008. "Land Titling and Rural Transition in Vietnam." *Economic Development and Cultural Change*, **56**(3), 531-579.
- Eck, K. 2014. "The Law of the Land: Communal Conflict and Legal Authority." *Journal of Peace Research*, **51**(4), 441-454.
- Emran, M. S. and F. Shilpi. 2017. "Land Market Restrictions, Women's Labour Force Participation and Wages in a Rural Economy." *Oxford Bulletin of Economics and Statistics*, **79**(5), 747-768.
- FAO, The World Bank and UN-Habitat. 2018. "Measuring Individuals' Rights to Land: An Integrated Approach to Data Collection for SDG Indicators 1.4.2 and 5.a.1." Washington, DC.
- Feder, G., Y. Chalamwong, T. Onchan and C. Hongladarom. 1988. *Land Policies and Farm Productivity in Thailand*. Johns Hopkins University Press, Baltimore and London.
- Fenske, J. 2011. "Land Tenure and Investment Incentives: Evidence from West Africa." *Journal of Development Economics*, **95**(1), 137-156.
- Fetzer, T. and S. Marden. 2017. "Take What You Can: Property Rights, Contestability and Conflict." *Economic Journal*, **127**(601), 757-783.
- Field, E. 2007. "Entitled to Work: Urban Property Rights and Labor Supply in Peru." *Quarterly Journal of Economics*, **122**(4), 1561-1602.
- Foellmi, R., S. Legge and L. Schmid. 2016. "Do Professionals Get It Right? Limited Attention and Risk-Taking Behaviour." *Economic Journal*, **126**(592), 724-755.
- Gal, Y. and A. Gal. 2014. "Knowledge Bias: Is There a Link between Students' Feedback and the Grades They Expect to Get from the Lecturers They Have Evaluated? A Case Study of Israeli Colleges." *Journal of the Knowledge Economy*, **5**(3), 597-615.
- Galiani, S. and E. Scharrodsky. 2004. "Effects of Land Titling on Child Health." *Economics and Human Biology*, **2**(3), 353-372.
- Galiani, S. and E. Scharrodsky. 2010. "Property Rights for the Poor: Effects of Land Titling." *Journal of Public Economics*, **94**(9-10), 700-729.
- Galiani, S. and E. Scharrodsky. 2016. "The Deregularization of Land Titles." National Bureau of Economic Research, Inc, NBER Working Papers: 22482.
- Galiani, S., et al. 2017. "Shelter from the Storm: Upgrading Housing Infrastructure in Latin American Slums." *Journal of Urban Economics*, **98**, 187-213.
- German, L., G. Schoneveld and E. Mwangi. 2013. "Contemporary Processes of Large-Scale Land Acquisition in Sub-Saharan Africa: Legal Deficiency or Elite Capture of the Rule of Law?" *World Development*, **48**(0), 1-18.
- Goldstein, M. P., et al. 2015. "Formalizing Rural Land Rights in West Africa: Early Evidence from a Randomized Impact Evaluation in Benin." The World Bank, Policy Research Working Paper Series: 7435.
- Greif, A. 1993. "Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition." *American Economic Review*, **83**(3), 525-548.
- Greiner, C. 2017. "Pastoralism and Land-Tenure Change in Kenya: The Failure of Customary Institutions." *Development and Change*, **48**(1), 78-97.
- Guiringer, C. and J.-P. Platteau. 2014. "The Effect of Land Scarcity on Farm Structure: Empirical Evidence from Mali." *Economic Development and Cultural Change*, **62**(2), 195-238.
- Hong, H. and I. Liskovich. 2015. "Crime, Punishment and the Halo Effect of Corporate Social Responsibility." National Bureau of Economic Research, Inc, NBER Working Papers: 21215.
- Hopkins, D. J. and J. Mummolo. 2017. "Assessing the Breadth of Framing Effects." *Quarterly Journal of Political Science*, **12**(1), 37-57.
- Jacoby, H. and B. Minten. 2007. "Is Land Titling in Sub-Saharan Africa Cost Effective? Evidence from Madagascar." *World Bank Economic Review*, **21**(3), 461-485.
- Jacoby, H. G., G. Li and S. Rozelle. 2002. "Hazards of Expropriation: Tenure Insecurity and Investment in Rural China." *American Economic Review*, **92**(5), 1420-1447.
- Joireman, S. F. 2008. "The Mystery of Capital Formation in Sub-Saharan Africa: Women, Property Rights and Customary Law." *World Development*, **36**(7), 1233-1246.
- Kumar, N. and A. Quisumbing. 2012. "Inheritance Practices and Gender Differences in Poverty and Well-Being in Rural Ethiopia." *Development Policy Review*, **30**(5), 573-595.

Kumar, N. and A. R. Quisumbing. 2015. "Policy Reform toward Gender Equality in Ethiopia: Little by Little the Egg Begins to Walk." *World Development*, **67**, 406-423.

Larson, A. 2014. Land Market Integration, Structural Change, and Smallholder Farming in Zambia, University of Minnesota.

Lawry, S., et al. 2016. "The Impact of Land Property Rights Interventions on Investment and Agricultural Productivity in Developing Countries: A Systematic Review." *Journal of Development Effectiveness*, 1-21.

Libecap, G. D. 2018. "Property Rights to Frontier Land and Minerals: Us Exceptionalism." National Bureau of Economic Research, Inc, NBER Working Papers: 24544.

Melesse, M. B. and E. Bulte. 2015. "Does Land Registration and Certification Boost Farm Productivity? Evidence from Ethiopia." *Agricultural Economics*, **46**(6), 757-768.

Merten, S. and T. Haller. 2008. "Property Rights, Food Security and Child Growth: Dynamics of Insecurity in the Kafue Flats of Zambia." *Food Policy*, **33**(5), 434-443.

Muchomba, F. M. 2017. "Women's Land Tenure Security and Household Human Capital: Evidence from Ethiopia's Land Certification." *World Development*, **98**, 310-324.

Ng'ombe, A., R. Keivani, M. Mattingly and M. Stubbs. 2014. "Impacts of Privatization of Customary Land Rights in Zambia: A Comparative Study of Rural and Peri-Urban Locations." *International Journal of Urban and Regional Research*, **38**(6), 1985-2007.

North, D. C. 1971. *Structure and Change in Economic History*. W.W. Norton, New York.

Peterman, A. 2012. "Widowhood and Asset Inheritance in Sub-Saharan Africa: Empirical Evidence from 15 Countries." *Development Policy Review*, **30**(5), 543-571.

Pinckney, T. C. and P. K. Kimuyu. 1994. "Land Tenure Reform in East Africa: Good, Bad or Unimportant?" *Journal of African Economies*, **3**(1), 1-28.

Promsopha, G. 2018. "Risk-Coping, Land Tenure and Land Markets: An Overview of the Literature." *Journal of Economic Surveys*, **32**(1), 176-193.

Proto, E. and D. Sgroi. 2017. "Biased Beliefs and Imperfect Information." *Journal of Economic Behavior and Organization*, **136**, 186-202.

Pycroft, J., M. Musepa, F. Ndilila and S. Robinson. 2014. "Agriculture and Land." in C. S. Adam, et al. (eds.), *Zambia: Building Prosperity from Resource Wealth*, Africa: Policies for Prosperity Series. Oxford and New York: Oxford University Press.

Restuccia, D. and R. Santaaulalia-Llopis. 2015. "Land Misallocation and Productivity." University of Toronto, Department of Economics, Working Papers.

Roth, M. 1995. "Land Tenure, Land Markets, and Institutional Transformation in Zambia." *LTC Reserach Paper 124*, Land Tenure Center, University of Wisconsin, Madison, WI.

Rozelle, S. and J. F. M. Swinnen. 2004. "Success and Failure of Reform: Insights from the Transition of Agriculture." *Journal of Economic Literature*, **42**(2), 404-456.

Sitko, N. J., J. Chamberlin and M. Hichaambwa. 2014. "Does Smallholder Land Titling Facilitate Agricultural Growth?: An Analysis of the Determinants and Effects of Smallholder Land Titling in Zambia." *World Development*, **64**, 791-802.

Sitko, N. J. and T. S. Jayne. 2014. "Structural Transformation or Elite Land Capture? The Growth of "Emergent" Farmers in Zambia." *Food Policy*, **48**(0), 194-202.

Sjaastad, E. and D. Bromley. 2000. "The Prejudices of Property Rights: On Individualism, Specificity. And Security in Property Regimes." *Development Policy Review*, **18**(4), 365-389.

Smith, R. E. 2004. "Land Tenure, Fixed Investment, and Farm Productivity: Evidence from Zambia's Southern Province." *World Development*, **32**(10), 1641-1661.

Stubbs, T., L. King and D. Stuckler. 2014. "Economic Growth, Financial Crisis, and Property Rights: Observer Bias in Perception-Based Measures." *International Review of Applied Economics*, **28**(3), 400-417.

Valsecchi, M. 2014. "Land Property Rights and International Migration: Evidence from Mexico." *Journal of Development Economics*, **110**, 276-290.

Zepeda, G. 2000. "Transformación Agraria. Los Derechos De Propriedad En El Campo Mexicano Bajo El Nuevo Marco Institucional." *CIOAC, Mexico*.